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<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

All right. Good morning. My name is Paul Silverstein, Senior Analyst at Cowen for Networking Communications Equipment. And first, I'm just going to say Roger Shannon, is CFO of ADTRAN. Roger had the pleasure improvements of watching the Cowen and Company for a long time. And I thought you guys with the U.S. version of Huawei**.** the secret thoughts whereas you look at it down in Huntsville, Alabama, which maybe people don't know or forgotten is where we brought the German and not the rocket sciences to think from one's perspective back after what were too and there's a lot of client…

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

We don't think it's a German.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Sorry.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

So, you were escaping the ladder.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

And there's a lot of train and there's also a lot of train obviously technical universities versus tech and were not down in the southeastern. So, you have very fine low cost labor, they want to live and die for the most part in the southeast and not interested in going to Silicon Valley or through the Massachusetts its corridor, and again, it sounds good, and doing lower cost, and you don't have the significant churn and serves you all well over the many years. So with that backdrop before I asked the specific questions about that here and now, and looking forward, I'd never like to assume everybody knows become different question, are you able to giving a brief overview, Roger?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Sure. So, I'm not here on behalf of the Huntsville Chamber of Commerce, but I will say it's a city on fire you were just…

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Hopefully, not literally.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Not literally, but from the space program and all the things that are related to that. Forbes simply third smartest city in America, seventh smartest city in the world, just selected for a 5000 jobs Toyota plant, and just selected as U.S. News and World Report seventh best place in the America to lift those. So to your point, it has been flying under the radar and starting to – you're kind of starting to catch on for those who prefer not to live in a more congested high cost area.

So, with all that said, ADTRAN is a broadband access company, and all that entails in our differentiation and our strategic advantage we believe is that the breadth of the portfolio that we bring across the broadband access technologies. And I agree with you that in the past, we were more known as a fast follower of high quality, low cost…

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Yes. You've been generous. I've been here long before you rather than… Fast is not a word.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Okay. That really changed from our perspective during the kind of the investment CapEx downturn of 2011 to 2015. we kind of saw where the market was going from an SD and FD perspective. We spent a lot of effort in reorganization around our R&D to play a lead role in the standards in development of an SDN platform, because quite frankly, we saw an opportunity as a disruptor and differentiator, and we had a lot less to lose than the big monolithic head in equipment like the Nokia's and Huawei.

So, we think we've been successful in that. Our Mosaic cloud platform as you've probably seen, is the first open SD platform access platform, is the industry's most awarded with a last count 13 awards, and is being deployed of the largest Tier 1's around the world as we speak. So kind of given that we're able to deliver any type of broadband access, technology all the way from DSL for those that still use that all the way to NG-PON2, where we're finalist for Verizon's, much talked about very large project that is in still an FO way and expects to start being deployed over the next few years.

We did just recently acquire and really saw this is EPON assets from Sumitomo. Having acquired the EPON assets from CommScope in 2016, CommScope was the second largest and deployed with the second largest U.S. MSO, the Sumitomo assets that we acquired is the only approved EPON at Comcast, the largest MSO.

So we're far and away the market leader now, and MSO EPON and Paul, your call that we've talked about this. And we said, what is the opportunity for ADTRAN? it's that 60% of the broadband access market that we really weren't playing in the MSO side, where we had a strong position in carrier. We did not two years ago, have a strong position in MSO, and now we have far and away the leading EPON position in MSO.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

I want to come back this individual customer persons like Comcast and showed among others, and to be not presumed to address some key drivers from the customer perspective. Before ado, I think it's a great place to start. And Roger, I want to – and I'm not saying that you are on, but having followed this sector for a bit, and maybe this is true of other sectors too, but only sort of this sector, and we've – in my sector, everybody is the leader, and everybody is the best, presumably that can't be the case for everybody. But just let's say, we're closer from calcifying better – over from Petaluma this morning, I know your CFO and CEO, and he comes here to check background. So we may have a little room advantage over here for the technology standpoint.

So, let me have some same question I asked that, right. You've got lose there, they've got access, their both opened platforms, can you give us a sense you so said, you're first in that with these contracts, let me do give you the same opportunity and give what's the value proposition of Mosaic, how does it differ from what Calix and others are doing and how is it unique? If you're extending to see.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yeah. I will, first, I'll let the industry recognition and the selection that we've been selected for, speaks for itself with the large U.S. Tier 1, G.fast rollout that started out of region a couple of quarters ago, is going to become and have a lab for an in-region this quarter and then in scaling at this second half of this year. That leading U.S. Tier 1, who is on the cutting edge of the code, initiative and kind of pushing the white box rather than using their OS selected mosaic for their in-region. So, that's what we're going through now.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Be clear Roger, I was referring to the three letters and an ampersand, but you can't say it…

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

That's right. So the largest U.S. carrier that starts with an A. So, I think a lot of that speaks for itself. the differentiation for us and I think we – I've heard the different perspective, but it's two things, it is that what I'd call the backwards compatibility. So, not everyone is going to be moving to an SDX type of technology and hardware network platform use. So you've got to have this backwards compatibility hooks into the existing hardware, so that as you move forward, you're able to do retain your legacy systems while building out and have that compatibility. We're the first and we believe we're the only one that does that, that has that full kind of backwards integration in capability. So, there's this kind of an intermediation layer that lets that Mosaic work with legacy technologies.

The other thing that we've done that's unique is, we've created a Mosaic open network alliance, and their last count around 10 or so different companies. So different types of players like fixed wireless players just is an example are signing up in this alliance. So, we're kind of working

together and building micro applications that reside within Mosaic, that benefit the carrier from an OpEx and from a functionality perspective.

The next thing we just announced a couple of months back, Mosaic experience, user experience suite, so its tools again through micro applications that kind of helped in more quickly, turned up Mosaic. And then we are and like I guess two, maybe compare and contrast a little bit with whether competitor, who seems to be backing away more quickly from the hardware side through selling chassis business, and possibly other things.

We see that move to White Box, but it's – it is overtime and where we're focused is still on the value end of the hardware, and you can talk about White Box and kind of open a lot, but there is still – there is still some secret sauce in those components, while it is becoming more open and disaggregated, there is still value in the head in OLTs in the TA500 in the platforms that we're still delivering.

So, we see that happening, is still happening for a number of years before you have the transition and not everyone is at the same place as the three letter in terms of cord in there White Box initiative. So, you've got players that are at different stages. And we talk about the NG-PON2 opportunity that again that we expect to be deploying on, later this year and ramping up over the next few years. Mosaic is going to play a huge role in that. We were the first to pass integration with that provider, so across all the different supplier components. So it's just a huge focus for us, I know everybody like to say, we'll say they're the first and the best. I think we have – the proof is in the adoption and in the recognitions.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Fair enough. You mentioned that you referenced that AT&T, I know even in the money in them. But that's a good segue. I want to touch about the more concrete aspect of your business from the customer perspective, I won't considered essentially, you understand what AT&T. So, let's talk about that, looking at some sensitivity on a customer by customer basis. So, I appreciate that. So, you simply can and you're willing. It's not unusual for this big project to be slower rolling out than you and your investors would like, albeit in the longer-term perhaps would be bigger than we expect. So that said, that's big wind up any incremental so that you can offer in terms of timing and the magnitude of the opportunity. Maybe if you address from the past, but can you either remind us we'll update us in that?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

So, what we're speaking about is G.fast technology and for those who aren't familiar with the technology. G.fast enables gigabit speeds over cover.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

But over still be short reach.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Over short reach. It's still high rise application.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

That's right. So, this large U.S. Tier 1 has single source selected us, and they have a fairly aggressive MDU strategy. And it's – I think you'll see as part of the Direct TV rollout, you're seeing more and more kind of Direct TV mouth, the non-satellite.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Where there's pauses interruption, just to be familiar that's what happened last year.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yes. So, we were selected last year as with most things with large careers that takes longer than expected. Again, they have the 23 states were there the incumbents. So what that's referred to is the in-region or in-network, and then you have the out of region, where they're kind of selling is on a competitive basis. That out of region is less complex, given that they don't have their existing infrastructure in network to deal with. It's just success based. You sell it, you deliver it the G.fast technology is a fiber run to the side of a condo or an apartment and then it picks up our G.fast DPU to deliver gig speeds again, over loop links of about 300 feet over copper or coax.

And with this carrier, they were – we talked about this last year, they were permitted by the FCC to treat that as a fiber home pass as part of their FCC commitment for their Direct TV acquisition. So, they had to pass a certain number of homes with fiber, G.fast counts as a fiber home pass, then it is their MDU strategy going forward. The in-region is going to be the larger opportunity, with out of region, they have a sales team, it is success based, it has been slower than I think they expected probably that we expected although we know we are – as you know we tend to be conservative in the expectations with this carrier.

the in-region like I said is a little more complex than integration, because we're working with their legacy networks and OS, and back to your question about mosaic, rather than using their system, they decided to use mosaic as the OS, because their system was not quite, their OS was not quite ready and they were impressed with Mosaic and decided to move forward with that. So that's why we're still in the lab going through kind of final integration and we expect that to as you mentioned in your question, start to ramp in the second half of this year.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Roger, I apologize if you've already said, the particular products they're going to that G.fast appointment that you will be selling to your…

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

It’s referred to as a DPU or distribution point unit; it’s different than what the traditional TA5000 MSAN chassis that you see out at the curve…

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Multi service access network transmission.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

That’s right. The DPU is a smaller box that sits in the basement or the curve that is fiber fed and then it picks up the existing copper or coax that’s already run into these living units. So, the benefit of that obviously is that to the land, if you’re coming from perspective of the landlord, you want gig speeds to your tenants. Whether it’s fiber or not, they probably don’t care other than they’d really prefer that you don’t come in and have to tear up all the plaster in the walls and run fiber to 300 units inside the building. So what G.fast enables is the fiber to the side of the building, our DPU running over existing equipment into the individual living units.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Roger, I’ve always been impressed by the discipline at ADTRAN from a cost to the margin perspective, within the constraints of your revenue volume. But that said, we just roll out when we reach this volume, how should we expect it to impact the margin structure and bottom line any insight you can assure?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yeah. We’ve talked about this some last year, we expect the margins to be kind of consistent with domestic corporate averages.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

In the mid-40s.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yeah, yeah. So, we don’t, where we sit right now, we don’t have any reason to see thing differ from that. We did have as you all know; we had a significant downturn in our margins in Q4 and also in Q1 with the CenturyLink merger in pass in the vectoring project. While we are very cost disciplined, then we are very actively taking measures to rightsize the cost associated with that program. We’re unable to do it quickly enough. So that you saw a much lower margins than ADTRAN that finds acceptable that’s used to having due to that absorption of overhead. We could have built more inventory and absorb those costs, but that’s not the right thing to do from a cash flow or balance sheet perspective. So we did have that overhead that impacted margins in Q4, in Q1, still into Q2. but we are, to your point of cost management discipline, very actively addressing that as we work with CenturyLink to determine what there.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

All right. You're anticipating that I mean I confidently won't say, there's one more question on AT&T. I know there's sensitivity. And you offered some objective data points in terms of whether you agreed to with the FCC on the rollout, with the FCC. Any thoughts you could share in terms of what the peak run rate could be from that and in what timeframe or what an annualized, how you want to pick?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yeah. So, again, as you know, I'm reluctant to get into firm numbers just because we – it doesn't quite happen as quickly as we expected. That said, our conversations with them even up to the most recent conversations of a few weeks ago is that this is their determined strategy for MDU. They are very optimistic and very bullish on it.

We have characterized it. There's a number of opportunities out there, so that we kind of characterize the size of. On one hand, you've got the – let me kind of put in this context and see if this helps. We were selected by NBN in Australia for their DPU, their G.fast build out. We have that PO that's going to ship in – start shipping in the third quarter. We have a commitment for the second PO. You've got the AT&T and G.fast, and then you've got the Verizon's NG-PON2. I would put it in…

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

You also had the Comcast ensured as well.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yes, yes.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Okay.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

So, I would put this probably the smallest or the lowest would be the NBN, which is kind of low-tens and millions, AT&T next. And then obviously, I would put kind of the MSO opportunities above that, and then I would put the Verizon, NGPON-2, particularly when it starts to as it starts to ramp in its Verizon pursues their one fiber strategy of bringing together 5G and 4G wireless backhaul, residential and low-cost internet onto one network. I think it is important to note on Verizon. You may have some questions on this, what they're doing now that we expect to get into FOA in the back half over the last part of this year is what they refer to as LCI or low cost Internet enterprise business.

Their strategy is called One Fiber is to bring all these different disparate networks now, which they have different OpEx structures for the residential files. The LCI, the low cost internet enterprise and then their wireless backhaul altogether on one network. So NGPON-2 for those who are not familiar with the technology is tunable way billings optics over a single wire. So, you take a 40-gig optical network and we're able to split that into four, 10 gig light waves if you will over a single fiber, each one going bidirectional and each one suitable for a different – different type of networks, you can bring all those different, disparate networks into one now and that involves having tunable optics on the OLT side, the head-in side and ONU side, so that it knows which – I like that this is a non-sagittal person, which color that is looking for as opposed to a single lightweight.

And so if you think about 5G, there is going to be a dramatic densification of the cells, coming out of that in the magnitude of 100 maybe a 1,000 times more cell radios that we have now and just because the 5G millimeter wave doesn't go as far. So, a tremendous opportunity for us. As 5G builds out, that's going to require fiber build out to these small cell radios. In addition, we're very actively involved in the fixed wireless component of that. We believe fixed wireless is going to be kind of in the front-end of 5G as opposed to mobile as container.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Showing that specific to Verizon – is this all under the NG-PON2 rubric or when you started selling the fixed wireless you talked about something separate in place.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Well, fixed wireless is related, but separate. So, we're working with a number of technologies, a number of different companies in the fixed wireless technologies, both on the millimeter wavelength that the 5G above 5 gigahertz as well as the 4G, where carriers are looking to possibly use that for their cash fulfillment. So we are longer reached 4G with fixed wireless, but we're very actively involved in both right now.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

All right. Because of course, the draft is many more hours of questions and we have time for it. I'm going to ask you to be very tight and going to apologize, it could help technology for you, let's give the numbers, that's all you're going to ask us before us, but essentially going back to the opportunities and you said if a reversed fee order, the biggest opportunity to Verizon's NG-PON2, followed by the MSOs, Comcast followed by AT&T, followed by NBN, you said NBN the lower inflow 10s total opportunity, correct?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Say annual.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Annual, I'm sorry. What's the large Verizon opportunity, which is downstream, how big can that be?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

I mean these are not my numbers, but this is hundreds of millions of years.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Okay. Let me ask you one other question of Verizon, they put out their own press release a year ago, now also, you'll trials if you recall.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Yeah.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

They've now formally announced cost deployments and I know it's still very early I don't think cost from that much revenue with that. But you have been announced, I do really say you are expecting second half. Any reasons for, is it spectacle with what's the nature of that investors should be concerned that this never materializes for you.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

So while the NG-PON2, not get into the technology that the technology is similar, we're obviously going about it different ways. We would have loved of in first out of the lab, we were not – again, for various reasons and we've said all along, there are areas that we're ahead on in the areas that they were ahead on. Obviously, it was a priority; they pushed very strongly to be at the lab first. We, into your earlier point; we still believe our technology is the best. We don't think not being first is disadvantageous, in fact I think there's been a slowdown from the carriers perspective on how many FOA's you're going to do. So we're at peak engagement right now. We expect to come out of the lab mid-year and we expect to do be an FOA second half.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Bottom line is you're not concerned from what you think you know are – let me move on, I got to ask you, but more obviously, going to ask you about CenturyLink. CenturyLink was 40% in the last year, you've been good so far for many years, and a really good customer for your measured by revenue, obviously with a Level 3 merger or Level 3 coming from an enterprise fiber perspective, essentially historically more from the consumer and broadband access. And it looks like at least, there's really two businesses; unit two is also initially the Calix, where the plants are influx. I don't think you know, and therefore we don't know exactly I was going to shape up, it's probably not going to be what it was in terms of as robust. Any thoughts you can share, I think you've been as transparent as you could be given the limits. But any update you can give us in terms of what's the prospect for recovery?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

I'll start by seeing our relationship within is very good. Our engagement in relationship with the new management is very good. And we are again very actively involved in dialogue with them kind of as we speak. So as opposed to what they were doing on a 6 million home, 22 city, widespread vectoring build out. They're looking – they have the Level 3 management has brought in a much more quantitative ROI based return model, where they're looking at meeting these financial hurdles. I think it's a different dynamic when you're talking about residual versus enterprise. I think they are having to get familiar to us with both the residential and in the copper technologies.

What that has created is, it really is two things that we see there has been a kind of a backlog and how these projects get approved even things that even cash has been much slower this year to be deployed or even business as usual, while we are still – they are very large customer, we're still doing a very meaningful amount of revenue within each quarter, albeit not where it was.

So what has changed is, they're looking at it almost on a neighborhood-by-neighborhood, street-by-street. We believe that and they told us that they kind of see a sweet spot of 50 to 80 meg for a kind of customer attention and subscriber ads. And we're working with them on a number of things that includes vectoring, super-vectoring, G.fast and GPON and we're having very good conversations. And again, I would even add to that from their enterprise fiber perspective, the opportunity is for ad trend that was not there before from a GPON or XGSPON perspective as opposed to the point to point fiber that they have traditionally been deploying.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

All right. We have been soaking through the less margins have been clinically important from our stock respective as your margins have gone. So it's going to stock, but you have very sensitive volumes and not surprised with a hit from such thing that your margins done hit real hard, any and so you can share with us very briefly in terms of the trajectory from here?

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Expect margins to go up in the second half that the reason has been lower in the first half is primarily due to the very high percentage of international business. Our large European Tier 1 is doing their super-vectoring rollout that was, if you looked at our international numbers, it was half of our revenue in Q1, expected to be a big number in Q2 as well. They traditionally are first-half loaded versus second half and there are lower margins internationally again due to the Chinese effect. So we expect margins to go up in the second half of the year is there's more U.S. business coming on less international. We reiterate, we continue to say our corporate focus is kind of mid to upper 40s, 46% to 47% gross margin or we think we can get there.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Great. I want to thank all of you. Roger, thank you so much.

<<Roger D. Shannon, Senior Vice President of Finance, Chief Financial Officer>>

Thank you, Paul.

<<Paul Silverstein, Analyst, Cowen and Company, LLC>>

Thank you.