



Akoustis Technologies, Inc.

First Quarter Fiscal 2019 Business Update Conference Call

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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 queue. A replay of the call will be available in the Investor Relations section of the Akoustis website.

I would now like to hand the call over to Tom Sepenzis, Director of Investor Relations. Please go ahead, sir.

Tom Sepenzis:

Thank you, Operator, and good morning to everyone on the call. Welcome to Akoustis' First Quarter Fiscal 2019 Business Update Conference Call. We are joined today by the Founder and CEO, Jeff Shealy; CFO, John Kurtzweil; and VP of Business Development, Dave Aichele.

Before we begin, please note that today's presentation includes forward-looking statements about our business outlook. Such forward-looking statements are predictions based on our team'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 Form 10-K for the 2018 fiscal year filed with the SEC to get a better understanding of those risks and uncertainties.

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

Jeff Shealy:

Thank you, Tom, and welcome, everyone, to our First Fiscal Quarter Business Update Call. I've organized my comments for this call into three sections: first, a strategic overview; second, our prior milestones and execution; and finally, I will provide our outlook. As this is our first time addressing investors in a conference call format, I will open with an expanded discussion on our strategy to set the framework for the rest of the call.

First, a strategic overview. As many of you may know, Akoustis was founded in 2014 on the premise that, by utilizing advanced single crystal materials technology, we could create a unique manufacturing process to produce a new class of high-performance BAW RF filters that would exhibit differentiated and superior performance at high frequency spectrum. In March of this year, we announced the most significant milestone in our history, that we had completed development of our first generation XBAW™ manufacturing process and had begun technology qualification. Just one week later, we announced our first commercial product, the industry's first commercial 5.2 GHz BAW RF filter. Since that time, we have started the product qualification of both the 5.2 GHz WiFi filter, as well as the industry's first 3.8 GHz BAW RF filter, initially targeting military communications and radar applications. Importantly, one of these filters operates within the emerging 5G frequency spectrum, and this morning, we announced two additional commercial products, both for existing 4G LTE band 25 infrastructure application.

What differentiates Akoustis is our high power, wide bandwidth BAW RF filter technology, which we have branded and trademarked XBAW™, for expanding sub-6 GHz wireless applications. Our products currently target applications in growing WiFi, wireless infrastructure, mobile handset and defense markets, each application requiring high power handling and wide bandwidth capabilities, as well as reduced form factor.

We operate under a vertically integrated design and manufacturing, or so-called IDM, business model. That is, we internally control the design process and manufacturing flow in-house, which allows for very rapid response to customer demand. The IDM model creates the opportunity for differentiation and innovation at multiple levels in the supply chain. Our model allows cost-effective, turnkey integrated RF BAW filter solutions to be developed quickly, without margin-stacking or risky supply chain delays. Our

ability to deliver product with short cycle time is a key attribute in our business model. Our products are sold through direct, reseller and distribution channels.

Our Company is built around four strategic pillars: Management and leadership, patented technology, markets and products, and operations. This allows us to deliver core RF solutions to enable connectivity across a wide range of wireless devices. I will now expand on these pillars.

First, our Management and Board have decades of leadership and entrepreneurial experience in RF wireless and MEMS wafer technology. We have 76 full-time employees and have recruited and acquired technical experts, many of whom hold PhD degrees. Our team comes from industry-leading RF filter and Silicon companies. We leverage core expertise and proficiency in single crystal nanomaterials, acoustic wave devices, MEMS manufacturing, RF filter design, and foundry operations.

Second, our patented and proprietary XBAW™ RF filter technology is the first commercial single crystal MEMS-based BAW manufacturing approach in the industry. Our unique XBAW™ technology encompasses core substrates, nanomaterials, bulk acoustic devices, RF filters and sub-systems. Since the very early days at Akoustis, we have been amassing what we believe is both a substantial and valuable portfolio of intellectual property, which today includes 21 patents, an additional 35 patents pending, and numerous proprietary, unpublished trade secrets and know-how.

Regarding the performance of our XBAW™ technology, we presented our latest results to the industry at the 2018 IEEE International Ultrasonics Symposium earlier this month in Japan. Our paper, entitled *High Power, Wideband Single Crystal XBAW™ Technology for Sub-6 GHz Micro RF Filter Applications*, was published at the Symposium, and is also available to investors to review on our website. The top five takeaways from our paper and presentation include:

First, our XBAW™ is a unique and flexible RF filter wafer process, which, to the author's knowledge, is the only BAW filter technology whose process flow allows the direct comparison between single crystal and polycrystalline piezo materials.

Next, our study compared single crystal and polycrystalline XBAW filters and found single crystal filters exhibited 2.3 times higher power handling capability over the same filters constructed using polycrystalline piezo materials.

Third, higher power handling translates directly to higher reliability, and we published our reliability results showing higher time-to-failure for single crystal RF filters compared to identical filters built using polycrystalline piezo materials at every power level we tested.

Next, a major benchmark in BAW technology is the resonator quality factor, or "Q". The measured Q of our XBAW™ resonator at 1.8 GHz is 3,685, which we believe is competitive against existing commercial BAW process in the industry. We also published impressive measured Q values at both 5.2 GHz and 3.8 GHz, showing a 66% improvement in our resonator Q at 3.8 GHz over the past year.

Finally, we published our 5.2 GHz WiFi RF filter performance showing an average loss of only 1.1dB, along with a wide bandwidth operation over 205 MHz, meeting the industry standard passband requirements of the UNI 1+2A WiFi band.

After our Symposium presentation, the Technical Program Vice-Chair invited Akoustis to be featured in the conference highlight closing session.

In summary, our high frequency single crystal RF filters offer higher power handling and reliability versus incumbent polycrystalline RF filters. This is an extremely critical pain point and key product requirement

for our customers, because these micro filters are located between the high-power side of the power amplifier and the antenna in the system. This is driving high power requirements for next generation mobile, infrastructure and WiFi applications, each of which we are uniquely positioned to address.

Now, on to markets and products. As I noted earlier, we are currently targeting applications in the growing WiFi, wireless infrastructure, mobile handsets and defense markets. Our product focus resides in the sub-6 GHz band, where we can provide performance differentiated RF filter solutions. We estimate our SAM, or serviceable market, is approximately \$3.7 billion in 2018, and is expected to grow to \$5.4 billion by 2021, per Mobile Expert's 2018 report, ABI's 2018 report, and Akoustis' internal estimates. The BAW filter market is currently serviced by two multi-billion-dollar RF module companies, which, together, have dominated 4G LTE. It is worth noting that we are currently the only company which offers BAW filter solutions in many of the sub-6 GHz applications.

We currently believe the addressable BAW RF filter market for each of these applications is as follows: The mobile handset market is approximately \$3.2 billion in 2018, and is expected to grow to \$4.3 billion in 2021. The wireless network infrastructure market is approximately \$49 million in 2018, and is expected to grow to \$432 million in 2021. This dramatic increase will be fueled by growth in both 4G LTE and 5G content. The WiFi CPE market is approximately \$347 million in 2018, and is expected to grow to \$540 million in 2021. The military market is approximately \$89 million in 2018, and is expected to grow to \$119 million in 2021.

We also see potential in the mobile market with tri-band WiFi architecture driving increased BAW content in the handset.

Within these focus market areas, we utilize a four-stage sales funnel, including prospect, opportunity, engagement and order stages. We will use these four stages to describe our sales activity within each market. A prospect is a potential customer without an identified opportunity; an opportunity is a potential customer with an identified opportunity; an engagement describes that we have secured a design win and/or provided a proposal, quote or samples; and, finally, an order describes a customer who has placed initial orders or repeat orders for product.

Now, with this sales funnel in mind, I will discuss customer activity in our four target markets.

The first market I will highlight is the 802.11 WiFi CPE market, in which we have seen increased activity since announcing the AKF-1251 product, the industry's first coexistence BAW filter aimed at the high-frequency 5.2 GHz unlicensed WiFi band. We announced the product in early March and started sampling the product to multiple retail and enterprise WiFi OEMs and chipset vendors. We currently have more than 12 engagements, with primary interest from OEMs, ODMs and RF module manufacturers for our 5.2 GHz filter. As stated, we are the only publicly announced BAW filter solution for WiFi routers, with the main competition being conventional dielectric resonator monoblock filters. Our BAW filters provide low insertion loss and meets the demanding coexistence rejection specs, while being 23 times smaller than the current dielectric resonators that are in use in WiFi today. Our filters can be surface mounted, whereas filters being used today require screw-down mounting and shielding, which leads to a lower cost for our customers.

Current generation WiFi access points have increasingly become tri-band, with 2.4 GHz, 5.2 GHz and 5.7 GHz bands operating simultaneously, and with typical dollar content in the \$1.00 to \$1.50 range for a single user system. With increased data demands being driven by streaming video and mobile gaming, MIMO and Multiuser MIMO configurations are driving the filter content significantly higher in both access points and end user devices. As an illustration, the number of filters in a 4x4 MIMO access point increase from three in a typical tri-band device to 12, which can boost the filter TAM into the \$4.00 to \$5.00 range. To date, we are the only RF BAW company to have delivered a product in the 5 GHz range. We believe

we have significant opportunity to take market share from the existing dielectric resonator filters that are being used today. For the next six to 12 months, we expect to focus on the WiFi router market, but over time we expect that our 5 GHz WiFi filters will also be used in the mobile handset and device market, as well, where the total addressable market is significantly higher.

We expect to receive our first pre-production order for our AKF-1252 by the end of the calendar year, which allows a customer to qualify our product in their system for production orders beginning the first half of calendar year 2019.

The second market we're targeting is the global 4G and emerging 5G wireless infrastructure market. We announced our first 4G LTE infrastructure customer in May. As you can see from today's press release, we announced that we have delivered two new 4G LTE filter solutions for this customer. This was one of the four key milestones that we set for this quarter and we're very pleased to announce we have achieved it. A couple of important facts related to today's announcement. First, this 4G LTE band was a completely new band for our Engineering Design Team. Second, we delivered two filter products to this customer in less than six months from receiving their specification. Our plan moving forward with this 4G LTE customers is to achieve qualification and move into production in the first half of calendar year 2019. Winning this original order was strong validation for our XBAW filter technology.

Moving on to 5G, here we are initially targeting the 3.5 GHz band, which is looking more like the primary worldwide standard for 5G. Globally, 5G cellular is beginning to take shape, with the most new planned bands in the 3.3 GHz to 5 GHz range. This is right in the sweet spot for us, as we have already developed commercial products at 3.8 GHz and 5.2 GHz, proving that we can produce RF filters at the higher frequencies associated with next generation wireless standards. We have been in discussion with multiple cellular base station and infrastructure vendors for filters at and above 3.5 GHz for us in 5G deployments that are expected to ramp in greater volume next year.

Lastly, we have secured a first purchase for Citizens Band Radio Service, or CBRS, from a customer developing last-mile connectivity solutions to the home. We plan to deliver initial product in the first quarter of calendar year 2019, and expect additional purchase orders later in the year.

To summarize our activity in wireless infrastructure, we have received orders from three customers to develop XBAW filters. Two of the customers are Tier-One infrastructure market leaders, one targeting newly licensed spectrum for 5G base stations and the other targeting filters for 4G LTE, as highlighted in our press release this morning. The third customer has ordered filters for CBRS last-mile application.

The third market we're targeting is the mobile handset market, the largest segment for BAW RF filters. We see significant opportunities for new 5G spectrum filters, as well as WiFi coexistence filter opportunities in mobile devices. Internally, we are currently developing our first 5G RF filter design, the associated wafer level packaging solution, and capacity modeling to address this large market segment. Our likely avenue to success in mobile handsets is through a strategic engagement to leverage a partnership with a much larger player who will help us scale our capacity.

We currently have four engagements in mobile, all of which are high-profile, industry-leading, multi-billion-dollar companies which compete globally in the handset market. We target delivering 5G mobile handset filter samples in the first half of calendar year '19, followed by at least one design win the second half of 2019. The mobile handset application is a more challenging segment, as packaging requirements and production capacity are significant considerations for engagement by both the customer and Akoustis.

Finally, the fourth market we are targeting is the military communication/radar market. We recently announced commercial availability of the AKF-1938, a 3.8 GHz filter that we have been developing for a customer for the past year. We expect to ship against two open production orders in the next two months.

This serves as another validation for our technology and showcases our ability to deliver filters at and around the 3.5 GHz frequency spectrum, where global carriers expect to deliver 5G voice and data. Since our press release in early April announcing the AKF-1938, we've received significant interest from both the radar market and cellular market, particularly wireless infrastructure providers, and we expect to have announcements in this market over the next 12 to 24 months.

In summary, we have one customer with two open production purchase orders. This customer has expressed a desire to engage us in new RF filter designs for other high frequency, sub-6 GHz applications.

Beyond these specific sales funnel activities, we have additional prospects and opportunities across all four focus segments.

Lastly, I would like to address manufacturing. In June 2017, we acquired a 122,000-square-foot silicon MEMs wafer factory, which included a 30,000-square-foot class 100/1000 clean room manufacturing floor, 150mm wafer fab tools, and 57 acres of real property. Importantly, it also included a team of highly skilled engineers and operations professionals. The MEMS manufacturing expertise we inherited as part of the acquisition allowed us to hit the ground running and saved us approximately two years of R&D required to recruit, train and synchronize such an operation. The acquisition provided us the silicon wafer process technology, short cycle time and initial capacity we needed to produce our XBAW RF filters. We quickly consolidated 100% of our chip manufacturing into this plant, including materials manufacturing, wafer processing and high precision frequency trimming.

Supporting our current engagements and emerging sales opportunities necessitates that we increase manufacturing capacity by up to fivefold, growing our capacity from tens of millions of filters per year to hundreds of millions of filters per year. To increase capacity, we will need to hire people and acquire additional process tools. The challenge with this exercise is the lead time on process tools, and for new developing market opportunities, such as 5G and 5 GHz WiFi, we have to be just-in-time or just-early with our manufacturing capacity. As a result, we are planning our capacity increase approximately one year ahead of production.

I also want to note that our XBAW filter plant is located in upstate New York and we are proud to manufacture our RF filter chips in the U.S.A.

In the more than 10-billion-unit-per-year filter market, we are certainly not limited by market opportunities. Given the size and scale of the end markets we are addressing, there is a potential that one or more customer engagements could result in a significant manufacturing ramp for Akoustis.

Given the need to scale our manufacturing capabilities to meet the market opportunities I just described, it became increasingly important for us to bolster our balance sheet to give potential customers the confidence in our ability to deliver on sizeable orders. To support this piece of our business plan, we just completed a \$40.8 million financing through an offering of both equity and convertible debt. This financing gives us the capital we need to build manufacturing capacity to deliver product to large strategic customers in our end markets. I have heard frustration from a number of fellow Akoustis shareholders about the recent financing, specifically on the timing and the terms. Whereas I acknowledge the frustration from Akoustis shareholders, Company Management and Board must weigh timing and terms against strategic need for capital, given current customer product engagements and long lead time for needed capacity expansion. I would like to reassure the shareholders that this added capital on the balance sheet puts us in a more credible position to engage large Tier-One customers, as they understandably need to know that we have the financial wherewithal to expand our manufacturing, execute on design and deliver product in high volume.

Next, I am excited to report on execution against the following five key milestones completed this year:

After acquiring the New York wafer fab in 2017, our first goal was to consolidate our entire manufacturing line under one roof. This included single crystal materials manufacturing, wafer processing and precision trim work centers. Given the uniqueness of our process flow and the high precision requirements of BAW RF filters, internal control of our wafer supply is essential to drive short cycle time. We achieved this goal in January 2018, and have been producing 100% of our RF filter wafers on this first manufacturing line in-house ever since.

Our second goal was to complete the development of our first-generation XBAW process, which we call XB1, by the end of the march quarter. We were able to deliver on this goal on March 6. Since then, we have proven our single crystal BAW process can deliver high performance BAW RF filters in the sub-6 GHz bands, which we believe positions Akoustis as having the best, and in some cases, currently the only, high power microfilter technology for next generation mobile networks and devices. We are now focused on leveraging our XBAW process to deliver qualifiable samples at multiple frequencies, building a catalog of high-quality, robust high frequency filters for current and future customers.

Our third goal was to deliver our first commercial product by the end of June 2018. We exceeded that goal by announcing not one, but three new commercial products by the end of June. Shortly after freezing our process, we announced on March 12 our first commercial product, the AK-1252, the world first 5.2 GHz BAW RF filter for the rapidly growing 802.11 tri-band WiFi router market. We also introduced our second commercial product, the AKF-1938, on April 9. The AKF-1938 is a general catalog product and our first customer utilizes the product for military RF transceiver and radar applications. Furthermore, on June 7, we announced a mobile version of the 5.2 WiFi product and are currently developing a wafer-level package, or WLP, for the mobile market. Today, we announced two additional products, the AKF-1125D and AKF-1125U, for the 4G LTE infrastructure market. These filters support both uplink and downlink connectivity and were chosen for their selectivity. Finally, we announced shipment of these two products against an open customer purchase order which we received on May 11.

Once XB1 process development was completed, our fourth goal was to qualify the process and materials under our quality management system by the end of calendar quarter Q3. On July 9, we announced that we had completed the XB1 technology qualification and completed qualification reports for the process and materials manufacturing.

Finally, our fifth goal was to secure our first RF filter production purchase order by the end of June. We received our first purchase order for a 4G LTE cellular infrastructure OEM on May 11 for a filter that operates in a key mid-band spectrum. We announced today the shipment of first samples of two filter products to this customer. We expect ramp against the original placeholder production purchase order in the first half of calendar year 2019.

As evidenced above, we are committed to execution, and I will now highlight four new milestones for you to track over the next few months to gauge our continued progress.

First, for our wireless infrastructure business, we expect to ship samples to our 4G LTE infrastructure customer, with production to commence in the first half of calendar 2019. We are also committed to shipping sample product to our CBRS customer in the first quarter of calendar 2019, with the expectation of a production order later in the year.

Second, for our 5.2 GHz WiFi business, we expect to ship first commercial AKF-1252 filters to our distribution partner by the end of the December quarter. We also expect a first pre-production order from a WiFi customer, which enables them to qualify their system with our RF filter product.

Third, we expect to introduce the AKF-1256, a 5.6 GHz filter, and deliver filter samples to targeted customers by the end of the year. This project required engineering of piezo nanomaterials to support wider bandwidth requirements. We expect this product to uniquely position us to offer the first complete WiFi high band BAW coexistence filter solution; that is, offering both the 5.2 GHz and 5.6 GHz BAW RF filters. We anticipate customer interest will expand greatly when we are able to offer both 5.2 and 5.6 GHz filters in tandem.

Finally, for our defense customer, we expect to ship the AKF-1938 RF filter product against two open production purchase orders.

Looking into the first half of calendar 2019, we target important milestones in the WiFi, infrastructure and mobile segments based upon our performance outcomes this quarter.

Specifically, for WiFi, we target pre-production orders in the next few months and the introduction of our 5.6 GHz RF filter will translate into production orders during the first half of 2019.

For our infrastructure business, we have several milestones in both the 5G and 4G wireless infrastructure market. In 5G, we expect to deliver RF filter samples to our base station infrastructure customer by the end of the first half of calendar 2019, to allow qualification of our product, with a first production PO expected in the second half of the year. We expect to receive a production purchase order in the first half of calendar 2019 for our 4G LTE infrastructure customer.

For mobile handsets, we expect to announce our first 5G customer order during the second half of calendar 2019. In order to support our customers' requirements, we intend to deliver a complete wafer-level package, or WLP, design in the first half of calendar 2019. Depending on our available wafer capacity, we believe this will enable us to secure design wins in mobile handsets for new 5G frequencies, 4G frequencies, or WiFi bands in the second half of the calendar 2019, which we believe is under-appreciated in terms of its potential impact.

We are working diligently to achieve these goals and we expect to update you on these longer-range goals as our view of the market and our positioning develops over time.

In conclusion, I would like to thank all of you who have joined us today on the call. Akoustis has come a long way over the past four-and-a-half years since the inception of the Company. We are building our Company on four solid pillars, including strong Management, patented high power XBAW technology, large and growing markets with limited historical competition in the higher bands, and our qualified wafer manufacturing operation which is ready to be expanded to address high-growth opportunities in our target end markets. Finally, the customers we have engaged are market leaders and provide our Company with tremendous growth opportunities in high-performance coexistence RF filters. We captured first revenue for our XBAW filters during the September quarter and we will deliver new and exciting opportunities for our customers and investors alike as we enter calendar 2019, and beyond.

Before ending my remarks, I would like to take a moment to thank all of our employees for their hard work and commitment to our mission, and to our investors who have helped us get to this crucial stage in our development as a company.

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

Operator:

At this time, we will be conducting a question-and-answer session. If you would like to ask a question, please press star, one on your telephone keypad. A confirmation tone will indicate your line is in the question queue. You may press star, two if you would like to remove your question from the queue. For participants using speaker equipment, it may be necessary to pick up your handset before pressing the star keys. One moment, please, while we poll for questions.

Our first question comes from the line of Cody Acree from Loop Capital. Please proceed with your question.

Cody Acree:

Thank you, guys, for taking my questions, and, Jeff, thank you very much for all the information. Maybe if you can take that conversation on pre-production and production timelines one step further and help us with your thoughts on how then that translates to a revenue ramp, if you can talk about it either by major markets or just your progression through 2019.

Jeff Shealy:

Cody, good morning to you, and thanks for your question. Let me just—for the general audience, let me comment on pre-production and production. I'd like to at least comment on the cycle. We really speak about three things. We talk about samples, we talk about pre-production, and then we talk about production. From our perspective, if we're providing samples, those are, technically, evaluation samples. If we're saying production, then the customer has gone to the next step and wants to consider the product for a design win, and they want to insert product in their system and then qualify their system, and then that leads to the volume production.

To your point, if you look at—we've put some target milestones on our website. I believe it's in the deck on Slide 14. What I would steer you to is really an alignment of revenue against those milestones. If you look at what we said for the current quarter, we had announced four milestones, and too, we're currently in the radar—we have open production orders for radar, so I'll start with that market, as we're deepest in the funnel with that customer in production. We'll be shipping production—we'll be shipping initial production quantities and ramp with the 3.8 GHz filter. We also announced that at 5.2 GHz for WiFi, we expect first pre-production order this quarter. We expect that would lead to production in the first half of calendar year '19. In parallel with that, I would be monitoring us on the 5.6 GHz samples that we're expecting to sample later this quarter. We would view that as an accelerant to production with additional accounts we've announced, and I made in my comment, we sampled that to at least 12 potential customers, and so we see the 5.6 as an accelerant. If you look at production then for first half of calendar year '19 for WiFi, we did 8KA, a development for a Tier-One infrastructure OEM, where we're designing a filter for a 5G base station application, and we expect pre-production to occur in first half of calendar year '19, and then production to be second half of calendar year '19, according to current customer expectations.

In mobile, as I said in my comments, we have two additional challenges in that arena. The first is the packaging requirements. It's a non-standard packaging requirement for us. We're working on the wafer-level package. We expect to have a design win in the second half of '19, which we would expect to lead to a production ramp. We're early in the funnel with mobile at this point, although we do have an internal design that we're currently working towards a customer spec.

I believe that addresses your question.

Cody Acree:

Yes, thank you, Jeff, and maybe this is for Dave, or whoever wants to tackle it. The two products announced today, or maybe if you can just talk about—yes, maybe start with those first two products announced today. I believe that's a 1.9 GHz frequency range. Can you just talk about the progression, then, of those products, how then that turns into—I think you began WiFi sampling with one customer and then now you're shipping samples into 12-plus customers. How does that then translate into a broader breadth of 4G and 5G infrastructure presence, and what do you think the timing and size of the opportunity is in 4G, and then if you can maybe talk about the potential of 5G's market size opportunity?

Dave Aichele:

Okay, Cody, this is Dave. On the announcement that we did today, it is a follow-on to a previous announcement. It gave a little bit more color. That's Band 25, so focusing on the North America market. This is more for small cell type applications. The nicety of it is, is that the volumes are appreciable to us for the defense market, so it's going to continue to push our ramp as we go transition from production in defense to production in the 4G LTE market for infrastructure customers. We'll see that, and we've given some color on what that production ramp looks like for next year, and that will continue to go through—obviously, into 2020 and 2021, and so forth, and we expand on that in small cell type applications, both for 4G and also for 5G.

On the WiFi side, it really comes down to the adoption rate that we're targeting here. As Jeff mentioned, we got 12 engagements and there's prospects beyond that in other markets segments even outside of the WiFi that are interested in this 5.2 GHz coexistence unlicensed spectrum. What we're targeting here obviously is to get some adoption with the 5.2, but when we introduce the 5.6, we expect the adoption to accelerate, because there is an interest—a significant interest and excitement around having both the 5.2 and the 5.6 coexist, so the timing on getting the 5.6 out is something, as Jeff mentioned, to track and to watch, because that's going to continue to increase the excitement out in the market. We expect that the number of customers that we can announce will increase in the first half of next year, and then obviously the production ramp will continue through, as Jeff mentioned, the second half of 2019, and then on to 2020.

Cody Acree:

Dave, would you expect that once you offer the 5.6 GHz into samples or into pre-production that—can you maybe quantify some magnitude of the impact of having both 5.2 and 5.6? Does that exponentially increase customers' interest or is it just something they'd like to add on, so they have a one-stop shop?

Dave Aichele:

There is increased interest, significant increased interest to have both parts, and it goes to the complexities of obviously both residential and the enterprise market, obviously, with 802.11AX, really start to take form now and into 2019, and then going to 4x4 MIMO, and some of those going to 8x8 MIMO, and then also some of the demands on the market to really create these mesh network APs, all that is driving to obviously a small form factor. The incumbent, as Jeff highlighted in the remarks, the incumbent, you know, dielectric resonator designs are fairly large in size, in that they, from an assembly and a yield standpoint, they impact the yield of the systems, and as you know, many of these systems are in the hundreds of thousands and millions of units per year, and you multiply the number of filters in each system. It's a pretty significant opportunity that presents to us and we just have to deliver those samples to the customers and then just continue to work with them to get them integrated into their system.

Cody Acree:

Knowing that the customers are going to want to test your ability to deliver in volumes, and that that's one of the proof points, I assume, that they're not only wanting 5.2 and the 5.6, but they want to make sure that you can meet their volume needs with, I guess, appropriate yields, but assuming that the candidate will fab ramps as you expect and that you are able to deliver those in volumes, are there any other major milestones? It would seem like a rather no-brainer decision if you can shrink by 23 times and you've got better power handling and your performance is on par, that the entire WiFi market would shift relatively quickly to these types of parts, assuming that you can meet your specs and your milestones, but are there other hurdles I'm not considering that might slow that pace or adoption, or how are you expecting that penetration to go?

Dave Aichele:

Yes, one of them is price. The dielectric resonators, you've got a handful of suppliers in that market right now, five that I count to today, and they're all Far East manufacturers and they're very competitive in taking market share. One of the things that we're doing is really differentiating on value proposition to our customers. We don't want to get into a price war. I think when you have certain models from the OEMs that are low-tier, lower performance type than the dielectric resonators, they're probably going to maintain that position, but when you have the higher performance systems, higher MIMO type systems, and enterprise, and also some of the high end retail gaming type routers, and some of the, as I mentioned, the mesh AP designs, which are critical to reduce the size form factor, that's where they'll pay a little bit more premium. We're really positioning ourselves to align with the customers looking for the value proposition first and then we'll look at those other opportunities that are maybe more lower priced decisions on the OEMs and decide to engage or not.

Cody Acree:

Then, lastly for me, I guess, just from a competitive standpoint, knowing the challenges of polycrystal, we still see Qorvo and Broadcom continuing to push toward the higher frequencies. I know that they've been challenged to get above 3 GHz. What are your thoughts on the competitive dynamics and how is that changing, and by the time that you're shipping in production, do you expect them to be encroaching into that 3-plus GHz range?

Jeff Shealy:

Hey, Cody, this is Jeff. Yes, I do, I expect them—they're continuing their developments as they see fit for their strategy. As I've always said with our business, we're a small company, so our challenge is—what we bring to the party is innovation. What we demonstrated to the industry—I mentioned in my comments the paper we published. You can see direct comparisons of single crystal power handling compared to polycrystal, and that's on our website. That was presented in front of the industry a couple weeks ago. Where I think we really excel is in these higher power sockets, where power is very important at very high frequencies. Our platform is directly scalable to these higher frequencies. We'll also be demonstrating, we expect, with the 5.6, a very wide band with filter capability later this quarter, as we've stated in the corporate deck.

I think, where performance is differentiated, I think we've got an excellent platform to compete in these high frequencies. The competition is going to do what they do with their current technology. I've made some differentiating comments in my comments earlier about how we're uniquely positioned and our process is flexible in terms of manufacturing both technologies and comparing the two, so we understand and know where our technology is better. I'll probably stick with my comments, stay with my comments on where we excel and let the other folks speak for themselves.

Cody Acree:

Thank you, Jeff, for that, and one last question.

Operator:

Mr. Acree, I'm sorry to cut you off, but we're actually going to have to move on to the next question.

Cody Acree:

Okay, thank you.

Operator:

Our next question comes from the line of Rick Schafer from Oppenheimer. Moving forward, we do ask that everyone limit themselves to one question and one follow-up.

Rick Schafer:

Yes, thanks, and thanks for the update, Jeff. Maybe my first question is if you could provide maybe just a little more color on the four 5G smartphone customer engagements that we've been talking about. I'm curious what customers are saying to you right now, kind of what they're telling you, what they like or don't like, or what their concerns are, where we stand today; and as part of that question, it sounds like—and tell me if I'm reading too much into this, but it sounds like some of the investments in production that you spoke about today are to support at least one expected smartphone ramp, if we look out to 2020; is that correct?

Jeff Shealy:

Rick, good morning to you, and thank you for the question. Let me touch base—and I need to be a little careful here on these matters. In terms of—I'll start, in terms of what we've previously said, to be clear, is we have a requirement to make investments in production capacity. That is clear, as I said in my comments. We've got to move from tens of millions of filters per year to hundreds of millions of filters per year. What I would say where we need to get to for smartphones will be another order of magnitude above that, to have plenty of cushion and capacity to address multiple markets. What we're taking the first step in is to address both WiFi, as well as 4G. Your question was around 4G infrastructure, but I think WiFi comes into play because you're talking about smartphones, but I do believe that WiFi is also a consideration for our capacity expansion. If you ask me what—your question was around what are our concerns. Our concerns are that we have the capacity to address orders as they come in. I mentioned the challenge for us is the lead time being nine months, as well as the need for cap ex. Those are the concerns that we have. We can demonstrate to the customers the wherewithal that we can be there to design the product, as well as to produce it in high volume.

Rick Schafer:

Okay, and then maybe just a follow-on to that. If we look at next year—and obviously next year's a revenue, a big revenue ramp here for you guys—should we model a step-up anywhere, a step-function up in costs or cash burn, or is it sort of a more linear spend next year for you guys as you ramp capacity?

Jeff Shealy:

My statement directly there is too early to comment in terms of that. I think what we've announced is we are developing—we have been—we've received purchase orders to develop in these higher frequencies.

The customer requirements are potentially very high. These are Tier-One-based customers. We have to look at that very confidently. What I will tell you, if you track the milestones that we say we're going to hit, we've been very specific in the 5G infrastructure, that certainly that is one that will drive significantly volume potentially, and also the WiFi also has significant volume. Our view on the WiFi is that market, we're not waiting on a development market, that is market is here now, and what we're working on is having the right product configuration to address it.

Rick Schafer:

Thanks, Jeff, and if I could squeak just a quick one in. From your release this morning, you talked about reducing development time with each successive new filter that you're putting out there. Can you talk about what development times look like today, on average, and maybe what your long-term targets are? I guess I'm curious sort of what the impact could be on qualification timing with new customers.

Jeff Shealy:

Okay. Let me comment on a couple of those things. At a very high level, what we said in the announcement was that we delivered, from the time a customer gave us the spec to the time we handed them two new designs, was less than six months. I can tell you that was a completely band for our technology. I think that's significant, because if we didn't already have existing demonstrators at that band, then we have to start somewhat from scratch. Our process has been pretty well—it's very controlled over the bands we're designing around, and it's predictable. What we've demonstrated for a new band, our cycle times, if you view we have to run two cycles to hit a product specification, you can kind of read into it that we're less than three months per cycle, and if you look at what we're looking at doing in capacity, our wafer fab capacity will continue to drive down, as we increase the capacity, the wafer cycle time. We continue to drive that down, but I would see our product cycles—each cycle is in the two- to three-month range, based upon the data that we put into the press release.

Rick Schafer:

Great, thanks, Jeff. Thanks, guys.

Jeff Shealy:

Thank you, Rick.

Operator:

Our next question comes from the line of Harsh Kumar from Piper Jaffray. Please proceed with your question.

Harsh Kumar:

Yes, hey, guys. First of all, thank you for holding the call. I had a couple of really simple questions. When you compare yourself to your—your technology to your competitors, predominantly Qorvo and Broadcom, which are doing BAW today, is there a specific criteria that they stumble on, relative to your technology? In other words, I get the size, frequency, board space and cost, but is there one where they just absolutely stumble and fall on, and where you think you will have the most dramatic criteria for success?

Jeff Shealy:

First of all, good morning, Harsh, and thank you for your question. First of all, there are two fundamental innovations that Akoustis is doing with its XBAW technology. First is the single crystal-based material on the material side, of the materials that we're using, and second is the MEMS-based manufacturing process that we're using. Now, when we compare ourselves against the rest of the industry, I would say we are the first single crystal-based technology in the BAW space and the other folks that you mentioned are polycrystalline-based, by all measures of any—any measure of their technology. The very brief answer is we differentiate ourselves from both those companies with the power handling of our technology.

I would point you to the published paper that we presented to the industry a couple weeks ago. There's a nice plot where you can see the power handling of both single crystal and polycrystalline materials that we were able to produce in our process. That's the best apples-to-apples comparison that we can compare and contrast between looking at the dependence of the material quality on the overall power handling—and, again, that contrast is fundamentally on the material front, where approximately 2.3 times higher power handling, as published in the paper, compared to those incumbents.

I would also add, if I could, Harsh, we've made our own—the paper that we published is our own internal study. We also added to that paper reliability. Higher power handling translates directly to reliability. As these frequencies for 5G, as well as WiFi, as they continue to increase in frequency, then the technologies have to scale, and when they scale, typically, what takes a hit is the power handling, and so one of the industry challenges that our technology directly impacts is we're able to demonstrate—and this study is at 5 GHz—that we can hit high power, high frequency simultaneously, and that addresses the market need.

The final point is two outside companies that have sampled our technology and provided us feedback, separately, both indicated that—and they're very seasoned in the marketplace, particularly with these filters—indicated that we have a very power handling process for bulk-acoustic wave filters.

Harsh Kumar:

Thank you, Jeff, and if I can get one more in just real quickly. I know that today in the mobile space, somebody was asking earlier, you are predominantly working ODMs, I think you mentioned. The model, my understanding is most of these other guys work directly with their Tier-One OEMs. I know you're not there in size today, but you certainly have the DNA and the genetics, product-wise, and technology to get there. I'm curious, are you talking to some of these OEMs directly, and I'm curious what they have to say. I know you may be limited in what you can answer, but we'd be just curious what their take is.

Jeff Shealy:

Yes. My first comment is we've been very careful going through the disclosure process on any information. What I can say, I can speak to what's in our corporate deck. We bifurcate the mobile market by both the ODM, or they're RF module-based companies, and the second category that we bifurcate is the baseband chip companies. Historically, most of the system information and the specs are driven by the baseband and system houses, so we prefer to work in the left-hand column, dealing directly with Tier-One OEMs.

One thing I would point out, that's evident on that slide, is there are several cases where—how the industry's reconfigured, where the baseband guys also have front end module capability. Whereas we're not a front end module player, we expect to compete and provide filters in the front end, it turns out some of the baseband guys have front end capability and we're pretty well strategically aligned with that. In that regard, we like our positioning, we don't see a need to change our business model to access the Tier-

One OEM roster, and, quite frankly, we think it's a pretty good strategy in terms of our IDM model, and I want Dave to come in, as well.

Dave Aichele:

Hey, Harsh, this is Dave. The only other thing I just wanted to comment on is all those clients on that corporate deck that Jeff mentioned, we have been talking and engaged with these guys, and the discussion around where our technology differentiates on power is resonating with these guys, on being able to—particularly, looking at the 5G spectrum, as it's getting integrated both in obviously the handset and also on the infrastructure side. The handset, looking at coexistence requirements up there, and it's either obviously the OEMs, the ODMs, or it's the RF front end module guys, or it's the (inaudible) chip guys. Our engagement, we're talking to the Tier-Ones of that industry and the engagements are all around, what does your technology differentiate and comparing against their need. We're in a good position there and continue to present our technology to those customers.

Harsh Kumar:

All right, thanks, guys.

Jeff Shealy:

Thank you, Harsh.

Operator:

Our next question comes from the line of Suji Desilva from ROTH. Please proceed with your question.

Suji Desilva:

Hi, Jeff. Hi, Dave. Hi, Tom. Thanks for all the detail today. On the products and customers you have wins for and ramps, what is the ASP range, Jeff, we can think of, by category, just to get some broad ideas on what kind of ASPs would be built into the unit volumes for the future?

Jeff Shealy:

First, good morning to you, Suji, or perhaps good afternoon to you now. I'll let Dave take that question.

Dave Aichele:

Obviously, we've got four segments that we talked about, and I think if you look at the script that we provided, the WiFi market, if you take it down to the price range that Jeff talked about, you've got price ranges in the per filter around \$0.50, plus or minus, depending on the application. The WiFi market, that's one that is not as price sensitive.

Obviously, the mobile market, particularly the 4G LTE market, with SAW, TC-SAW, and some BAW devices, are much lower priced than that. What we're looking at is, applications particularly around the 5G, north of where the 4G LTE pricing is.

As you get into the infrastructure side, what I can comment on is—where we're really excited about is the 5G segment, the infrastructure segment, particularly in the new frequency bands, the 3.5, going up to 4.8 GHz, where they're utilizing cavity-type filters that are significant buys, increase over BAW technology, and also in price. We are offering a significant cost reduction from there. Those filters are in the range of

\$10 to \$20, when you look at a FD-MIMO system that's going to be 32 components in array, or even 64 components in array, and you reduce the cost of the filter from cavity by half. Then, you're getting into a significant cost savings to the OEM. That obviously moves the needle and gives us an opportunity to engage with more than just one infrastructure OEM.

Finally, defense, defense is, depending on the volume there, you get systems that are in the thousands to hundreds of thousands, and it's just really depending on the application, but your prices can be in the tens of dollars to hundreds of dollars per filter.

The good thing is our technology right now, as we've highlighted, in the 3 to 6 GHz, is servicing all these customers, leveraging that technology, and really just designing the right filter and obviously pricing it appropriate is our objective.

Suji Desilva:

Thanks, Dave. Then, on the manufacturing side, I thought I might have heard you say in the prepared remarks that perhaps, to address higher volumes to smartphone guys, you might look to partner for manufacturing. I'm wondering if that implies the XBAW technology is at a point now where it can be ported to another manufacturing facility to run along with in-house or whether you'd focus on in-house capacity, whether that's a viable option to provide volume quickly to a large customer.

Jeff Shealy:

First and foremost, I'm aware—if you think about porting to a silicon fab, you've got multiple aspects of the manufacturing that create challenges there, so this is not—historically, this is more of a niche technology compared to something that big silicon houses can just straightforward run. I would add this is one of the technologies that is most heavily integrated in the design because of the trimming function to hit the high resolution and high precision required for the filter. What you're mentioning is potentially a licensed-based model. First and foremost, we'd have to find a partner that could do the materials, the wafer processing and the trimming, and have their expertise in place. That's a challenge with going with that approach.

We don't rule any business opportunity in or out. What I would say is we're focused on filling our manufacturing capacity at this time and we're focused on—since your previous comment was around ASPs—is being selective over the business that we actually take in, to where we maximize the ASPs as we're ramping the plant. Just to recap, wouldn't rule out licensing, focuses on ramping the fab internally, and there's challenges about just directly porting a technology to any other plant. I would even include any of the other two big guys. Someone who's already doing bulk-acoustic wave, our manufacturing flow is completely different and our materials science is different. It's not just straightforward handing off a recipe and someone can pop up and do it.

Suji Desilva:

Okay, helpful color. Thanks, guys.

Jeff Shealy:

Thank you. Take care, Suji.

Operator:

Our next question comes from the line of Quinn Bolton from Needham and Company. Please proceed with your question.

Quinn Bolton:

Yes, hey, guys. First of all, thank you for holding the call today. I just wanted to ask a question. You guys have highlighted your power density and your first designs seem to be focused more on the infrastructure for both cellular, defense and WiFi. I'm wondering if you think you've got more of an advantage in those infrastructure markets where you typically have higher power levels relative to the handset market? Then, my second question, as you develop filters for the bands, the infrastructure bands, say the Band 225 that you announced this morning, how much work would it take to take that infrastructure design and port it for a handset design? I know you talked about the wafer level packaging as something you need to complete to get into handsets, but can the same base filter design be ported pretty quickly, once you've developed it for infrastructure, over to the handset side? Thanks.

Jeff Shealy:

Good morning, Quinn, and I'll let Dave start and I'll comment if needed.

Dave Aichele:

Hi, Quinn. I guess on your first question with regards the power handling, yes, it definitely is an advantage for the infrastructure. As we commented, on the new architectures of FD-MIMO, the power levels of each element going down to one to five watts is an advantage that we're going to play off of, but I also would say that the power requirements in the handsets are important, as well, for two reasons. As Jeff highlighted, particularly when we're looking at the 5G spectrum in that 3 to 5 GHz, there's really no BAW technology to date that's, you know, chipping, other than ours, commercially in the market today, and so we are getting interest from people that need access to the technology, but we see there also, as you go up in frequency, the size of the filter resonators go down in size, so the ability to handle power Class 2, each PUE, if you've heard of that, which was driven primarily by things like Sprint with the Band 41, and they have to go—concerned about propagation distance at the higher frequencies. That's going to push the existing incumbent polycrystal technology limits, because you're increasing your power handling by almost 3dB. I think this is going to play to our favor, in addition to—obviously, there's requirements out there that there are some coexist of those higher frequencies that haven't been demonstrated, so we're out there having that discussion with OEMs.

With regards to the second question on the Band 25, yes, the design that we have right is two discrete filters. To do a duplex type design, which is in our roadmap, be it Band 25 or others, it would require redesign, primarily just because of the close proximity to the dye in the package, but it is something that we could leverage, obviously, on the existing design, to do that. The thing it comes to is, obviously, opportunity costs. You're going after a lower price component versus the needs, maybe, on the 5G list, so on the 4G LTE, but it really is more strategic discussions we'll have with the OEMs as to what their priority is and making sure it's a good fit with us.

Jeff Shealy:

This is Jeff, Quinn. We accounted a 1252 product and also a 1652, which is targeted for mobile. The specs are slightly different. In some cases, they could be relaxed in the mobile on some of the specs. However, really, the core engine of the filter is very, very similar between the two. What is typically done on a design is you have to optimize for the external interface. If it's a discrete filter, then that's a particular interface; if it's a wafer level package for a handset, that's another interface. I think the bigger issue, as I think about design of these devices, is do we have high-performance designs in filters at these

frequencies. If we do, then they can be ported from one application to another, and we go through the things that Dave discussed, where like opportunity costs and what's strategic for us. That's how we think about it, but it's certainly not dramatic—the chip size itself is not dramatically different between the two applications, it's mainly the interface that has to be reconsidered.

Quinn Bolton:

Got it. Thank you.

Jeff Shealy:

Thank you, Quinn.

Operator:

Our next question comes from the line of Ashok Kumar from Think Equity. Please proceed with your question.

Ashok Kumar:

Thank you, and thank you, Jeff, John and Dave. A two-part question. The first part, Jeff, you indicated on the challenges in the mobile handset market and specifically the front end module. The (inaudible) complexity again favors the module vendors and today many of the phones rely on FEM, or the front end modules, to integrate a lot of the RF front end components for one or more bands using the smartphone design, and most of your competitors in the space use modular and partnerships to access all the requisite components for the front end modules. This includes Broadcom, Skyworks and Qorvo. I was wondering—you talked briefly about the strategic relationships that you're exploring to scale up your footprint for this opportunity, could you please expand on that?

The second part of the question is actually for John. Your bond is currently at about \$5 million a quarter. I know a lot of it is dependent upon when you place your capital purchase orders. What is the timeline? Given, I think, Jeff, you had indicated you had to place a capital requirement a year ahead, when (inaudible), at what level. The operating expenses currently are running at about \$25 million, \$26 million annualized and what would be the right number for '19 and '20 fiscal years? Would \$30 million to \$35 million be the right number? Thank you.

Jeff Shealy:

Okay, let me start with your first question and then I'll hand it off to John on the financials. You stated that 5G is expected to be very heavily integrated and module vendors also have significant advantage. What I would share there is take a look at some of the module manufacturers, they're also the baseband chip manufacturers for 5G. Therefore, at the end of the day, the module manufacturer needs the high-performance, high frequency chips in the 5G spectrum. As we said in our prepared comments, the WiFi market is expected also to potentially grow in the handset at 5 GHz, with potentially tri-band architectures coming forth.

Our view of that is we do not want to—we have no plans to expand our business into front end modules. We see an adequate number of opportunities today to provide core chips operating at these very high frequencies, where we believe we're ahead of the industry at being able to produce them, and we have a technology which is differentiated, and we've published those numbers in that study in the journal. In terms of strategics, I would just point you to our deck, you can look at names and judge for yourself, but at the end of the day we're not competing with our customer, whether it's a front end module house or a

baseband module house, and certainly for some of these other alternative markets, that I don't think you're really jumping into, they're still buying discretely and we see opportunities to potentially integrate multiple filters into multiplexer type modules, as opposed to just selling just discretely.

Our integration strategy is certainly different than a traditional FEN. We see opportunities with FEN manufacturers providing differentiated chips and what they can either produce themselves or what they can acquire on the outside, as well.

With that, let me hand it off to John on your other question.

John Kurtzweil:

Yes, hi, Ashok. Going forward, we're looking at—and we've been very effective in managing our cost structure. What we're expecting to do is time revenue and the opex additions associated with that. As we get deeper into the sales funnel, as Jeff said, and we have more revenue, I would expect to see the operating expense increase over time, but until we see that, I would not expect to see a lot of hiring. When we look at our expenses overall, historically, they've been really driven by headcount and factory expenses, and until we see the revenue, we'll add a little bit, but we're not going to be going overboard.

In terms of the capital, as Jeff said, and we've also put on our website, we're looking to increase our manufacturing capacity by 5x from where we're at today. That would take accounts in a couple different ways. One is that we'll go from a single shift to 7/24, so we'll be adding people over time, we'll be as capital-efficient as possible, but it is going to take capital, and over the next two years, we're still working the exact timing, but we believe it'll take close to \$20 million of new capital equipment over the next couple of years to reach that 5x capital, which really was the driver for the equity raise that we just did. I think we're in a good position on both the capital and also the ability to hire the people to meet this ramp.

Jeff Shealy:

Ashok, I just want to clarify one comment John made. He said 5x to capital. It's 5x to capacity.

John Kurtzweil:

Yes, 5x to capacity.

Ashok Kumar:

Thank you, John and Dave, really appreciate it.

Jeff Shealy:

Thank you, Ashok.

Operator:

Our next question comes from the line of Dennie Braun from Wells Fargo Advisors. Please proceed with your question.

Dennie Braun:

My question's been covered, thank you.

Jeff Shealy:

Thank you, Dennie.

Operator:

All right. Our next question comes from the line of Bob Johnston from Herald Investment Management. Mr. Johnston?

Bob Johnston:

Yes, can you hear me now?

Operator:

Yes.

Bob Johnston:

Great, thanks.

Jeff Shealy:

Hi, Bob.

Bob Johnston:

I appreciate that, as well. Hi, Jeff. How are you?

Jeff Shealy:

I'm well, thank you.

Bob Johnston:

Good, good. I just want to follow on from that last question and just talk about that increase in capacity, 5x. You've laid out a lot of very positive potential milestones over the next couple of years. What would that get you to? Would that get you to the end of next year, would that require something significantly more, or what should we think about in terms of how that \$20 million of new capacity will address a portion of potential needs.

John Kurtzweil:

Yes, this is John, and, Bob, that's a very good question. As we look at it, the \$20 million and capital will get us through at least the next two years for that and get us to the point where we have better visibility into the larger customers. It will get us into the WiFi ramp through the infrastructure that we have and the initial mobile handset business.

Jeff Shealy:

Yes, and, Bob, I add to that, you know, capacity—and I mentioned this in my prepared comments. Capacity is a big swinger for us, depending on these markets. We've mentioned four end markets that

we're engaged in. There's various plans, different scenarios that can drive different outcomes on how rapidly we have to invest. In our planning process, we plan on—we have a capacity plan, expansion over the next couple of years. I think John articulated what that looks like. It can vary from that. I think perhaps the biggest variation that one would expect would be something in mobile come and ask us to increase capacity. There's different scenarios and it certainly varies by market.

What I can say is the initial markets that I've announced and the plan that we've kind of commented against, we've got a capacity plan, we've got a strong balance sheet, we expect to have the cap ex we need to execute on it, and it'll support revenue ramp in the second half of '19. As I said in my prepared remarks, it's really the lead time to get the capacity in place, and for these new markets, being late is just not an option in our mind in a new market.

I hope that answers your question.

Bob Johnston:

Yes, just the follow-on is, as you add that capacity and you go to additional shifts, what does that do to your headcount and what does that potentially do your burn?

John Kurtzweil:

Well, what it would do to our headcount—right now, we're on a single shift and what it would do to the headcount as you go to a second shift, our headcount up in New York would probably increase by probably 30%, and then when you go to a 7/24, you're not adding a lot of the management and a lot of the other infrastructure stuff, so it would probably increase by another 30% on top of that to cover the other two shifts. In terms of the burn, what we're not going to do is we're not going to be adding a lot of people until we have the revenue to match it against. I don't expect to see a large increase in our burn ahead of the revenue.

Jeff Shealy:

Yes, and I want to just pile on John's comments, that the headcount we would add in operations is going to be part of cost of goods. Clearly, we'll have to bring that in likely a quarter, roughly a quarter ahead of time. Capital takes us nine months to bring in. We're going to work and optimize—we're going to work with the operations in New York to optimize when to bring capital in and when to bring headcount in. Certainly, we can respond much faster with headcount and we get higher utilization, up and to the point we're running 24/7, and then it's the capital equipment purchase. I just wanted to add that additional color.

Bob Johnston:

Great, thank you.

Jeff Shealy:

Thank you, Bob.

Operator:

Our next question comes from the line of John Gruber from Gruber McBaine. Please proceed with your question.

John Gruber:

I never thought you'd get to this call. A couple things. What was the—the original announcement today, if things go right, what could be the volume for that in calendar '19? The bond's about \$25 million.

Jeff Shealy:

Good morning, John. I'll hand it off to Dave and I'll comment accordingly.

Dave Aichele:

Yes, John, this is Dave.

John Gruber:

I want real numbers. There's been a lack of numbers in this whole call. The revenue of this Company has declined precipitously every three months, the projections. We need some real numbers here. It's nice to have technology, but without sales, it doesn't do a lot of good, as you know from the stock down 50% here. What kind of revenue can we expect from that Tier-One?

Dave Aichele:

Yes, John, this is Dave. The volume—again, this is a small cell type application, so what you can expect from this type of application is that you're in the high hundreds of thousands to low millions type volume, and we're talking about two filters per system. I think what we announced is that we have visibility for 0.5 million units, so that's \$250,000 per filter, and then obviously continue to ramp from there. The ASPs are below—from a standpoint of that type of application, you could expect \$1.00 each. You can model that with those type of—that type of feedback.

John Gruber:

Okay, thank you, and then a last one. All this stuff we discussed today, how does that change your calendar '19 and calendar '20 revenue forecast? Does it increase it or is it still the same and this declining mode we've seen here in the last two years?

John Kurtzweil:

John, this is John Kurtzweil. Where we have the analysts, and we have discussed with the analysts, for the most part, they're all in line with where we currently believe we're going to be. Their models are up to date. There's one that's an outlier, but we've been told that he's going to adjust that model. I think that by mid to next week, you're going to see models that are in line with where we expect to be able to deliver the revenue.

John Gruber:

Well, I know what that's on Bloomberg. I don't know how much the outlier affects it. But, I mean, the number is pretty pitiful, \$3 million in fiscal '19. It used to be multiples of that a year ago. Since you're getting everyone aligned, where should everyone be for fiscal '19 and fiscal '20, revenue, top line-wise?

John Kurtzweil:

The top line, they're all in line, somewhere between \$2.5 million and \$3 million for the year. That's where we're currently targeting.

John Gruber:

The next year, in '20?

John Kurtzweil:

In '20, a lot depends on how the programs ramp, but the expectation is that we're going to have a mobile order that we're going to be able to deliver against in the second half of the calendar year, or the first half of fiscal '20, and get a revenue up beyond that. We have the opportunity, at that point, to grow the revenue and our target is to get to breakeven, somewhere around \$13 million to \$15 million a quarter, and we have a chance to do that by the end of our fiscal '20.

John Gruber:

Thirteen to fifteen million a quarter by the end of '20, fiscal '20.

John Kurtzweil:

Yes.

John Gruber:

Fiscal '20 you said?

John Kurtzweil:

Yes.

John Gruber:

Okay, thank you very much, that's helpful. Thank you.

Jeff Shealy:

Thank you, John.

Operator:

Our next question comes from the line of Mike Cahill from Crispin Capital. Please proceed with your question.

Mike Cahill:

Thanks for doing the call, guys. Just a question on the cap ex. Given how strategic or superior you are with the filters that you're offering, could you get some—almost like a strategic partner to help finance some of that cap ex in the future to lock in production or output capacity for you as a kind of a trade-off? Thanks.

Jeff Shealy:

Hi, Mike. Jeff speaking here. In terms of how we look at this, there's initial cap ex, as I said, that gets us into the hundreds of millions of filters per year, that we have a balance sheet to support. I think beyond that, for particularly the mobile market, which is a scale-up from there, we're not looking at taking on that full risk ourselves, and so we will continue to explore that. That's an added conversation to any engagement that we have in the mobile arena. As I said in my prepared comments, that is likely how we would proceed in mobile with any high volume. We do not want to be installing capacity without some sort of guarantee that it's going to be utilized.

Anything else you want to add to that?

John Kurtzweil:

Yes. As we look forward on this, it's very important, when you look at the industry and look at historically what's happened, is that not just in this industry, but other industries, is that you get a major player, they'll put large demands on you, you'll invest in the capital, and then they're not there. Getting back to Jeff's point, is that we're going to make sure that when we invest in the capital we have the backing, in terms of purchase orders or other commitments, to make that capital investment. Those commitments may come in the form of a purchase order that are non-cancelable, they come in the form of they're going to invest some capital into the factory, our fab. There's many different ways that we're looking at getting there.

Mike Cahill:

Thanks, that's it.

Jeff Shealy:

Thank you.

Operator:

Our next question comes from the line Brook Deaver from Infinitas. Please proceed with your question.

Brook Deaver:

Thanks, again, for having the call today. I've been a shareholder personally since January of 2016, and as an advisor, I've lots of clients that have positions, and so there's no question the financing was painful recently for shareholders, but thank you for the presentation today, because with that, it gives us all a better understanding of why you decided to take that approach.

My question is related to the WiFi router market. You mentioned that the existing—first of all, you mentioned the advantages you have over the incumbent dielectric approach, and you also mentioned that there's a certain percentage of the market that's enterprise and high performance. You stated earlier that the market is expected to be \$540 million by 2020-ish. What percent of that market is the higher performance and enterprise piece? Then, how successful do you think you'll be in converting the dielectric producers on the lower end to use your filters in future models?

Jeff Shealy:

First, Brook, thanks for your question and thanks for you comment. I'll let Dave answer the first part of the question; I may add to it.

Dave Aichele:

Yes, Brook, this is Dave. If you talk higher performance—and, again, you've got to look at—the WiFi market is broken down into enterprise and retail, and then within enterprise and retail, it's broken down between tri-band routers and also dual-band type. The way you have the transition right now going on, that most of the designs going out into the market are now tri-band architectures, and a lot of this is driven by this mesh network and being able to use obviously multiple bands to connect up to the users, but also use some backhaul between devices. Again, the number of filters, the number of bands being utilized on a system are increasing, and obviously the smaller size reductions is important. If you break down the retail and the enterprise, the enterprise is probably about 30% of the volume and the retail is the rest. A lot of the volume is driven through the retail, obviously, for consumers. If you break down what percentage of the systems are more higher end, it's a smaller percentage in the retail, but a higher percentage in the enterprise. What we're really focusing on right now is the enterprise, obviously, for the higher performance, and then a select few on the retail side, that are really driving performance for the mesh networks. Hopefully, that gives you a little bit more color on the breakdown on percentages.

Brook Deaver:

Great. I guess the follow-up is—I know Jeff said in past presentations that you all feel like you can dominate the WiFi market. Do you think, is half to big for you, does “dominate” mean you get half the revenue, or how do you feel about that?

Jeff Shealy:

What I would say is we play—if you look at where our focus is in the tri-band, which is the dominant architecture that's out there, today two-thirds of that architecture consists of a dielectric resonator. We've mentioned what our strategy—our strategy is pretty clear. We have the 5.2 and we're expanding, and one of our milestones for this quarter is to get the 5.6 to a select target group of customers. Two-thirds of that market is roughly in play for 5 GHz, and our business objective is to get more than our fair share of the market there. Right now, we're the only one that can service that, and I believe we'll be the first into that market with both parts. It's a greenfield opportunity. You've got to have the product portfolio to play. We believe we're going to be first in the market with the product portfolio. That usually ends up being pretty well. But, our strategy is to be dominant in the markets that we go after and I think that's a good business strategy with a new technology and able to address a new market.

Brook Deaver:

Thanks, guys.

Jeff Shealy:

Thank you, Brook.

Operator:

Our next question comes from the line of Robert Carlson from Janney Montgomery Scott. Please proceed with your question.

Robert Carlson:

Hey, guys. Can you explain in layman's terms why your single crystal filters can outperform today's state-of-the-art polycrystals?

Jeff Shealy:

Yes, Robert, good afternoon to you. I'd be happy to address that question. In layman's terms, I'll touch on what we've said in the script, but also, as I've said to an earlier caller, there are two innovations to our technology. First is the single crystal material, the second is the MEMS manufacturing process that we're running. Your question was to the single crystal-based materials. These are low-defect materials, so they're very—they're pure, they can handle a lot of heat, and also sound waves move through them very quickly, and so the advantages translate to the 2.3x advantage and power handling, so we have higher power; that is, a higher power single be passed through them before they're damaged. What that directly translates into is reliability, because the power handling capability determines how much power you can reliably put through the filter, and as we go up into these higher frequencies, the link budgets get tighter because of some of the atmospheric losses, and so you have to transmit more power or put the repeater stations closer to one another, both of which are good signs for our product in terms of performance and/or unit volume. But, the answer to your question is it enables high power systems to operate in 5G, as well as it allows us to have reliable operation for WiFi routers.

Robert Carlson:

Thank you.

Jeff Shealy:

Thank you, Robert.

Operator:

Our next question comes from the line of Kevin Spellman from DVM Asset Management. Please proceed with your question.

Kevin Spellman:

Hi, guys. I just want to kind of follow up on the chipset that you announced today that's on Band 25 and just if you can speak about your competitiveness. If I go out and look, I can find these filters from Qorvo, Broadcom, even Qualcomm, they're available, so what is it that (inaudible) acoustics, why did somebody pick the time, the six months, and effort and the cost to go to you, when these are available elsewhere?

Jeff Shealy:

I'll let Dave address that, as he's closest to the market.

Dave Aichele:

Hi, Kevin. As we, I think, announced, these are orders that we did receive, so not only did they take the time, but they also are funding the development here, and then also placed a placement order for production, once we get the product qualified. The main things is, as I think Jeff mentioned in the script, that we're hitting really high Q at this frequency, very competitive to obviously other competitor solutions out there. With that higher Q, it's a proxy for improving the insertion loss and also what's called the attenuation in the duplex gap, because Band 25 spacing between frequencies is only about 10 megahertz, so you have to have a high Q with a very sharp skirt, as they call it, on the filters. We've been able to design a filter that has improved on the insertion loss and the attenuation near band in that spacing, that duplex spacing, better than the current solution that they're using. I can't address why

somebody else hasn't delivered to that, from a competitive solution, and what I can tell you is what we're delivering is better than what is out in the market, and that's the reason that the customer engaged on it and it's a tribute to the process and the design team here at Akoustis.

Jeff Shealy:

Kevin, I'll add to that—this is Jeff—that everything Dave described is—just between the transmit and the receive is the property of the filter called selectivity, and so what Dave described is a higher selectivity filter. It also really discusses the concept of coexistence spaced filters. The only point I wanted to add, I thought Dave articulated it well, but these coexistence challenges with 5G and with WiFi expanding are only going to increase with time, and I think that's part of the—if you ask what's driving the market—the market dynamics driving the TAM in the market, is the need for these coexistence. More new bands that are added is going to add to coexistence, and this happens to be a customer where, if you don't have adequate selectivity, then you have coexistence challenges, and if you have coexistence challenges, then your hardware you're producing, it degrades the performance of the hardware. This will be a catalog product that we can sell to this customer, as well as customers beyond, moving forward.

Kevin Spellman:

Okay, and the other questions I had have been answered. Thanks.

Jeff Shealy:

Thank you, Kevin.

Operator:

Ladies and gentlemen, we have reached the end of the question-and-answer session and I would like to turn the call back to Management for closing remarks.

Jeff Shealy:

Thank you, all, for your time today. Just a reminder, we've completed one of the first four milestones we promised to our investors and we plan to update you on further progress this quarter. We look forward to speaking with you during our next call in Q1 of calendar year 2019. With that, thank you very much and I'll hand it back over.

Operator:

This concludes today's conference, you may disconnect your lines at this time. Thank you for your participation.