



Akoustis Technologies, Inc.

Second Quarter Fiscal 2021 Business Update Conference Call

February 1, 2021

CORPORATE PARTICIPANTS

Thomas Sepenzis, *Vice President, Corporate Development & Director of Investor Relations*

Jeffrey Shealy, *Founder, Chief Executive Officer, & Director*

Kenneth Boller, *Interim Chief Financial Officer*

David Aichele, *Executive Vice President, Business Development*

CONFERENCE CALL PARTICIPANTS

Suji Desilva, *ROTH Capital Partners*

Harsh Kumar, *Piper Sandler*

Anthony Stoss, *Craig-Hallum*

Rick Schafer, *Oppenheimer*

Cody Acree, *Loop Capital*

PRESENTATION

Operator

Good day, ladies and gentlemen, and welcome to the Akoustis Technologies Business Update Conference Call.

As a reminder, this conference call is being recorded. At the conclusion of the Company presentation, Akoustis Management will take questions. To ask a question, please press star, one on your keypad to be placed into the queue. A replay of the call will be available on the Investor Relations section of the Akoustis website.

It is now my pleasure to introduce Tom Sepenzis, Director of Investor Relations. Thank you. You may begin.

Thomas Sepenzis

Thank you, Operator, and good morning to everyone on the call. Welcome to Akoustis Second Quarter Fiscal 2021 Business Update Conference Call.

We are joined today by our Founder and CEO, Jeff Shealy; Interim CFO, Ken Boller; and EVP of Business Development, Dave Aichele.

Before we begin, please note that today's presentation includes forward-looking statements about our business outlook. All statements, other than statements of historical facts, included during this conference call, including statements regarding our strategies, operations, costs, plans, and objectives, including the timing and prospect of product development and customer orders, our expectations regarding achieving design wins from current and future customers, the possibility of entering into collaborative or partnering relationships, potential impacts of the COVID-19 pandemic, and guidance regarding expected revenue, product orders, and milestones for the current and future fiscal quarters, are forward-looking statements.

Such forward-looking statements are predictions based on the Company's expectations as of today and are subject to numerous risks and uncertainties. The Company and our management team assume no obligations to update any forward-looking statements made on today's call. Our SEC filings mention important factors that could cause actual results to differ materially. Please refer to our latest Form 10-K and Form 10-Q filed with the SEC to get a better understanding of those risks and uncertainties.

In addition, our presentation today will also refer to certain non-GAAP financial measures. A reconciliation of these measures to the most directly comparable GAAP measure is presented in our earnings call highlight release, available in the Investors section of akoustis.com.

I would now like to turn over the call to Jeff Shealy, Founder and CEO of Akoustis.

Jeffrey Shealy

Thank you, Tom, and welcome, everyone, to our 2021 Second Fiscal Quarter Business Update Call.

We ended the calendar year with another strong quarter, exceeding our original guidance by 30% with revenue of \$1.3 million, our highest quarterly revenue to date in our core chip business driven by XBAW filters and filter related revenue. Revenue increased over 100% quarter-over-quarter in December as we generated revenue from each of our major commercial markets, including Wi-Fi, 5G network infrastructure, 5G mobile devices, and defense. We now have 15 commercial XBAW filters in our product catalog with many more planned. Our production ramp with our first Wi-Fi 6 customer has been a great success and we delivered additional filters to our Tier 1 5G network infrastructure customer in the December quarter.

We expect additional success throughout calendar 2021 as we layer in new products and customers across our focus markets. We also call for the redemption of \$10 million of our convertible debt in the December quarter, and last week, we announced that we have delivered notice of the redemption for the remaining \$15 million to our existing note holders. This will retire all convertible debt remaining on the balance sheet and put Akoustis on a more sound financial footing. Our outlook remains confident as we continue to execute across multiple markets with the opportunity to deliver significant top and bottom line revenue and earnings growth for years to come.

We currently expect to report strong revenue growth in the March quarter in the range of \$2.0 million to \$2.5 million or up 70% at the midpoint. We are fully booked to the midpoint of our revenue target for the March quarter. The increase will be driven by our current Wi-Fi 6 customer, shipments to our Tier 1 5G small cell network infrastructure customer, initial shipments of our new 5G mobile filters to two of our three announced 5G mobile customers, engineering revenue from multiple 5G RF front end customers, network infrastructure providers, and our recently announced DARPA contract.

I would now like to provide a quick update on the impact of COVID-19 on our business end markets. We continue to employ precautionary steps including selective remote work authorization and worksite isolation from outside visitors. The incredible flexibility afforded by our in-house manufacturing model in the current environment has allowed us to continue to develop and ship our products with minimal impact.

During the pandemic, Akoustis has continued to operate with all key personnel as an essential business in both New York and North Carolina, and we continue to accelerate product development consistent with our strategic roadmap. We greatly appreciate our employees and value their flexibility and discipline staying safe during this challenging time. It is difficult to predict how or if the ongoing pandemic will impact our customers' future production ramp timing, or if we will be impacted by any supply chain disruptions going forward.

Currently, we are experiencing a normalization of demand across our product markets, including Wi-Fi, especially given the emerging Wi-Fi 6E standard, and the demand for high IQ micro Akoustis ball filters that can address these new high frequencies.

I would now like to address our business performance by market segment beginning with 5G mobile. The December quarter was our most significant quarter to date in 5G mobile, as we added not one but two new customers who plan to incorporate our XBAW filters in upcoming products targeting 5G handsets. The two new customers are in addition to the existing Tier 1 RF module maker that we have been working with for over a year. The mobile handset market is our largest potential BAW filter market opportunity by both unit volume and revenue and we continue to see a broad increase in interest and activity in our XBAW filters for the mobile market.

In fact, our XBAW filters have already been evaluated by several leading Tier 1 and Tier 2 mobile handset OEMs. As we have previously mentioned, entering the Tier 1 handset market in the near term would require a partner. However, we believe with our previously announced 500% capacity expansion of our New York fab, which we expect to complete by this June, that we will have the wherewithal to enter the handset market servicing our recently announced new RF customers and/or several Tier 2 handset OEMs without a partner.

Given the substantial interest in sales funnel activity for both our 5G mobile and Wi-Fi 6E filters, we're planning to further expand our New York fab by doubling again our capacity by the end of calendar 2021 to support the ramp expectations of multiple 5G handset and Wi-Fi 6E customers in calendar 2022 and beyond. With respect to our first Tier 1 mobile customer, we have remained actively engaged and are currently developing new 5G XBAW filters for testing and approval, which is expected in the first half of calendar 2021. We shipped initial samples of our XBAW filters to this customer in the second half of calendar 2020 and are currently executing against open purchase orders.

Our second RF module customer, which we announced in early November, is moving quickly to develop a module for mobile applications using our XBAW filters. The customer's product is expected to be available for sale by the end of calendar 2021. I am happy to report today that we successfully completed the first filter design for this customer in the December quarter, which was one of our stated milestones, and this new design is currently running through our New York wafer fab.

Finally, in mid-December, we announced a third Tier 1 RF solution customer. We are currently developing 5G mobile XBAW filters for this customer with the goal of entering commercial production in calendar 2022. Given early discussions with this customer, we believe our engagement may expand to include multiple filters per multiple bands in both 5G and Wi-Fi modules. As this customer sells into multiple handset OEMs, we expect that this customer could become a significant contributor to both filter volume and revenue in calendar 2022 and beyond. We currently expect to complete the first filter design and provide early engineering samples for this customer in the upcoming June quarter.

As we have discussed previously, we have dedicated engineering resources to the development of advanced chip scale packaging and wafer level chip scale packaging or WLCSP to address the next generation of 5G products. One of our stated milestones for the December quarter was to deliver our first fully qualified CSP flip chip solution.

I am pleased to announce today that the WLCSP process flow is now locked, and we expect to complete technology qualification next month. Once qualified in release, we will be able to address the mobile market across our entire product line given the significantly smaller footprint of our new package solutions, which offer a one-to-one ratio to the size of the XBAW die.

To summarize our 5G mobile activity, we have multiple customer funded filters in design. We have announced three customer engagements, two tier 1 RF component companies, and one leading RF front end module maker, and all three customer engagements are active with either the design or manufacturing teams within our Company.

And finally, we have just completed the development of our first chip scale package and have additional designs slated for completion in the first half of calendar 2021.

I will now discuss our achievements in Wi-Fi. We announced last week that we have successfully design locked our tandem 5.5 gigahertz and 6.5 gigahertz BAW micro filter solutions for Wi-Fi 6E. The designs are breakthrough and very challenging given their wide bandwidth requirement, which is nearly 10 times wider than our first 5.2 gigahertz product for the Wi-Fi 6 market.

Further, it requires the development of high-performance piezoelectric materials, and the associated modeling design kits to engineer these filter solutions. Clearly this was one of the most important milestones we set for the December quarter as the enormous momentum in Wi-Fi 6E continues to build both in the U.S. and worldwide as other countries are making room for extended Wi-Fi above 5.9 gigahertz.

Wi-Fi 6E is emerging as one of our largest opportunities driven by the rapid release and adoption of Wi-Fi 6E CPE and evidence that handset OEMs are planning to incorporate the new 6E frequencies in 5G mobile devices. The new filters will now be able to target the router, cable set top box and other CPE markets as well as the future 5G enabled mobile device market likely making the Wi-Fi 6E market significantly larger than the current Wi-Fi 6 market by both volume and revenue.

We have multiple active engagements in OEMs, ODMs, SOC makers, and channel partners for Wi-Fi 6 and now Wi-Fi 6E. We are now in the advanced stages of the sales cycle with several customers for Wi-Fi 6E and expect additional design wins in the coming months. Specifically, last week, we announced a volume order from our first 5.5, 6.5 gigahertz tandem Wi-Fi 6E solution from a new Tier 1 customer. The orders for multiple user, multiple in, multiple out, or MU-MIMO consumer focused router using multiple 5.5 and 6.5 gigahertz XBAW filters. The customer expects to ramp this platform in the second half of calendar 2021.

In the December quarter, we revised and improved our custom Wi-Fi 6E filters for one of our two announced Tier 1 enterprise class customers and delivered volume prototypes for their engineering builds. Both customers intend to use our standard 5.5 and 6.5 gigahertz XBAW filter product, which we designed locked last week. We remain on track with both customers and expect both to enter production once the respective product qualifications are complete.

Our Wi-Fi 6 XBAW filter solutions entered the commercial router market in the December quarter, as our high-profile Tier 1 consumer focus customer began shipping finished products. The filters are being used in a tri-bin MU-MIMO mesh router with multiple XBAW filters per device. Feedback from the customer

continues to be extremely positive and discussions are already underway with increased unit expectations for next year.

In addition, we have provided this customer samples of our standard Wi-Fi 6E, 5.5 and 6.5 gigahertz filters for potential use in future Wi-Fi 6E platforms. We have met all delivery expectations for our 5.2 and 5.6 gigahertz filters, and I'm personally very proud of our design and operation teams that have successfully managed this first significant commercial production ramp during a pandemic.

During the December quarter, we announced the addition of two new design wins with new Wi-Fi 6 customers. The first design win announced during the quarter is for a gateway router product that will use multiple Wi-Fi 6 XBAW filters for a MU-MIMO product. It is expected that this product will begin its production ramp late in the June 2021 quarter. The second Wi-Fi 6 design win announced in the December quarter is from another new customer, which intends to use the 5.2, 5.6 gigahertz XBAW coexistence filters for a Wi-Fi bridge product and is expected to enter production in the second half of calendar 2021.

As Wi-Fi is rapidly becoming one of our largest opportunities, I want to highlight that Akoustis is one of the first to market with both the 5.5 and 6.5 gigahertz BAW micro filter solutions for the rapidly developing Wi-Fi 6E market, which we believe will expand significantly in calendar 2022 and beyond as 5G mobile device makers begin to incorporate the new Wi-Fi 6E standard in smartphones, tablets, laptops, and other devices. To be clear, we believe that Wi-Fi 6E will drive significant filter revenue and unit growth beginning in the current calendar year with significant growth in 2022 and beyond.

To summarize our Wi-Fi activity, we have four completed XBAW Wi-Fi filters, two for Wi-Fi 6, and two for Wi-Fi 6E. We have announced three design wins in Wi-Fi 6, one of which is already in a commercially available tri-band mesh router. We have announced two Wi-Fi 6E customers that are using our standard 5.5, 6.5 gigahertz solutions. We have signed a strategic purchase agreement and are building multiple custom 6E filters for a third enterprise class customer, and finally, we have over 15 customer engagements in Wi-Fi 6E, 10 of which have already placed prototype purchase orders.

Next, I would like to discuss the opportunities in 5G network infrastructure. Wide bandwidth, high power handling, low insertion loss, and high out of band rejection are the core filter performance requirements for 5G network infrastructure. Akoustis is ideally positioned to grow with market share in this segment, given our small form factors filter solutions and our growing portfolio of RF filters above 3 gigahertz, where 5G is being deployed worldwide. We are currently designing and/or shipping filters in three main segments of the 5G infrastructure market including small cell base stations, macro base stations, and citizens broadband radio service or CBRS equipment.

Additionally, we are watching closely the ongoing FCC C-band auction for 3.7 to 3.98 gigahertz spectrum, which thus far has garnered more than \$80 billion in gross bids. This will create yet another 5G network infrastructure opportunity for Akoustis, and we expect to demonstrate XBAW filters addressing this new spectrum in the first half of calendar 2021.

We continue to ship XBAW filters to our Tier 1 5G small cell network infrastructure customer in support of this initial ramp. We have shipped a total of four filters to this customer and have received three design wins. The production ramp with this customer is presently slower than previously expected given operator driven network deployment and timing changes, but we continue to expect to ramp up production with multiple filters with this customer in the current year.

We are currently on track to begin ramping our second small cell 5G network infrastructure customer with volume shipments in the first half of calendar 2021. The citizens broadband radio service or CBRS has emerged as a new market for Akoustis after the spectrum auctions that occurred this past summer. We

continue to believe that the successful utilization of the CBRS bands within the 5G network will require a significant amount of high frequency filters and recent customer design activity appears to support our thesis.

We locked the design of our first 3.6 gigahertz CBRS XBAW filter in March of 2020 and announced our first order from a distributor in the September quarter to support promotion and customer engagements. In the December quarter, we received our first order from a leading wide area network equipment provider for both CBRS infrastructure and customer premise equipment. We understand that this customer remains on track to begin commercial ramp in the second half of calendar 2021.

Furthermore, we're currently engaged with over 10 SOC OEM and ODM makers for the development of CBRS networks using 5G and expect to have additional design wins in calendar 2021 and beyond. One of our milestones for the December quarter was to complete the development of a macro base station filter for our first Tier 1 customer and design lock the product. We successfully delivered a new high performance filter design to this customer at the end of November and will update investors on the progress with this customer when possible.

To summarize our 5G network infrastructure activity, we have five completed 5G network infrastructure filters, four for small cell base stations and one for CBRS. We have announced three design wins and small cell with our Tier 1 customer. We expect volume filter shipments to our second customer by June 2021. We have announced a CBRS order from a leading wide area network customer for infrastructure and CPE, and finally, we have over 10 customer engagements, 4 of which have already placed purchase orders.

I would now like to discuss our progress in our other markets segment. During the December quarter, we were awarded a new multiyear R&D contract from the Defense Advanced Research Projects Agency, or DARPA, to further develop Akoustis Technology through the development of a Piezo MEMS process design kit or PDK for the Company's proprietary and patented XBAW process. The direct-to-phase-2, or DP2, contract is dedicated to developing a general purpose PDK that will enable BAW and other similar MEMS structures to be designed and fabricated using the Company's state of the art patented XBAW process.

The Piezo MEMS PDK under development will encompass all aspects of the process ranging from material properties, process rules for stack dimensions, process control, monitoring, design rule checking, and example device models. Upon successful completion of the DP2 program, DARPA has an option to fund a Phase 3 program.

This option supports multiple new customer engagements leveraging the new PDK to create devices and circuits including RF filters using the Company's XBAW process. We expect this will expand the opportunities for XBAW moving forward as other designers will be able to develop new products utilizing our novel piezoelectric materials and substrates outside the current devices, which could lead to new opportunities and adjacent vertical markets.

To summarize our other market segment activity, we have seven completed XBAW filters solutions completed for the civilian and defense market. We have one design win in phased array radars and have and continue to ship production filters to our customer. We have already started and are currently progressing on our DP2 contract with DARPA. And finally, we have a total of three customer engagements, two of which have already placed purchase orders or provided NRE revenue.

Now, I would like to turn the call over to Ken to go through select financial highlights.

Kenneth Boller

Thank you, Jeff.

For the second quarter ended December 31, the Company reported revenue of \$1.3 million, which was an increase of 106% as compared to the previous quarter, and approximately 30% higher than our guidance. This revenue growth was driven by an 81% increase in our core filter related revenue on a sequential basis.

On a GAAP basis, operating loss was \$10.2 million for the December quarter, mainly driven by labor of \$6.3 million, depreciation of \$1 million, and other operational costs totaling \$2.9 million. As a result, GAAP net loss per share was \$0.30. On a non-GAAP basis, operating loss was \$8.2 million, and non-GAAP net loss per share was \$0.22. Reconciliation of these amounts to the corresponding GAAP measures is included in the press release issued this morning available on the Investors section of our website at akoustis.com.

Capex spend for Q2 was \$2.1 million, compared to \$2.3 million in the prior quarter. Mostly related to the target 500% capacity expansion or the Company's New York fab. Cash use and operating activities in Q2 was \$8.3 million, compared to \$7.9 million in the prior quarter. The current quarter include an increase in accounts receivable expected to be received in the following quarter, and certain inventory build related expenses associated with our ongoing product ramp.

The Company exited the December quarter with \$47.8 million of cash and cash equivalent versus \$37.3 million at the end of Q1. During the quarter, the Company raised \$20.2 million utilizing our ATM program by issuing 2.3 million shares of common stock at an average stock price of \$8.93.

The Company also took action to bolster its balance sheet by calling all of \$10 million over October 2018 6.5% convertible senior notes for redemption, and the notes were subsequently converted into shares of common stock. Separately this past week, we delivered notice of redemption to the holders of our \$15 million principal amount of May 2018 6.5% convertible senior secured notes.

While there's still some uncertainty regarding timing of customer production ramp due to COVID-19, our visibility continues to improve given the rollout of 5G and new Wi-Fi platforms. We currently expect to report strong revenue growth in the March quarter in the range of \$2 million to \$2.5 million. We're up 70% at the midpoint. We are fully booked to the midpoint of our revenue target for the March quarter.

I will now turn the call back over to Jeff to discuss our future milestones.

Jeffrey Shealy

Thank you, Ken.

Our backlog and sales funnel continue to grow as we enter commercial production across multiple markets and layer in new customers across each of our market segments. In the March quarter, we expect to generate revenue from each of our business segments including 5G mobile, Wi-Fi, 5G network infrastructure, and other markets including defense. We continue to strive towards executing on our targeted milestones, and we'll continue to keep you informed of our progress.

Our March 2021 milestones include qualification of our first wafer level packaging solution, shipment of a 5G mobile filter designed to our second RF front end module customer, release of the XBAW filter design for our third mobile customer. We expect to announce our first design win in Wi-Fi 6E, and finally, we plan to receive at least one design win for the CBRS market.

Looking slightly further out, our calendar 2021 milestones include the design lock and commencement of production with our second RF mobile module maker, the delivery of compliant XBAW filters to both our Tier 1 RF mobile customers. Next, we expect to ramp production with multiple Wi-Fi 6 and Wi-Fi 6E customers, including three announced Tier 1 Wi-Fi 6E customers. We plan to complete product qualification of CSP and WLCSP XBAW package filters for 5G mobile, 5G infrastructure, and Wi-Fi, and finally, we expect to ramp production with multiple 5G and CBRS infrastructure customers.

In conclusion, we continue to work diligently to achieve each of our stated objectives, and we will continue to update you on our execution against these objectives going forward. Our growing XBAW filter product catalog puts us in a great position to grow revenue by more than 70% sequentially in the March quarter as reflected in our guidance, and we look forward to expanding our filter catalog as we progress through 2021. To support our current engagements and emerging sales opportunities, we have been working diligently to expand our capacity by 500% to be able to produce hundreds of millions of XBAW filters per year.

Given the expected ramps in both 5G mobile and Wi-Fi 6E in calendar 2022, we now plan to double this output once again by the end of calendar 2021. We continue to add key hires across our sales, design, and manufacturing teams beyond our current expansion plans. The Company is positioned to scale as our New York fab can ultimately produce up to 5 billion XBAW filters per year when fully equipped.

I would like to thank those who have joined us on the call today. We continue to build our Company around our core belief in strong management and technical staff, strong intellectual property, which currently includes 38 issued and licensed patents, and 74 patents pending. Large and growing markets with limited historical competition in the high band and ultra-high band spectrum, and our qualified wafer manufacturing operation, which is now proven to deliver volume quantities of XBAW filters, and is expanding to address high growth opportunities in our target end markets.

Finally, I remain especially grateful to our employees for their hard work, passion, and dedication throughout 2020, particularly during this ongoing pandemic as our team has kept the momentum going on our R&D, which has led to multiple design wins across the Wi-Fi, 5G network infrastructure, and defense markets.

We've also experienced exceptional momentum in the 5G mobile market driven by our leadership and filters that can operate above 3 gigahertz, and our new and expanding wafer level packaging capabilities. I also wish to thank our shareholders who continue to support the Company.

And with that, I would like to open the call for questions from the investment community. Operator, please go ahead with the first question.

Operator

Thank you. We'll now be conducting a question-and-answer session. If you would like ask a question, please press star, one on your telephone keypad. For participants using speaker equipment, it may be necessary to pick up your handset before pressing the star keys. We ask that you please limit yourself to one question and one follow-up question. One moment, please, while we poll for your questions.

Our first question comes from the line of Suji Desilva with ROTH Capital. Please proceed you're your question.

Suji Desilva

Good morning, Jeff, Ken, Dave, Tom.

Very happy to see the progress you guys making in revenue. It's well deserved. Couple of questions. The Wi-Fi segments, I believe three revenue customers, and I think you said 15 in the pipeline, perhaps 10 prototype orders, just tell me if I got those numbers right. And more importantly what portion of those do you think can ramp revenues for you guys by the end of '21, just to give us some ballpark idea, and the factors there in that ramp 6 versus 6E other factors? Thanks.

Jeffrey Shealy

Good morning, Suji. This is Jeff. Appreciate your comment, and I'm going to turn it to Dave just for some color on Wi-Fi. And maybe I'll add a few comments at the end.

David Aichele

Morning, Suji.

The activity that you estimate is correct. We've got three engagements on the Wi-Fi 6E, and we have three engagements with Wi-Fi 6. We're ramping in production right now one of the Wi-Fi 6, and we have two more that should be ramping in the nearby June 2021. The majority of the activity that we highlighted on the additional customers in the Wi-Fi 6E is going to happen in the second half of the year. So, if I was to give a ratio, probably a larger percentage would be to the Wi-Fi 6E once it starts really ramping in production the second half. So, we should have a combination of both, you know, throughout 2021 with a majority picking up in the second half with Wi-Fi 6E.

Suji Desilva

Very helpful color. Go ahead, Jeff. I'm sorry.

Jeffrey Shealy

Yes, I just wanted to add to that. We've had a very successful ramp in Wi-Fi 6 that's (inaudible) is also as a follow-on program in Wi-Fi 6, as well as a new program in 6E. So, we've been providing parts to support both of those programs. Just a little bit more color, you see customers that are continuing Wi-Fi 6 evolution, you see customers that are in Wi-Fi 6 that are building hardware that contain both 6 and 6E configurations, and then also customers that are exclusively working on 6E.

Kind of the field that is pretty diverse, and I think with the customers that we're talking about, we also see as many as three platforms per customer in terms of different platforms that are launching over the next 12 to 18 months. So, it's a very robust from a sales activity, and we're very pleased with the portfolio that we have that we can service both Wi-Fi 6 and Wi-Fi 6E at this point.

Suji Desilva

Yes, great, and it sounds like a very exciting opportunity. My other question is on the smartphone market. It sounds like you have a smartphone OEM and a module provider. I just want to understand which one was potentially larger, and how long would it take for the module customer to get their own OEM customers to qualify the product? What's the cycle there?

Jeffrey Shealy

Okay. I'm going to start here, and I'm going to ask Dave to chime in. So, first, I want to clarify what I said was in the script because I think I had the numbers flipped. It's two RF front end customers in mobile and

one RF component customer. Your question was regarding the RF component customer, and all that Dave talked about, so what that sales cycle looks like.

David Aichele

Yes. The activity that we've got going into mobile is primarily focused on supporting those three customers that Jeff just mentioned. We do have some activities talking with the mobile phone OEMs as well. Those are focusing more on the Asia market, where there's opportunities for discrete BAW filters.

With respect to one of the three customers, you know, we could see something in the second half of this year, depends on, obviously, the development of their module and getting it into the market and getting it into certain models. They are proven suppliers in the market. So, that's something that we're taking advantage of, and also, having access to the BAW technology, which we're the only non-captive premium BAW provider out in the market, now that we've got a WLCSP platform this will accelerate the development with that end customer.

With regards to the other ones we still have to deliver compliant product to them or compliant designs to them. The intent would be to see something in the 2022 period calendar year. So, again, depending on, obviously, their success of designing it into a mobile phone OEM, but these guys are well known in the industry and service multiple customers in that market segment.

Suji Desilva

Okay, great. Thanks for all the color. Congratulations again, guys.

Jeffrey Shealy

Thanks, Suji.

David Aichele

Thanks, Suji.

Operator

Thank you. Our next question comes from the line of Harsh Kumar with Piper Sandler. Please proceed with your questions.

Harsh Kumar

Hey, guys.

First of all, congratulations. This is tremendous. I mean, literally watching this Company become very meaningful, so congratulations. I had two questions, mostly strategic. Jeff, if I could ask you to kind of, there's lots of stuff going on, right? You got different end markets, lots of action. So, could you maybe rank order for us, on the order of attractiveness, how you see some of the end markets, and which one you would prefer if you had your way? Which one would you prefer over the others if there's anything like that? Then I've got another one.

Jeffrey Shealy

Okay. Good morning, Harsh, and I appreciate your comments and thank you for those.

In terms of attractiveness, we've stated previously that the mobile market in terms of unit volume and overall size is the most attractive to us. That certainly remains so, and we've talked about some of the activities that we've had WLCSP to enable us to get into that market. That's been a key development this year, but most mobile markets, also, the Wi-Fi market, would come very quickly after that.

In terms of the mobile market, that's for us a little bit betting on the outcome in terms of growing number of engagements, we've got three now in that one, but the Wi-Fi market is one of that we're currently ramped in. It's one we've taken, you know, our XBAW technology and ramped it into high volume production over a period of months. As we said, in the script, we've executed, we believe brilliantly in that market by delivering volume quantity.

In that market, one of the things we really love are our markets that are being disrupted, I think Wi-Fi 6E is a big disrupter, and if you look at the products that are required for Wi-Fi 6E, they require as much as 10 times the bandwidth of what we had to deliver in the Wi-Fi 6 market for 5.2 gigahertz, and so we see a very dynamic market there, one that's going to have a lot of minute volumes. That one also is going to dovetail, we believe, into the mobile. So, it's got kind of a dual significance in that regard.

Then the 5G infrastructure, we talked about the traction in the small cell, and we did see some slowdown in that market in 2020, but we think that's going to pick up pretty dramatically in 2021. So, those are the— I'll call those the big three. Then the other derivative markets, certainly the best market has some attractiveness to us, because it's very high performance oriented, and also, they weren't really cutting edge type filters. For phased array applications, they need high power and those are areas that we excel in. So, that's kind of a secondary one, but still one of interest.

Ultimately, what we need to do on our end is fill that factory up at New York. That's where we're focused on. We're focused on expanding our capacity to get there, but that's our recipe for success here is in our business.

Harsh Kumar

Okay, Jeff. Thank you for the color. So, piggybacking off of that question, mobile, all of a sudden has gone up in your eyes quite dramatically. I think last year you guys were saying that you would not enter it without a partner, because of the capital requirement. You've seem to have overcome the capital requirements piece, doing really nicely in the capacity piece. I guess, question is, is it just from the interest you're seeing that you felt like having a partner would limit your opportunities? Is that what happened? Or was there some other logic to just going into battle on your own?

Jeffrey Shealy

So, I think for the mainstream Tier 1 market, it's still a partnership. What we're seeing with two of the three customers is their business is that a magnitude that we actually can bite off and chew. Certainly, the size of opportunity is meaningful to us as we're scaling up. I think the December quarter what it brought to us was two new customers in that category that allow us to play.

We still have a Tier 1 front end engagement, that one has taken some steps to accelerate, and we'll see where that engagement goes, but I think for the extremely high volume, it's still going to be through a partnership, and we've got adequate relationships, we think, that our ongoing now that can ultimately drive there, but the two opportunities in mobile that we announced in December quarter were ones that we can manage without a very large partnership that requires dramatically increasing the scale of the capacity of the factory in New York.

Harsh Kumar

Understood. Thanks, Jeff. Congratulations, again.

Jeffrey Shealy

Thanks, Harsh.

Operator

Thank you. Our next questions comes from the line of Anthony Stoss with Craig-Hallum. Please proceed with your questions.

Anthony Stoss

Good morning, guys. My congrats as well to the entire Akoustis employee base.

It's nice to see the hard work really starting to pay dividends. Two for Jeff, then a follow up for Dave. Jeff, on the doubling of production by the end of 2021, do you foresee any issues in lead times and getting that capital equipment installed and ready to produce? Then also, I'd love to hear an update kind of where you see the competitive landscape at this point, especially on the Wi-Fi side, and then I'll do a follow up after that.

Jeffrey Shealy

Okay. I appreciate your comments and good morning, Anthony.

In terms of procurement challenges for expansion, one of the things that we've been, you know, one of the things strategically we've done is really looked out at what lead times has done (phon). I can tell you one, on some of the longer lead times we've seen, you know, maybe one to two months' type of adjustments in lead times. The way we've mitigated that is we looked at that select category as very long lead time tickets and we already, we pulled the trigger on bringing those in. So, that's one of the way we manage the lead time challenge there.

The other challenge is in terms of capacity expansion has been bringing outside installers into our fab in order to install the equipment, but we've implemented solutions, say off hours, the weekend to enable us to remain compliant from a regulatory standpoint, bringing those outside heads in and also keeping our employees safe. So, we've worked some off scheduled and off hours in order to achieve that.

Overall, we think we're in very good position in terms of lead time for this expansion, and the other aspect, it's not always just lead time of equipment, we have to recruit and bring in the labor for the added shifts, and so we make significant progress on a second shift in the second half of 2020, and we're going to continue with—we don't foresee any major problems there filling out those shifts for that additional capacity.

In terms of the competitive landscape, what I would share is that we're not the only one seeing the attractiveness of the Wi-Fi market, and the dynamic. Clearly, that was in our top two, and it really dovetails back into mobile. What I would say from a competitive landscape standpoint is that the industry is never standstill. This is always the case. What we have to do is not standstill either, and I hope from what we've reported to the investors today, investors can judge for themselves, but we're not standing still either.

But in terms of specific competition, we don't comment on any specific competitors. What I would say is that the burden is on us to produce state of the art filters, and do those in a timeframe that allow our

customers to compete, and so that requires rapid response on our end, rapid prototyping, and really gearing to a very short time (inaudible) in order to allow our customers to compete.

You said you had a question for Dave or any follow up.

Anthony Stoss

Yes, no, thanks for that detail, Jeff.

Then for Dave, maybe you wouldn't mind commenting on just overall where you're seeing changes on the content side. How many BAW filters per device on the Wi-Fi 6E side, and how important do you think wafer level packaging might be, even just for that Wi-Fi marketplace.

David Aichele

Morning, Tony.

Good question. With Wi-Fi 6, we relate to the market there, and the DR and LTCC type filters had created a pretty strong position, but we had success, and we are continuing to have success in that market segment.

On the Wi-Fi 6E, it definitely is playing in our favor with the high Q acoustic, you know, BAW technology. The spectrum is more challenging there for the other technology to be able to hit that coexist requirement of 110-megahertz split between the two bands.

So that's something that, you know, the content wise, we are seeing that there's a good mix of 2x2 MIMO and 4x4 MIMO that's playing there both on the enterprise and the retail, and then that the interest level, as you can see in our announcements, is that we've got over 15 engagements there, and 10 of them have already placed orders, and we just locked the design, and we're going to be providing pre-production parts in this coming quarter. So, there's a significant pull. The main reason is, is that we enable that channel 15 in the 6-gigahertz spectrum that nobody else does from a—that can from a DR and LTCC.

So, that, in addition the pull that we're seeing in the mobile side as Wi-Fi 6E, and not just on the smartphone, but also in potential tablets and laptops is a big play for the BAW technology, and that's where we'll need the WLCSP. So, we could utilize the WLCSP in our modules that go into CPE. That may give us some advantages in performance, but size is not as critical as it is in the mobile via smartphone or tablet and laptop. You'll see more announcements of product being released with Wi-Fi 6E.

Just like in 5G, some of them won't have as rigid or as, I guess, higher performance on the filtering for their initial model, but they'll need to integrate it with higher performance filters if they want to meet the requirements for those standards.

Anthony Stoss

Thanks. Best of luck, guys.

Jeffrey Shealy

Thanks, Tony.

David Aichele

Thanks, Tony.

Operator

Thank you. Our next question comes from the line of Rick Schaefer with Oppenheimer. Please proceed with your questions.

Rick Schaefer

Hey, good morning, guys. I'll add my congratulations as well.

Jeff, I guess I got it kind of a two-parter for you first. You've talked in the past, I think, about having sort of at least a 12-month lead in Wi-Fi 6. Do you feel like you've got a similar or possibly longer lead in 6E?

The sort of second part of that question is sort of, assuming Wi-Fi is about to lead growth this year, which it sounds like it is, what would you consider sort of a dark horse for you guys for this year for upside? Would it be, you know, the handset business ramping a little quicker? Could it be CBRS after the, you know, the cable guys, I think just spent \$4 billion on spectrum. I'm just curious kind of your take there.

Jeffrey Shealy

Okay, good morning, Rick, and thank you for the comments at the beginning.

In terms of product lead in the market, I'd say that in Wi-Fi 6, we do see competitive parts that are in that marketplace. That, again, is a type of situation where we also have redesigned some of our parts to improve their competitiveness, and that's really how the game is played once you commit to a particular market as you make constant improvements to the product all for, and we certainly have done so with our Wi-Fi 6 product.

In terms of Wi-Fi 6E, one of the things that's pretty interesting to me from a standpoint is, as I mentioned earlier, the bandwidth requirements are 10 times that of the narrowest Wi-Fi 6 product that you have to produce. That's not just the circuit design, that's a complete redesign of materials. You're looking at in the 6-gigahertz band, nearly 1,200 megahertz of bandwidth. That is by any means trivial. So, there are very few competitors that I believe can even pull that design off.

Nonetheless, as I said, previously, from a competitive standpoint, the industry never stands still, and nor do we. So, hard to gauge on that. I think with the magnitude of interest and 6E, I would be completely shocked if competition is not those that have the opportunity to produce those parts aren't building and designing 6E products, but we'll see what comes out. We always take the approach of don't sit and stare at what the competition's doing, make them sit and stare at you. In terms of (inaudible) execute on our end, and we think the rest will take care of itself, if we're able to package the technology and deliver the performance requirements in a short period of time.

To your second question in terms of any dark horses or upside, you mentioned, clearly, one that really has materialized during the last quarter is in the mobile. We mentioned two additional customers coming on board; pretty aggressive schedule. However, they really work in our favor because they're working at frequencies we think we're already pretty good at in terms of these ultra-high band 5G frequencies where we already have models in place, we already have products and very near the frequencies we're looking at playing. So, those are really nice opportunities in that they're volume, and that they've got very tight schedules and short triggers, so when they want to move.

You mentioned the CBRS. I think that's clearly another one. If you look at that one, that was really an event last summer with that spectrum in the 3.6 gigahertz range. I think another one that's kind of a dark horse to be looked at is the C-band option. I mentioned that in the comments. That spectrum in a 3.7 to 3.9 gigahertz, that's for 5G.

The amount marketed at auction thus far is pretty staggering. It's over \$80 billion. That's clearly going to have some impact, we believe, on the 5G spectrum. We're already, as we said in the prepared notes, already designing filters for that, that we think are going to be available this first half of this year.

One of the other dark horses since we're on the subject is I think there's a nice opportunity of platforms that are using both Wi-Fi 6 and Wi-Fi 6E and being able to—it's not all of are doing parts switchover to 6E, they're doing kind of bridge type design that use both are Wi-Fi 6 and 6E, so I think we'll see more life out of our Wi-Fi 6 products as the market evolves to 6E. So, those are all positive things.

Dave, anything you want to add to that, in terms of dark horse?

David Aichele

I think the only other thing that maybe I touched on a little bit ago, too, is in the mobile sector with laptops and tablets. That's an area that we haven't talked too much about, and there's interest that we're seeing in the market, particularly around Wi-Fi 6E. So, I think you can see some activity picking up the second half of this year around that sector as well.

Rick Schafer

Thank you, guys. Thanks, Dave. Thanks, Jeff.

Just a quick one on the capacity announcement. Please level set me here if I'm incorrect, but I think you're reasonably targeted sort of 200 million to 300 million filter capacity by this summer. So, I guess, is that correct, and so we should be thinking sort of 400 million to 500 million filters by end of year in terms of capacity, and what does that mean for your Capex plans this year?

Jeffrey Shealy

Yes, I think where we're targeting there is clearly by the end of the year. So, your assumption is correct. We're careful not quote the exact number, but certainly, in that 400 million plus, call it 400 million to 600 million type capacity. It would be in that range. There's still some bottlenecks and incremental bottlenecks that we can address that ink more capacity, clearly a focus on our end on staffing out all four shifts in order to maximize capacity.

There's some things that we can do incrementally that—a lot of the large equipment that we have in the back can do significantly higher, but we get these bottlenecks that we have to address. Some of that through automation, other is through smaller capital equipment, and then obviously, the length of rolled out piece of that. It also depends on the mix. The mobile market is going to have, if it's—itclearly has the smallest chips, so you can get more per wafer. So, there's a lot of different ways of calculating the number, but overall, I think your comments are correct.

Rick Schafer

Thanks.

Jeffrey Shealy

Okay, thank you.

Operator

Thank you. Our next question is coming from the line of Cody Acree with Loop Capital. Please proceed with your question.

Cody Acree

Thank you, and congratulations, guys, and the entire team.

Maybe if I could just touch on Opex with the ramp through '21 past the end customers. What does the Opex budget look like for the year? Maybe your thoughts on cash burn and as well for the year.

Jeffrey Shealy

Hey, Cody. Good morning. This is Jeff. I'm just going to hand it off to Ken. Let him comment.

Kenneth Boller

Yes, good morning, Cody.

As Jeff mentioned, we are ramping up our capacity expansion over the next throughout calendar year '21 to get double again. We will be bringing on additional shifts, and the way we handle that is we typically, we bring in new employees, it's usually a quarter ahead of when the capacity need is required. We will be bringing in additional costs to fund that capacity to expansion, but it will be prudent and we will do so when we have line of sight to revenue. We'll be looking at, like I said, about a quarter ahead of time when we expect to incur those costs.

Then obviously, as we utilize more of the capacity in our plant, the operating cash flow burn itself will come down. We mentioned before, when we get to the \$12 million to \$15 million in revenue, we would expect the operating cash flow breakeven at that point depending on mix.

Cody Acree

Any specifics that you're thinking about as far as your Capex ramp through the year?

Kenneth Boller

Yes, I think what we stated before as far as the initial 500% capacity expansion, we have about \$4 million to \$6 million left on that spend and additional about \$9 million to \$10 million to get double again, to get to what we talked about earlier, 400 million filters this range. A lot of those items that we discussed earlier where we purchased the equipment and they already have the capacity to do that level filters. So, what we're talking about now is some of the left lead time items and bottleneck areas to get doubled again, our capacity throughout the calendar year 2021.

Cody Acree

Do you expect to be cash breakeven in the same level has been discussed for?

Kenneth Boller

Yes, as I stated earlier, I think our models still indicate that we'll be operating cash flow breakeven in the \$12 million to \$15 million of revenue, and some of that depends on whether it's a lower end or a higher end, depending on the mix of what we're selling during that quarter.

Cody Acree

Then, lastly, Jeff, can you just talk about, maybe for Dave as well, just the overall implications of this C-band auctions? Albeit, it plays to your sweet spot of filter your capability today, but as you go forward, do you expect that C-band opens up significantly more spectrum for you? Does it become a larger market driver maybe than what handsets would have otherwise? Then what do you think that does to 5G and millimeter wave?

Jeffrey Shealy

Okay, a lot to unpack there but let me jump into it. I just was scribbling notes here just to make sure I try to address it.

Your first piece was here on the C-band auction. I'll comment, and I'll get Dave to jump in here as well. In terms of the C-band auction, if you look at how long we've been planning our capabilities in our technology around those necessary capabilities, the C-band auctions, those that aren't too familiar with it, it sits right in the n77, it's right at the high end of n77. So, that's been a band that's been of interest to us. The interesting thing about n77 is its extremely wide bandwidth. So, we've been developing materials that are necessary to be able to address a very wide bandwidth within the overall IV spectrum, including n77.

So, in terms of our capabilities, it's right in the bullseye of where we've been developing, I'll remind you back, the first product the Company made and delivered into the market was a phased array radar filter, a 3.8 gigahertz, which is right at that band. We've been developing models, designed kits, capability, and expertise at these higher frequencies, all throughout the life cycle of the Company.

In terms of it being a larger market, I think, in terms of the deployment in the market, I think there's great indications by virtue of the magnitude of what's going on in the auction that it's going to be deployed. There's a whole load of filters that are going to be required for that particular band, both in the infrastructure, as well as in the mobile area. So, it really falls within the sweet spot when you couple in our wafer level packaging capability we're bringing on.

In terms of what that does for 5G and millimeter wave, I think there's from, certainly from my perspective, that the sub-6, sub-7 gigahertz technologies are by far easier to implement for in the mobile environment than millimeter wave, just a lot of challenges with no emit wave in a mobile environment that are that are just challenging.

I think from a more reliable standpoint, the sub-6, sub-7 gigahertz frequencies are really certainly going to be deployed. There's certainly a role promoting wave, it's for fixed type of backbone, for the fixed backbone of 5G is a clear business stage for that, so that's more of a point-to-point type use. Whereas the mobile environment is very much a dynamic one that creates some challenges for millimeter wave. So, back to the C-band, I think it's going to play a significant role in 5G, and we believe we got the technology and capabilities to address that.

Dave, do you have anything to add to that?

David Aichele

Yes, Cody, I'll just add a couple more points. I think Jeff highlighted that we've been focused on that 3.8 gigahertz and developing the technology several years back. Additionally, we've been shipping 300 megahertz solutions and that n77 band to the Asian market, and so this new spectrum is 280 megahertz. We just shipped this up new designs, and we've been talking to the providers in the market, and we've also been talking to the key OEMs that service the North American market as well. So, this is a huge play, and we've got pretty good line of sight on the technical requirements.

Obviously, the shakeout, you know, as far as who bought what and, you know, and who's going to win the contracts still got to happen, but we believe, as Jeff highlighted, it's going to be a pretty significant market opportunity for us on the infrastructure side, and the mobile will follow then thereafter.

It will, I believe, eat into the millimeter market based on the spectrum that becomes available. It's easier from a technology standpoint to deploy, carries the similar band—not as good of bandwidth, but has better bandwidth than, obviously, the legacy frequency spectrum. So, we think this will be a—we're bullish on what will happen over the next several years with this sector.

Cody Acree

Great. Thank you, guys. Congrats.

Jeffrey Shealy

Thanks, Cody.

David Aichele

Thanks, Cody.

Operator

We have reached the end of the question-and-answer session. I would like to turn the call back over to Management for any closing comments.

Jeffrey Shealy

Hi. Thank you all for your time today. We look forward to speaking with you during our next update call to discuss the current quarter execution against certain milestones and future expectations. I want to wish everyone a safe and healthy, week and we look forward to following up soon. Thank you very much.

Operator

Thank you. That does conclude today's conference. You may disconnect your lines at this time. Thank you for your participation and have a great day.