Company Name: ADTRAN, Inc. (ADTN)
Event: Drexel Hamilton Telecom, Media & Technology Conference
Date: September 7, 2016

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

Good morning. Thank you, Greg. Thank you everyone for your interest in ADTRAN and for coming in. First thing this morning I appreciate the invitation from Drexel Hamilton to present. I'm always thrilled to be talking about ADTRAN and our history of innovation and leadership in the broadband access space. As someone who has an older brother who is a retired Air Force colonel I'll also appreciate the excellent service this firm provides to veterans and disabled veterans who've served our country so well.

I need to begin as always with our Safe Harbor statement. And during the course of this meeting ADTRAN expects to make forward-looking statements, which reflect management's best judgment based on factors currently known. However, these statements involve risks and uncertainties including the successful development of market acceptance of our core products; the degree of competition in the market for such products; the product and channel mix, component cost, manufacturing efficiencies, foreign exchange rate variations and other risks detailed in our Annual Report on Form 10-K for the year ended December 31, 2015. These risks and uncertainties could cause actual results to differ materially from those in the forward-looking statements, which may be made during this meeting.

So with that out of the way hopefully everyone is familiar with ADTRAN. At the most basic level, ADTRAN is a broadband company we provide products and services that enable high-speed data, video and voice to thousands of customers in more than 65 countries. The company is a networking communication solution company founded in 1985 and publicly traded since 1994, headquartered in Huntsville, Alabama.

At a glance and I would pursue almost everyone knows this but like to touch on this at the beginning just to set the stage. ADTRAN is a top three global supplier of broadband access products and services the only one in the U.S. Operating in 68 countries with approximate 30% of our 2015 sales being international. We have 2,000 employees including at our Huntsville headquarters and R&D and quality control functions in Munich, Berlin, Greifswald, Germany also Sydney, Australia, Melbourne, London and Hyderabad, India

In 2015 we had $600 million of revenue. And as an update, we've talked about in the press releases that you may have seen that 250 Gigabit communities – enabled by year end 2015. Recently that was updated to 300, now I can say that's now over 350 Gigabit communities that have been enabled as of August of this year. We are a leader in SDN and NFV, which I'll talk about in this presentation.

ADTRAN, maybe a surprise too many of you, is a software company. We do spend around 21% of our R&D – of our revenue in R&D and that's resulted in 60% more patent

per dollar than industry average. Of that R&D approximately 80% of our R&D dollars are going toward software development at this current time. We have a very strong balance sheet and history of profitability over $308 million of cash and investments on the balance sheet. And you can see the other industry first that we've had over the course of the company's history.

ADTRAN has consistently been an innovator starting back in 1995 we were the first to break the $1,000 barrier for Tier 1 access, gaining 95% of market share in that area and also the first fiber backhaul solution for 2G in 1995. Up to the current day where we have recently announced the release of our Mosaic Platform and also breakthroughs in NG, NG-PON2 economics for our NG-PON2 optical products. So those that innovation history and legacy crosses the Internet area, the IP transition area and where we see ourselves today in kind of an overlap of this Gigabit era and SDN era.

And our innovation leadership, I like to talk about that in two areas, the first of which being in Broadband Access. ADTRAN is the market leader in 10 Gigabit optical access innovation going back to our XGS PON commercial deployments that we've talked about over the past year or so to the more recent NG-PON2, industry breakthroughs in tunable optics. And you may have seen our recent press releases from a large U.S. Tier 1 that has announced ADTRAN is a finalist for that – for their large scale NG-PON2 developments.

We have over 60 G.fast trials going on announced on six continents. And this is a tremendously exciting technology that we think has an opportunity too at a very economic scale complete with fiber for many applications, including MDUs where we're able to – or the carrier is able to push the fiber deeper into the network and deploy distribution point units and the basement or the building of an MDU and use that installed copper base over the last several 100 feet delivery near gigabit speeds or above gigabit speeds in the next-generation of G.fast.

ADTRAN has Europe's and the world's largest deployment of vectoring and super-vectoring. Just mentioned the over 350 gigabit communities and those continue to be announced seems like almost daily. And we're also the leader in CAF2 solutions, lot of discussion and questions in the conversations that we have around CAF2 as I'm sure everyone knows the FCC has is rolling out and is working under the Price-Cap CAF2 where carriers have accepted $1.5 billion per year to rollout, for six years to rollout broadband access to underserved and unserved communities across the U.S.

As we speak, the FCC is finalizing their rate of return CAF2 also known as the Alternative Connect America Model for the Tier 3s. Those Tier 3 companies have until November of this year to select which model they're going to proceed under be that the traditional rate of return model or this Alternative Connect America Model just more or like the Price-Cap model and those funds will being to flow next year.

As an innovation leader we are also at the forefront of SDN access. And I'll talk more about that in my comments this morning. But we are the first and only to deliver complete cloud-edge to subscriber-edge solution sets with our Mosaic Platform. We're

the first to integrate and deploy a complete fiber to the X portfolio with an open source SDN controller. We are the only vendor with a complete software-defined access solution built around a CORD or a central office reimagined as a datacenter, which are being driven by the Tier 1s in the U.S. As part of that ADTRAN is the first and only deployment 10G PON vOLT in a CORD environment and Tier 1 and first in industry interop of the vCPE portfolio.

As I get into this Mosaic platform, I will talk a little bit more about the basics there. And it's really built around a modular software architecture that's developed over a number of years. While this is just only been recently announced in the press this is a combination of many years of work using Agile/DevOps, we're building our applications on a modular basis really forms together to fit from the cloud edge to the subscriber edge in this new user-defined world.

And finally, in the area of innovation leadership and SDN access have to highlight our leadership in the Broadband Forum, ITU, ETSI and other standard setting areas where we're actively involved in playing leadership roles as those standards are being set and that technology being developed.

So what does that mean? Futurist Mike Walsh said change appears incremental until it's too late. So the world as we know it is changing and gone are the days where the service providers dictate what services will be available to consumers and they take years on testing integration to deliver services across their network. Today, as we all know, we live in a user-defined world where the consumer expects to get exactly what they want across any device or any platform, anytime they want it. Some call it the Uber generation.

Steve Case, AOL's founder, described it really well when he talked about the Third Wave coming and this is how we see this also. So the three ways of the evolution of the Internet being the first wave, which was the building of the on-ramp to the information superhighway, 1985 and 1999 timeframe where ADTRAN was the leadership in access in that era with over 130,000 MSANs deployed and the global leader in hardened OSPs, business gateways, carrier ethernet and again the world's largest vectoring deployment.

The second wave was building on top of the Internet with applications that provide access to information that enable us to connect to one another, the social media that we all use each and every day.

And then the third, the wave is just beginning now. This third wave is where the Internet becomes integral to every aspect of how we live, work and play in the so-called Internet of Things. And ADTRAN is prepared for that third wave with a leadership position in full integration for web scale for the users and the service providers. And I'll talk more about that SD access, we've talked some already about G.fast and our leadership in XGS-PON, NG-PON2 and 10G EPON.

So how do you do that? What does it mean to build a modern web-scale ecosystem? How do you capitalize on that third wave or where the Internet and the demand for access is

ubiquitous anywhere all the time and connected to every aspect of our lives. So if you look at the stakeholders, you've got the service providers and the consumers. And the service providers are really demanding agile delivery. Scale on demand is one thing that you'll hear a lot about it's as events change time of day, location and where you are the service providers need to be able to scale up and down quickly. They don't need to have ultra levels of broadband access at one place all the time that needs to be moved around efficiently and effectively to meet the demands of the consumers.

And they're also demanding an open ecosystem moving away from vendor specific equipment hardware this type throughout their model. On the consumer side, the consumers, as we all know are demanding modular and open systems just think about the apps that we use on our iPhone's, on our computers and how we get our entertainment these days with Over-the-Top.

And the value proposition that that creates is faster time to market for the service providers, lower operating costs, more rapid innovation and for the consumer increased customer satisfaction. So to do that, as I mentioned, ADTRAN is focused on building the next-generation access components to be natively integrated into programmable APIs and integrated into leading open source SDN control and orchestration systems.

So we recently announced our Mosaic software platform, which incorporates the cloud platform, the Mosaic operating system and the programmable network functions. The cloud platform combined to modular apps have been developed in microservices software architecture with open source control and orchestration platforms to create open SDN-based network programmability.

Mosaic operating system is a modular OS that's been optimized for SDN programmability, virtualization, high availability and multi-vendor app integration. And finally, the programmable network elements is multi-vendor networking solutions that integrate natively with open SDN controlled access networks.

So we get asked why the name Mosaic? Obviously when you think of Mosaic you think of a piece of art created by forming smaller components together to create a bigger picture. And that's exactly what this operating platform, cloud platform is. And as I mentioned it's the only platform available SDN access platform in the market that goes from the cloud edge to the subscriber edge. There are others out there that is an operating system, this is the integration, the cloud platform the operating system and the programmable network elements. So you can see how those step from the cloud edge to subscriber edge in those components that I've just discussed.

What does that really mean in graphic terms? So as we've talked about over the years and as each of you know that the application that's most applicable in any given location or customer base differs depending on whether it's a household, whether it's an MDU, whether there's a short loop or long loop, whether it's economic to drive Fiber-to-the-Home. And that platform is what we are able to deliver under this Mosaic operating system and integration platform. Mosaic brings together all these next-generation SD-

Access networks under one platform that the service providers are able to realize cost savings and increased user experience for their customers.

I'll transition now a little bit to the company's financial performance and I'll leave some time for Q&A and any questions that you might have. So as I mentioned in the beginning ADTRAN has strong, has shown a consistent history of strong profitability with nearly three decades of continuous profitability. We have a very strong balance sheet, strong cash flows and we've been publicly traded for 21 years which offers full transparency for the company.

Looking back to the past couple of years in 2015 as I mentioned we had revenues of $600 million, gross margins of approximately 44.5% that resulted in operating income of $13.5 million or a 2.2% margin and EPS of $0.36. For Q1 of this year as we talked about this coming third wave and the growth in this next round of infrastructure investment we're seeing that demand start to be created in the U.S. and around the world from investment and network infrastructure.

For our first quarter, our revenues were $142 million. Our gross margin was 46.3% and in Q2 that increased to $163 million and gross margin of 48.5%. You can see the leverage in the operating income from $5.5 million and $14.8 million in Q2. We've talked consistently about how at ADTRAN we believe that our operating expenses and our R&D function are scaled for leverage. So as that revenue grows the operating income is expected to grow at a more exponential level because of the scaling of our – and our management of our OpEx and R&D base.

For FY'16 the consensus The Street expectations for ADTRAN are $617 million of revenue. Our gross margin is around 47.5%, operating income of $44.2 million and EPS of $0.65. And the limited 2017 consensus estimates that are out now call for $645 million, again around 47.2% in gross margins, $50.0 million of operating income. Bless you.

And just to touch on that a little bit further, I'll talk about some of the segment changes that we made at the beginning of this year. As I mentioned at the beginning we've had a historically very strong balance sheet and cash flow, I think that distinguishes us as a public company, as a provider in this space and a consistent history of returning cash to shareholders. So as you can see from 2012 through 2015 we've returned over $83 million in dividends and $310 million in share buybacks. And as of the second quarter we had cash investments on the balance sheet of $308 million, just $28 million of debt, with total assets of $637 million.

You can also see our working capital metrics which we manage very effectively at DSO 50 days, 3.8 times inventory turns, and again our headcount is approximately 2,200 people.

So we are seeing growth in the beginning of the cycle we believe in the domestic market, as well as carrying over into the international market with these trials in G.fast, the initiatives that are going on across Europe with broadband access.

I'd particularly highlight the yellow line that shows the year-over-year growth in domestic revenues. If you go back to the first quarter of 2015 going into the subsequent quarters 8%, 21%, 20%, going up to 39% in first quarter of 2016 28% in second quarter. So the year-over-year domestic revenue has shown some impressive growth over the past year.

You can also see the increases – increase in our service and support numbers. At the beginning of 2016 we resegmented our financial statement presentation moving away from a carrier network and enterprise network segmentation, moving toward – moving rather to a products and services – product network solutions, and products segment and a global services segment. And that services organization is a differentiator for us. It began really from demand for our customers asking for help and supporting them as they not only engineer their network, maintain their network, but all the way to network implementation and turnkey services. So being a differentiator that business is continuing to grow and we've publicly said many times we expect that to grow over the years as we work with our carrier customers in helping them deploy their networks.

Kind of looking at our numbers, revenue and gross margin by operating segments, as I mentioned network solutions and services and support: network solutions for Q2 of 2016, that totaled $138.5 million of the $163 million at gross margins at around 51%. Services and support, as we've mentioned on calls each time as we discussed publically has a lower gross margin but we believe is accretive to operating income due to the lower levels of OpEx that's required for that services business.

So you can see in Q1 gross margins 48.3% going back to Q2 2015 at 41.6%. So growth in the gross margins for the products that has come from in Q2, Q1 particularly a shift and geography of our product mix. The U.S. product mix tends to be richer than the international as we've talked about our international business has been lower this year compared to last year there were some unusual or non-typical buying patterns out of our large European Tier 1s beginning of 2015, which created some inventory over overload for the balance of that year. And they are finishing up their vectoring rollout this year.

Looking forward to 2017 as that Tier 1, large European Tier 1 rolls into super-vectoring, that comes back into we believe back into our footprint which is about 70% of that carrier which bodes very well for that period going forward. But as you think about the margins the U.S. gross margins on product tend to be higher than the international gross margins. As I mentioned the services gross margins tend to be lower than the products and network solutions gross margins, but still because of the OpEx profile accretive to operating income.

When we resegmented the network solutions, and services and support we also created three new groups access and aggregation, which you can think about a little bit on terms

of the old carrier network but really is the more carrier side focus of the network infrastructure versus the customer devices, which includes not only the components of the old enterprise network segment, but also things like the ONT, the customer facing CPE that is from the carrier.

So our thought on that and the rationale behind that resegmenting and this grouping is if you think about the enterprise solutions and how those are delivered to the customer, you need to think about the scale and the investment in your sales operations, how you effectively go-to-market with that. Of course we have a very strong and historical partnerships with the distribution and we certainly do still value and sell the distribution.

But what we – what became very apparent is that a great deal of these small and medium businesses that are utilizing the enterprise side equipment get that through the carriers. So rather than have a salesforce and R&D force that function that distinguishes between carrier network by looking at it on an end-to-end solution. We're able to deliver the full network from the head office to CEO all the way into the customer premise as these carriers are moving toward a ubiquitous unified network, be it over optical or faster copper.

And then finally, traditional products the way to think about that is products that we are really no longer investing significant R&D dollars but still have a historical market, continuing market with our customers. You can think about HDSL, for example.

And then finally, you can see the U.S. and international revenues I talked about. The international revenues being down year-over-year domestic revenues being up year-over-year.

We are in the last month of the quarter. So we go into sort of more of a quiet period in the last month the third quarter end of each quarter. I just reiterate the guidance that we gave for Q3 we expect our revenue to be in $160 million to $164 million range. We do expect our gross margins to be slightly down from our second quarter results, driven by that mix that I've talked about. We had much higher mix of certain U.S. products in Q2 that mix will be slightly different in Q3 which results in – resulting in a slightly lower gross margin from Q2.

We expect our OpEx to be consistent with Q2. We talked in our Q2 call about a number of discrete projects where we're investing. You've seen some press releases come out from the large Tier 1 in U.S. that have short listed of us on a NG-PON2 opportunity. That being one of the things that where we're certainly making investments. And then finally tax rate remaining in the mid-to-high 30% range.

So just to summarize, we believe we are at the beginning of the new wave, a new cycle. ADTRAN very well positioned for that with a strong history. We are a leader in SDN access. It's an interesting opportunity for us. I've been CFO at ADTRAN since November of 2015 and we have historically talked more obviously to our customers and to the industry press and maybe could have done a better job in communicating to the

Street and to the investor community our leadership role in that. And we are really trying to get that message out not be defined by the market but define that leadership and history of innovation that we not only have historically had, but that we believe that we're in the lead with in SDN and in technologies in G.fast and in CAF.

And with that, this is the end of my prepared remarks. And I'd be happy to answer any questions I can.

Q&A

<A – Roger Shannon>: Yes, sir.

<Q>: [Question Inaudible]

<A – Roger Shannon>: We really haven't looked at it that way. I guess the way that you can think about it is when you look at the products I recognize that looking at our R&D budget. The majority, the vast majority of that R&D spend is for network solutions. So you could do the math and look at how that falls down to the bottom line. I did say and would reiterate that there is not – obviously not much R&D at all on the services business.

That services business did historically have a much higher gross margin went into the smaller scale more really more care and maintenance. But as we've transitioned to more and more NI turkey engineering, those revenue dollars have got up and continue to go up but you see the margins in that mid-to-low 30% range.

<Q>: [Question Inaudible]

<A – Roger Shannon>: No, so $1.5 billion a year over six years and this for the – that is for the Tier 1 and Tier 2 the so-called price-cap carriers. I, on another presentation I have a slide that shows the carriers that have accepted the primary wins being AT&T, of course Verizon, except that it handing that off for the Florida, Texas, California market the transition of Frontier, yes Frontier, Windstream, CenturyLink, Exo Cinci Bell, those are Tier 1 Tier 2s. That CAF money started flowing at the beginning of this year that is a billion and a half a year over six years. The first milestone that they have will be in 2017 when they're required to show that they've met the 40% benchmark for a number of homes passed under the program.

<Q>: [Question Inaudible]

<A – Roger Shannon>: It just started beginning of 2016 it is still in ramp up phase and…

<Q>: [Question Inaudible]

<A – Roger Shannon>: We do see it continuing to benefit our revenue number. So we're still in ramp phase in 2016. I won't speak to any specific or particular carrier but you can

look at what they've stated publicly about where their focus is on customer broadband access while there's been some questions and comments about overall CapEx being down. I think you'd see that where that CapEx is being focused is on that consumer access.

So if you look at really the two prongs of domestic growth you've got the CAF II funding which we have consistently said is incremental. By definition incremental they would not be building out in those areas where enough of that support. And then you have the competitively driven build out. So you've got carriers responding to the so called of Google effect, or you've got another Tier 1 carrier who is rolling out Gigabit Power. So much of the conversations from other carriers over the past couple quarters has been how they respond to that, you've seen some drop off in churn in subscribers and they're having to respond to that.

So really from those two prongs from the continue ramp of the CAF and I would add to that that in November of this year under that the second part of CAF II which is the rate of return or the Tier 3 carriers, they have to decide in November, what model they're going to choose that is $2 billion a year for 10 years. That money will start flowing 2017. That's really not even begun yet for this year.

Now you can argue that that part, really the Tier 3 part is substitutive, it's the transition of the whole USF which was really more data and voice focused over to a broadband focus under CAF II. So that $2 billion a year for ten years arguably could be looked at as a substitution of the old USF. The Tier 1, Tier 2 price Cap is incremental, that's the money that was not being deployed before.

<Q>: [Question Inaudible]

<A – Roger Shannon>: Yeah, you would – I think you'd have to look at each one individually to see how they plan and deploy. How they spin that CapEx, I would argue could change even likely change because and here's a reason why, it is a way to choose what's referred to as the A-CAM or the Alternative Connect America Model, rather than sticking with the rate of return mode, which they've historically used. And that rate of return is coming down from at least 11.25% down to 9.65% or 9.75%, transitioning down over time. The FCC is really trying to incent them to move more – to be more inline with the Tier 1, Tier 2 price Cap, where they signed up for a number of homes passed.

So again they'll come to November they'll decide whether they want to move to this alternative A-CAM model where they sign up for a particular number of homes that would dictate how they spend their CapEx versus continuing under a rate of return model where that rate of return margin is decreasing by about 1.75 points.

<Q>: How sustainable is the brokerage of domestic revenue given infrastructure companies like DyCom have been really well for sometime. And number two what is the probability of recovery of international revenue to at least the prior year level?

<A – Roger Shannon>: Yeah, on first question we are very optimistic about the domestic market. There are initiatives that seem to being announced weekly. And again I won't speak for the carriers they do a very nice job of that, but talking about things like the 100 meg cities, vectoring cities, there's a again a continued rollout of fiber we're economic. ADTRAN was a single source by the large U.S. Tier 1 for G.fast which Tom Stanton, our CEO gave an interview couple weeks back that talks about how G.fast is a comparable economic alternative to fiber, particularly for the MDU market.

So there are a lot of positive factors in domestic markets. You can also look at the NG-PON2 opportunity that we have short listed for which is a significant opportunity in the U.S. is that carrier looks to aggressively move to a 10 gig NG-PON2 environment, On the international front again we are positive on the outlook on international. In our last call, up into our last call we had talked about an expectation of being flattish year-over-year on international, but we were kind of looking for flexibility on where that was going to come from. We know, as I mentioned in my prepared remarks that our large European Tier 1 is kind of in the final stages of their vectoring rollout.

They had previously introduced the third provider and there was some issue, call it some margin economics that we had to look at and that we want to go after that at the expense of margins knowing that once they finished this vectoring rollout then they roll into a super vectoring, which fits back into the existing footprint that we have.

So it's kind of an economic decision and on their part bringing out this third provider to from a geographic perspective of course that footprint was being developed, we see that transitioning back more toward our favor in 2017 on forward. Where we talked about in our second quarter call about where we said we're no longer going to be seeing, expecting international revenues to be flattish year-over-year was a LATAM situation where we expected a couple of opportunities to come out of the labs quicker than they did. Those have been delayed not that they've gone away but have just been pushed back.

So those opportunities are still out there and again when we mentioned the very wide scale testing of G.fast around the globe there was a recent press release from Bezeq where we've been chosen for trials for their G.fast initiatives.

So there are a lot of opportunities going on around the world, we expect that the international to recover, but we certainly see the beginnings of a strong domestic market we think.

<Q>: [Question Inaudible]

<A – Roger Shannon>: I don't know that I am really in a position to compare those. I've seen commentary from different players in the space that say that this is a larger cycle than what we've seen in the past. I mean I haven't said that – I haven't done the math to look at the spend and the duration. Of course we're talking about different technologies and different uses that technology both on the consumer side and on the carrier side. The carriers, but what the carriers are trying to do is to move toward a single, unified,

software-defined ubiquitous network that covers both their business and their consumers, where in the past if you go back to past cycles you would have consumer DSL, you would have some people rolling out fiber, you had the business. That's all being – that's all very expensive for the carriers and where they're able to themselves recognize earnings leverage, operating leverage, reduce operating expenses is bringing those together. Not having to roll a truck when the consumer wants to change the platform or the access to speeds, the amount of data that they have.

So it's a different kind of model, different kind of investment that we've had before, but we have not put pencil and paper. But what I have tended to read has been this is a larger wave that we've seen in the past.

<Q>: [Question Inaudible]

<A – Roger Shannon>: Yes, the last cycle was, I'd say 2010, 2011 this wave really started at the beginning, or it started during 2015 kind of ramping in 2016 is what we believe. Yes.

<Q – Greg Mesniaeff>: Yeah question Roger, Greg Mesniaeff up here. With this Verizon opportunity for NG-PON2, I mean historically ADTRAN has not had a very major scale of relationship with Verizon, I mean it's been more of a AT&T shop or some of the predecessors of AT&T as we know it today. Verizon has a reputation of being extremely aggressive with its vendors. And I'm wondering how are you going to handle a potentially good problem of having them as a customers.

<A – Roger Shannon>: So thank you for that question, it's a very good question. It's something that certainly plays into how we approach that opportunity and model that opportunity. I guess the operative word that I would focus on is kind of a economic breakthrough in tunable optics. So we recognize the opportunity for what it is, we recognize the cost pressures, we understand what those are. We know what the expectations are for the pricing.

It really is on the cost and the equipment side of it being able to meet those expectations at a economically feasible number. So the revenue number is what it is, right. So where we're driving emphasis and where we're seeing opportunities is on the economic scale of the tunable optics.

<Q – Greg Mesniaeff>: As history is a guide, I mean some of your predecessors to Verizon in this case Tellabs doesn't exist anymore pretty much lost their share selling some equipment to Verizon on a mass scale so that's why [indiscernible] (0:43:10).

<A – Roger Shannon>: Well I guess the other thing that I would remind everyone is while this is a significant opportunity we have lots of customers across the U.S. and across the globe. So it's not, certainly not a situation where we're putting all our eggs in this one basket. It is a attractive opportunity and it's – I would say as we look at NG-PON2 and the opportunities that creates especially moving toward to 5G world where

that's going to be very important in the area front hall back hall where we see opportunities. It's not like we're developing a product just for this customer. We're developing a product which we think has market and economic viability that this customer has seen as very attractive and selected this one.

<Q>: We have time for may be one or two other questions, if anyone?

<Q>: [Question Inaudible]

<A – Roger Shannon>: So we're – I won't to go into any…

<Q>: Can you repeat the question?

<A – Roger Shannon>: So the question was if we could compare our NG-PON2 portfolio to Calix. And with all due respect I won't get into specific customer comparison. What I can say, obviously the large Tier 1 who is focused on NG-PON2 has made press statements and shortlisted two companies. Those companies have been invited to go into their innovation lab in Massachusetts.

Those – there are timelines and milestones for the development of those products. What I can tell you is we believe that we're the leader in that area. We believe that the breakthroughs that we're seeing in tunable optics and the economics of those tunable optics are very positive for ADTRAN. So I just prefer to leave it at that and then rely on the customer for their commentary.

<Q>: One final question, I'll throw it out, 5G and how does ADTRAN see itself playing in the 5G cycle?

<A – Roger Shannon>: So we see 5G certainly as an opportunity, I've seen, certainly I've seen questions what this 5G mean for fixed broadband access. 5G is certainly going to bring some very unique opportunities we think for the consumer 100 times faster supposedly than what you're seeing over 4G. But you see the same thing on fixed broadband access as we've gone from ADSL, HDSL, VDSL. There is yet to be a leap in wireless technology that has been more economic and fixed access. So you can go back and look at 2G, 3G, 4G, each one of those has turned out actually to be positive for fixed access.

Setting all that aside if you take the case that okay maybe it is different this time, maybe 5G really is going to be the ubiquitous network, where we see certainly a great deal of opportunity. As I mentioned as we talk about these, the NG-PON2 optics and moving into 100G optics going forward, is there is going to be a tremendous growth and explosion of small cell towers, need for front hall back hall and ADTRAN sees itself play in there very strongly.

<Q>: Thank you Roger. That concludes our presentation.

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

Thank you very much.