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ADI - Analog Devices Inc at Raymond James Technology Investors Conference

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DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

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PRESENTATION

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

So good afternoon, everyone. I'm Chris Caso, Raymond James' semiconductor analyst. Our next presentation is Analog Devices. So thanks for being here, guys. With us is Greg Henderson, Senior Vice President at Analog Devices, and I'm probably going to get your primary responsibility wrong. It's communications automotive...

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

And aerospace and defense.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

And aerospace and defense. And also with him is Mike Lucarelli from Investor Relations, former sell side analyst and inspiration to us all. So maybe to start out, and I'll get it going and please, everyone, feel free to jump in and ask questions. The elephant in the room question that everybody's going to ask, so we'll get them out of the way about some of the stuff that's happened in the near term and some of the uncertainty that's been in -- that's been generated from yourselves and your peers, maybe you could talk about that a bit. Because one of the things I thought that was interesting from your earnings calls was you did see the step down in September, but then it kind of stabilized. But I'm interested in kind of your take on that and the take from your customers.

QUESTIONS AND ANSWERS

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes. So I think overall, we feel cautiously optimistic about our outlook. The reality is that different segments are performing differently, so a big driver for us, as we've said, that we look forward going forward for the shift next year is communication. We've had strong growth in communications over the last year and we expect, as 5G starts to ramp, to have continuing growth of communication. We are -- we do expect growth in industrial, albeit slower than we had in previous quarters, but there are pockets of industrial like health care, electronics test and measurement and aerospace and defense that are actually continuing to grow well. So as we did mention on the call that we had -- August is usually slow, but September was slow, but October had recovered and we feel confident in our backlog and order position to the guidance that we gave.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. So, so far, so good. And obviously, things over the weekend were not going to put you on the spot over...



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Well, there's a lot of noise, right? And I think the trade wars add uncertainty and certainly, that's not good but we feel positive about our guidance, I would say.

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Yes, I'll just add one thing. October did do better than September, which is not abnormal because September was a bit weaker. And I'm not going to say we're calling the bottom where everything's all good from here or everything's bad. It has showed stabilization and it's all supportive of the guidance we gave, so we're not the ones calling it's done, it's over, everything's good but it does give us some confidence in the guidance we gave.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Like I said, not getting worse is an improvement over what happened in September, right? So something to be said.

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Correct.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. What about as you look into your kind of drivers over the next year and you mentioned communications as one of them, maybe you could talk about the areas that we should really be kind of focusing on as you're looking at growth rate over the next couple of quarters. What -- level set us in terms of the things that we should really be focusing on for you guys.

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes. So I think communications has been a strong growth driver for ADI over this past year. And I think the good thing about that is that our communication growth over the past year has been -- our communication business is roughly 50-50 between wireless communication and wired. Wireless communication grew faster than wired over the past year, but both of those have contributed to growth. But I think what's important is that growth is really based on our position in 4G. 5G hasn't really delivered material revenue yet. But looking into '19, as we start to see 5G roll out, we expect to continue to have growth in our wired business and also in our 4G business, but we are going to start to see material growth in 5G in 2019 and beyond. So I think one of the biggest growth drivers we have is in communication. We also -- we do see growth in industrial. We've had past 2 years of very strong growth in industrial, double-digit growth in industrial, which we think is kind of maybe abnormally high. We are still looking at growth in industrial for this year, but it's more about pockets. Some pockets of industrial have -- we do see have slowed a little bit like industrial automation, mostly in China, but there are pockets in industrial like health care, aerospace and defense and electronic test and measurements that are actually continuing to grow well. And actually, the electronic test and measurement, again, that's on the RF and microwave space for us that we actually believe is also driven by the 5G. A lot of people are buying the test equipment ahead of the 5G deployments.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. And I want to drill down to each one of those areas as well. But just to kind of finish off on some of the shorter-term stuff, you mentioned some of the slower industrial that you saw. And I think one of the questions a lot of people have is, as we've looked at the last year for some of these sectors that have been affected, do you have a sense that perhaps there were some over shipment in the industry such as there is some inventory to be brought down. Perhaps not even necessarily in your channel because your lead times have been shorter, but I guess what we're trying to get to is a real level of demand so we can kind of take it from there and then put the growth on some of the comm stuff on top of it.

DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

So I would say the first order, when we look at our -- and it's always hard for us to look out into our customer's inventory. We can see what you can see there. But so first order, we look at our channel inventory. It's been stable and our channel inventory's at our target range. Our lead times are at our target range so we've tried to manage that well. I would say even though we talk about some growth slowing in some industrial segments, we believe that most of the core demand is really real demand. And for example, in the factory automation, people talk about factory automation in Industry 4.0, it's not like we think that was a cycle that came and then is over. We believe that there's still a long-term cycle on factory automation and industrial upgrades and so we think that that's a trend that's going to continue. There may be ups and downs in it, but we think that long-term growth driver in Industrial 4.0, is still we're in the early days of a lot of that.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay, before I get into some of the other specific segment drivers, I wanted to talk a little bit about ADI's acquisition strategy. And you've got a particular unique insight because you came from Hittite. And as one of the things actually as discussed in the call is that the revenue synergies from Hittite was pretty impressive. And I'd imagine that given that history, you're kind of trying to apply some of that towards LTC going forward. Maybe you could talk a little about that, about what does did the firm learn from Hittite and how do you apply that?

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Yes. So I think I did -- I came in through the acquisition of Hittite but I think ADI's strategy on acquisitions is really -- ADI is looking for companies that provide core capabilities to ADI to really provide some kind of market synergy and solution synergy. And in the case of Hittite's acquisition, it was really about RF and microwave. And I think we -- the kind of investment thesis was that RF and microwave capability for Hittite, along with the high performance data converter technology from ADI really provides a complete signal chain from markets like what we just talked about: communication, 5G, aerospace and defense, and electronic test and measurement. And actually, all of those have been very successful. And I think the revenue for -- I actually don't know what the revenue synergies exactly were on the input of Hittite, but I can say that the revenue synergies have probably outpaced that. And the key is that through the bringing together of ADI and Hittite effectively, it was able to double the growth rate of Hittite from before and the solutions that were -- these revenue synergies between ADI and Hittite also outgrew ADI's organic growth rate in these markets like communication and aerospace and defense. And the reason for that is that there was really a signal chain synergy. If you take that to Linear, I think the main investment thesis for Linear was that Linear had a high-performance power management technology, which was a capability that ADI didn't really have. So again, it's about that technology capability. We're starting to see those revenue synergies come in the form of design wins in the pipeline now. I think you heard Vince talk in our last call about how we see an opportunity pipeline of \$2 billion now for those revenue synergies. We thought that was about \$1 billion at the beginning. So as we start to really understand the market opportunities for those synergies that's growing and we feel equally positive about that. I think one thing I would say about ADI and Hittite, which I came from, and Linear is all 3 of these are technology-driven companies. So they're really companies driven by technology and innovation. And so that's a common culture across the organization that has made the integration going.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right, and are there particular changes you made? And again, because I'd imagine some of the Linear areas are under your belt now. And Linear, that they had my understanding covering the company for years, very regimented processes, strict ASP and margin targets. How would some of those maybe change? And I know speaking with your management over the last year, so that was some of the intention, that there was value to be unlocked by just maybe changing some processes.

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Yes, so Linear has had and has and now ADI, has great technology, right? So good example, the battery management technology which is in my automotive business. Linear created and defined that battery management space, and we have the best-in-class solution there, for example. Power



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

conversion technology as well, best-in-class technology. But I think the Linear kind of business model was to go after the sockets early, but they tended to avoid the verticals like automotive. Or if they were in those verticals, they tended to avoid once they've got to kind of high volume and became more competitive, they might move on. And I would say in Analog's -- our strategy is we want to compete in these verticals, we can compete in these verticals. Our strategy is, one, we want to bring value technology that has value to the end customers so that we can get paid for it, while we also are focused on price reduction and -- I mean, cost reduction of existing products. And so I think that's different than the -- the Linear philosophy was: let's just go to the next new space. Analog wants to maintain our position and also go after the new space. So it's more of a growth strategy. We want profitable growth but we brought that. And I think we are bringing that business mindset to this technology. The good news is great products, the technology is there, it's really just about business mindset and it's, I think, to the management team, it gives a lot more opportunity. So we're starting to turn that and I think we'll see that turn to growth, especially in the verticals, because I think Linear was well penetrated in the broad market but the verticals like communications or in like, automotive, they were relatively less penetrated.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right. And you're confident you can do that without sacrificing their margins which was...

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

I would say that we're confident we can do this in a way that will support the ADI model. So we support the ADI model, we gave a model on our Investor Day maybe what, a year ago? Yes, we're confident that we can support the ADI model in gross margin, ADI model in profitability and also in growth. So we're confident that we could support the model. Part of that is through the scale of ADI. We have a much larger manufacturing operation and so we can bring some of our scale in manufacturing and operation on the cost side as well.

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Yes, just quickly. It's just not about pricing. We can lower prices at Linear but also lower cost and so drive good gross margins. And thinking about Linear's portfolio today, they're actually doing record revenues in the quarter and the gross margins are higher than they've been -- than they were when we acquired them. So it's not all about pricing, it's about cost reductions and driving revenue synergies for this company.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right. So you actually -- you've improved on the gross margins at Linear since you've -- and that's -- they were the highest gross margins in the industry, so that's pretty good. So I'd imagine they're still are.

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

They're still very good.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. Maybe move onto some of the product segments and maybe let's talk about comm and specifically, 5G. And maybe you can contrast a little bit because you guys have actually been growing very well in 4G over the last year, 1.5 years or so, even as that has slowed, so -- but how does that -- is it -- maybe you could talk about it, like how do you make the transition from 4G to 5G? What's your strength and what gets your place at the table there?



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes. So I think that we have had good growth in 4G over the last year. I think part of that growth is we have seen some increase in CapEx spend for infrastructure over the last year, it's been an improving environment. But that's not the whole story. We also have a very good design position, so we have a good share position in 4G. A lot of that design position is based around our software-defined transceiver that we've talked about before. This is a category that we created. We're on our fourth generation product. And the good news about that product is that sells in macro, it sells in small cell, it also will sell in 5G. We also have significant revenue synergies in this 4G from the Hittite acquisition. So some of our 4G design wins are based on Hittite technology that we have brought in as that revenue synergy as well. And so I think that it shows our position as we look into going towards 5G. So it's really about the share position that we have now. And the good news is much of that technology that plays in 4G is the same technology that plays into the 5G solution.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right. And I mean in the past, what you've seen is -- and with your software-defined transceiver, that's not how LTE started. Because I guess, that point, you didn't have that position at the early days of LTE. Is that more of a situation of the maturity of that product line? In other words that product matured later, or is it a point of the lifecycle of the 4G technology that you've...

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

I would say we see this as an evolution, so we created the software-defined transceiver and I think that it was maybe an architectural innovation, for how to build the radio and how to build the base station. And it was an architectural innovation that was -- it brought a lot higher levels of integration and maybe some of the tier 1s thought it was risky. And so it took us time to prove that, that architectural innovation could satisfy the requirements. And I think it started out that it looked like it was good for small cell but it took a long time for small cell to happen, but we were able to prove that, that architecture is the optimum architecture for small cell, for macrocell and it actually is the only architecture that will support massive MIMO at the levels of integration that you need. In many ways, that architecture enables the massive MIMO radio. If you didn't have that level of integration, size power consumption, you really couldn't build a massive MIMO. So I would say from our perspective, it's architectural innovation. It takes time for that to get accepted in the market but now, it has very high penetration. And in the go forward, we believe that this architecture is the architecture that's driving 4G and 5G in the future.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right, so that you -- by proving it out on 4G, you don't have to wait until later stage of 5G for that particular product to ramp?

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

That's right, that's right. And we have technology today that is in the latest generation 4G base station. That same product is in the 5G trials.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. And in terms of timing, what's your estimate of timing of -- because you're seeing some benefit now from the early trials.

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes, I would say we are participating obviously and we've shipped into the trial but revenue hasn't been material for ADI based on 5G yet. But we believe that in 2019, we will start to get material revenue from 5G. Exact timing of the ramps, you can try to guess as close as we can. What we feel comfortable in is that we feel comfortable about our design position and we feel comfortable that this is going to happen, it's just modulated by exactly the timing of the carrier rollout.



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Got it, okay. Maybe move on to another one of the other areas and your responsibility at automotive. And automotive has not grown as fast as maybe something you guys have liked over the last year. So maybe you can talk about what changes on that, what are the areas of automotive that you're targeting? Obviously, the automotive market is a rich market for semiconductors, there's a lot of opportunity there, where do you participate going forward?

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes, so I think the reality is that ADI -- we feel very positive about the outlook for ADI's automotive business. I think we have probably grown slower than some of our peers due to a couple of reasons. And I would say that on the legacy ADI side, we had a large business in safety MEMS that we are no longer investing in. So we continue to participate in that market but we're no longer investing in that market. And on the Linear side, we already talked about this, how they penetrate the verticals but then don't necessarily stay in. And those things have contributed to the growth. But I think the focus we have in automotive, we feel very positive about first is 3 areas in automotive we're focused on: electrification, infotainment and autonomous driving. And those are the areas that we're investing in, those are the areas that we feel like we have good solutions towards. And so we feel positive that the macro trends that are driving those are going to sustain even if SAR is kind of flat, and we feel very positive about our position in each of those areas. So I think we feel strongly that this growth will start to turn. In the case of electrification, we talked about will Linear really define this battery management technology? We still have the best-in-class performance, we're bringing a lot more feature sets to that in terms of safety and total cost of ownership, and we have good traction on that from a battery management perspective. And electrification as an industry, a lot of that business was originally just in China but now, it's moving outside of China and it's -- as the rest of the world gets serious about electrification as well, we expect this to grow.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right. Is that one of the examples you talked about, like Linear perhaps not staying within the vertical as some work. The electric vehicles, is that one of the examples of...

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes, the battery management is a perfect example of that where Linear defined category, they were first to market, they had very high share but then didn't necessarily maintain that share on the competitive environment. But what we are confident in is that we are here to compete, we believe we have the best products in the market and we'll see growth. We saw double digit growth at the end of last year. Latter half of last year, double-digit growth that we continue to expect to sustain our growth in the go forward.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. Before I move on, are there question from the audience? Yes, please?

Unidentified Analyst

Just any commentary you have on just the neuroscience investments that you're making, things like GAN (inaudible) aerospace as far as the RF (inaudible) technology (inaudible).



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes, so we are doing work in GaN. And for aerospace and defense market, for example, we are doing work in GaN. We're also doing work on GaN for the power electronics market, and we are doing work in silicon carbide. So we are investing in all of these areas. We're investing to possibly deliver those as well as we are making sure that our solutions are optimized to work in those spaces as well. So for example in power conversion, we have a leading technology in the isolated gate drivers for power conversion which today, sell mostly to IGBT-based technologies but we're moving forward to move into having those solutions optimized to work with silicon carbide.

Unidentified Analyst

(inaudible) products that are already in market or kind of almost there or...

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

I would say we have products in the market that work with that today, and we have GaN products today in market in the aerospace and defense for power amplifiers, for example, and we also have advanced technology that we're developing.

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Just to clarify, we use our foundry partners for these technologies but not in-house technology we have at ADI.

Unidentified Analyst

(inaudible) your design?

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Yes.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Other questions? And maybe I'll slip in like, a consumer question and it's related to the acquisition of Linear, is why I asked. And it's one of the things, to your point about how you may be operating Linear business differently and Linear -- the fact that it's so consistent, you used to tell the same joke, which is if you mentioned consumer at Linear, your mouth was washed out with soap, and they've said the same joke for years and years. But I get the sense that, again, the way that ADI is looking at the business now is a bit differently than that -- or perhaps, the consumer wouldn't necessarily wash your mouth out with -- get your mouth washed out with soap if it met the right criteria in terms of differentiated business and margin. How do you look -- I mean, your consumer business is smaller but it's still important.

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Yes. So I think what I'll say is that ADI's approach to consumer is that we have 2 sides to our consumer business actually. We have a side of our consumer business which is like a prosumer business. So a lot of that is audio, high-end audio. It's actually an infotainment product we're selling to automotive, also sell into that. I'll also say that Linear has a big business in that kind of prosumer business as well. Some companies would classify that as industrial. We classify that as a consumer but that's prosumer. So we participate in that and we invest in that. In kind of the portable consumer business, our strategy is that we will leverage technology into that business. If we have solutions and technology that we have developed for other markets, we are open to leveraging those into that business if that makes sense and gives us good returns. And so if we find those opportunities,

DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

we will take them. We've done that in the past and then as we find those opportunities, we will take them, but we're not focused on core investment for the portable consumer business which in maybe some ways, is similar to Linear.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right, okay. And Mike, for you, that one piece of business you did take which is no longer there. We're at a run rate now where that issue is behind you, am I correct?

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Well, if you look at 2019, we forecasted consumer as a bucket to be down 10% to 20%. So it's still a headwind just given the mix of business, but we'll start to that lap that later in the back half of this year and kind of hit that run rate level. And one other point I'll make on Linear, we talked about the \$2 billion of synergies, that's B2B markets. We're doubling the growth rate for Linear through the B2B market. That's not taking the consumer socket here or there, we bought them for their B2B business and that's what we're going to drive the growth from.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. Just following up my direct question to you, level set us for next year also, there's 2 things as we look at you guys on a year-on-year basis. There was an extra week in your fiscal year this year and then there's some of the changes from revenue recognition. Maybe just helpful, a reminder as we're looking at year-on-year...

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

Yes, no, that's a good question. So in '18, we had a 53-week year, which adds about \$120 million of revenue or 2% that doesn't repeat just because of math. And we're also switching from a sell-through accounting to sell-in accounting in this year. And our guidance for the first quarter of 15/10 is actually neutral to that. We don't expect much change channel inventory in the first quarter, so the sell-in and the sell-through is equal at 15/10. Now if you look at '18, just to give you kind of high level, we built some inventory in the channel in the first half of the year and we bled it down in the back half of the year. And the net change on average for the past 3 years is plus or minus 1%. So it's not a huge number. It could fluctuate from quarter-to-quarter, but from a year perspective, it doesn't change much.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Right, but as compared to some your other peers who have had inventory changes during the quarter that...

Michael C. Lucarelli - *Analog Devices, Inc. - Director of IR*

No impact to us. We're on sell-through, correct.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Any other questions from the audience? We'll move on. We've got a couple of minutes left. Yes?

DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Unidentified Analyst

Yes, I wanted to just to get a -- more of a macro on 5G. So you're seeing synergies on the microwave side with Hittite and with Linear and ADI combined. How should we view that as part of your overall business? I mean, should comm then over time as 5G really begins to roll out late '19 and into '20, should it increase from a bigger portion of the overall revenue mix? I'm assuming a big part of that (inaudible) is probably 5G...

Gregory N. Henderson - Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense

Well, I think what I'll say is that -- and then Mike can add to that. I think comm grew very strongly in '18, we reported that so we had very strong growth. We also had strong growth in industrial in '18. We expect to continue that strong growth in comm in '19 as 5G starts to ramp. So I would say given the fact that industrial is going to grow but not maybe as fast probably yet as a relative percentage, comm will grow faster than the other segments in '19, that's what I would say.

Michael C. Lucarelli - Analog Devices, Inc. - Director of IR

And on that \$2 billion number, I would say it's all our markets. It's comms, it's industrial, automotive. The 2 earliest markets will be comms and automotive just given the design cycle. And we'll start seeing those revenue streams in late '19 but really more in 2020 across both those, comms, the automotive market. And industrial is probably a year or so after that.

Gregory N. Henderson - Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense

And you were asking -- I didn't -- you were asking about the \$2 billion of revenue synergies that we see from Linear. The '19 growth in comms is really not driven by LTC yet because they were really not focused on that market. The comms growth from LTC, as Mike said, will roll in later, yes, more like late '20 or early '21...

Christopher Caso - Raymond James & Associates, Inc., Research Division - Research Analyst

So where do we see it with regard to like, those Linear synergies? Which bucket do we see it and how we do we measure it?

Gregory N. Henderson - Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense

Well, I think it's -- we believe it's going to happen in all markets. I think the market that goes first is comms because it's the fastest. Second is automotive and then third is industrial. So I think that's the way you will see it based on the natural time. There's obviously exceptions to that which might just be opportunistic. But in general, we believe that the comms is the segment that goes fastest to market from when you get design win and when you get production. Automotive's second, industrial third.

Christopher Caso - Raymond James & Associates, Inc., Research Division - Research Analyst

How will you -- I mean, I guess it's a tough question. How do you measure that their synergies as opposed to just the markets just growing? And as I said, in Hittite's case, you're probably in a unique position to know because you know what your forecast was.

Gregory N. Henderson - Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense

Yes, well, it's always tricky but I'd give you some examples, right? In communications, for example, we're starting to win some power solutions that relate to small cell and massive MIMO. And the reality is that Linear did not have the channel really focused there because we have so much position, there's so much channel resources that puts us in a position to bring in that technology and win, that's an example. On the alternative, Linear was very good at the broad market. There were actually a lot of Linear customers that had very, very little ADI content and were basically not called on



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

by ADI. And so now we have a larger sales force. We have a sales force that calls on those customers and they were able to bring the rest of the ADI portfolio to those Linear customers and those -- so we're measuring synergies like that. Customers that were basically Linear customers and not ADI customers, bringing a lot of new content and vice versa. So that's that way we're looking at it and that's what -- that \$2 billion is encompassed of those things.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Okay. And it sounds like you'd do it again.

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

We would do it again.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

If you had the chance. What? (inaudible) again.

Unidentified Analyst

I'm curious. In the automotive area where do you invest in power beyond battery management?

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

I'd say we're broadly focused on power management in automotive. So we have a -- were focused on electrification beyond just battery management. It is a growing area and a big area but the rest of the electrification system, electrification in the car. Also, Linear has a very high-performance power conversion. So basically, anywhere where you're doing power conversion from the battery to a processor or from the battery to something else or from one battery to another battery, we're also very focused on that power conversion problem. So a lot of the power conversion in the car is an area that we're going to focus on.

Unidentified Analyst

(inaudible) portfolio that's sort of (inaudible) or what is the process and how long (inaudible)

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

So we have auto qualified parts. We have parts that we're qualifying for audio -- I mean, we have auto qualified parts, we have parts that we're qualifying for auto and we are starting them. We've already, as ADI, won some design wins on power conversion in automobile. But again, likely more like '21 when those things turn to revenue.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

All right, so the question -- and I think that hits that time. Gentlemen, thanks a lot for coming. Thanks, everyone.



DECEMBER 03, 2018 / 8:35PM, ADI - Analog Devices Inc at Raymond James Technology Investors Conference

Gregory N. Henderson - *Analog Devices, Inc. - SVP of Automotive, Communications and Aerospace & Defense*

Thank you, too. Thanks, Chris.

Christopher Caso - *Raymond James & Associates, Inc., Research Division - Research Analyst*

Come on, they deserve a round of applause. Sure.

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