

Broadcom Corp. (NasdaqGS:BRCM)

Analyst/Investor Day Transcript

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Presentation

Operator

Welcome to Broadcom's 2012 Analyst Day. Please welcome Chris Zegarelli, Broadcom's Senior Director of Investor Relations.

Chris Zegarelli

Director of Investor Relations

Hello, everyone, and welcome to Broadcom's 2012 Analyst Day. Also I want to welcome those joining us on the webcast as well. We know you have a busy schedule, so we definitely appreciate your time in joining us today. Before we get started, I should let you know that we will be making some forward-looking statements today. These statements may differ materially from Broadcom's actual results, so I would encourage you to review our SEC filings where you'll find the description of our businesses and the risk factors associated thereto. And even on this cautionary statement slide that you see in front of you, I won't read it for you right now but those same risk factors are outlined on that slide as well. To the extent we make references to any non-GAAP financial measures, as defined by the SEC Reg G, you will find those, the requisite reconciliations in the books that you received at registration and you'll also find them on the Investors section of our website as well.

One additional point you will find, an evaluation form in the books that you received at registration today, please fill those out by the end of the event and return them back at registration. When you do, you'll receive a Broadcom-powered device as a thank you for filling out the form and giving us your feedback .

We do have a full day today. We have presentations from Scott McGregor, Rajiv Ramaswami, and Dan Marotta, Bob Rango and Eric Brandt. So let's just get right to it. Please join me in welcoming to the stage, Scott McGregor, Broadcom's President and Chief Executive Officer.

Scott A. McGregor

Chief Executive Officer, President and Director

Good morning. Thanks for joining us today at Broadcom's 2012 Analyst Day. Today, I'm going to talk about Broadcom's strategy for sustained outperformance. And for me, there are 3 aspects of this strategy. One is continuing to outperform and then if you can outperform, you want to make sure that you're in the markets that are really growing. And we believe we are, so we're going to talk about why we believe communications will continue to grow and what are the drivers for that. And the third part of it is if you can continue to perform, if you believe you're in the right market, how do you manage your portfolio to make sure that you can continue to fuel the fire and keep that going. So that's what I'll cover today.

Let's start with outperformance. From a financial point of view, Broadcom has had a very good year this year. I saw a report this morning that said the semiconductor industry as a whole is expected to be down about 3.2% this year. The communications peers are doing a little bit better than that. We estimate our peers in the communications part of the semiconductor industry will be about flat this year. And when we look at our business, we expect we'll be up about 8% in this year. At the same time, in terms of financial results, we expect to have record cash flow as a company this year, and we expect to be in model profitability this year. So both delivering growth significantly faster than our peers and also good financial performance at the same time.

Now this is not a 1-year phenomenon. Let's look at the last 5 years. In the last 5 years, we estimate that our communications peers have grown about 9%. At the same time, Broadcom has a CAGR over the last 5 years of 16% revenue growth. Now it's not just revenue growth, we've grown faster than our peers. If you look at our EPS growth over the same period of time, we've grown 18% CAGR on our EPS growth, delivering leverage on the bottom line because our EPS is growing faster than our revenue. So strong operating results, a keystone of how you measure success for us in this business.

Broadcom has incredibly powerful scale in the market, and I want to share a little bit about that with you. No one else is able to say they ship the better part 1 billion wireless combo chips in the hand market. We shipped over 150 million connections in last mile and 700 million or so Ethernet ports, no one else can do that. We have competitors who have some great products and sometimes they ship a few million of them, okay. But nobody has this kind of scale. And we're working to extend this scale as well. In the hand, we're increasing our 3G basebands, we have a more than a fivefold increase in 3G baseband shift this year. In the Home, we've increased our set-top boxes by 15%. And to put that in context, the subscriber growth for the same period of time was 5%. So we're growing our sales 3x faster than the subscriber growth in set-top box.

In infrastructure, we've managed to increase the content on every line card by more than a factor of 2. So that means that even though the number of systems remains the same, we've been able to increase our content on those

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systems. So this is part of a great footprint, leveraging that power, and then growing that footprint going forward and no one else can make these statements.

One of the things that is a hallmark of Broadcom is relentless execution. And what does that mean? Relentless execution is when you spec a product correctly, you build it, you get it done on time, you get it to your customers, you help them get their products out on time and you ramp it successfully. That's execution. Okay. Broadcom does that incredibly well. And as a result, you can see on this chart, there are 12 different market leadership positions we have in the Hand, the Home and Infrastructure where we have a worldwide #1 position. In the Hand, #1 in WiFi, Bluetooth, wireless combos. In the Home, we're #1 in pretty much all of the set-top box technologies. We're #1 in pretty much all of the last mile technologies of how data gets into the Home. And this is again because of execution. In infrastructure, ethernet switch, Ethernet Fi and with the acquisition of NetLogic, #1 now in knowledge-based processors. So very, very strong market positions due to execution.

So let me talk for a moment about why we believe the communications market is growing strongly and what we think will drive that going forward. This is an interesting chart because it shows how Broadcom is really at the heart of all of the different aspects of communications. We have other competitors out there who maybe focused on wireless and dabble in some of the other things or focused on wireline and dabble in some of the other things. Broadcom is really the only company with this breadth and exposure to all the elements of communications. And we believe all of these are driving significant growth.

So for example, you see at the lower left-hand side here, we see smartphones accelerating. As people move from 2G phones to smartphones, they use a lot more data traffic on the network. LTE upgrades allow them to use even more, and we expect video will be an increasingly large percentage of the total cellular traffic going forward. And anything that drives bandwidth is good for Broadcom. We see that people moving to social media, doing a lot of video streaming, you cannot download a Web page these days, it seems, without having some video running in the corner of it. All of that is bandwidth. Bandwidth is good for Broadcom.

We see a lot of people moving to the cloud, putting applications in the cloud, both in the enterprise and for a lot of customers. That generates additional bandwidth over the Web. We see consumers moving to richer content using much more bandwidth, and you'll see some presentations from Dan today that will really help you understand how that's going to even accelerate substantially going forward. And that increases the bandwidth to the Home.

And finally, we see tablet computing taking place and tablet computing is interesting because a lot of the old PC model where your PC or your laptop executed a lot of the applications, okay, inside the laptop or on the PC, now being done remotely. So very interesting applications that move a lot of the compute over the network and they can do that because of low latency networks and high-bandwidth. And all of that is a very good trend. It will drive more communications going forward.

Now we estimate that something like 99.98% of all Internet traffic in the world goes across at least one Broadcom chip, okay, sometimes many, many Broadcom chips. And so for us, anything that drives Internet traffic, anything that drives worldwide communications, okay, is a good thing for Broadcom.

So you've seen how there's an overall trend for growth, but there are also some other things that are helping us out in driving growth going forward. One is we see very strong growth in a lot of the emerging markets. They are growing faster than the developed world in many of these areas. For example, the Hand in China, okay, growing smartphones very quickly, you see 34% CAGR for smartphone growth in China. In the Home, we see a variety of pay TV subscriber growth outside the United States and Europe, growing significantly faster, growing at a CAGR over the next few years of around 25%. And then Infrastructure, a lot of the data centers we've developed in the United States, now the growth is moving faster in the rest of the world as they try to catch up, growing data centers there, and we estimate an 80% CAGR, okay, for this business in the emerging markets. So we see strong communications growth overall, even faster growth in emerging markets. And then Broadcom has another accelerator, which is we use new technologies to drive us even faster. Broadcom innovates. Some great examples here in the Hand. Broadcom has launched 5G Wi-Fi. 5G Wi-Fi, it's sort of a no-brainer. It's substantially better performance, substantially better range and lower power. Okay. So it's very easy in terms of existing Wi-Fi applications, access points, other kinds of things, access points growing significantly in 2012. We believe mobile will grow significantly in 5G Wi-Fi next year.

And it also enables new kinds of markets and Bob will talk a little bit about this but you can use Wi-Fi now because it has significant performance, significant range for moving content around the home, for example, for video services. So it expands new markets as well. NFC, another technology, we're really excited about NFC. NFC, we think, enables some really great user interface, some really great mobile banking, financial transactions, games. It's a great technology. We believe next year will be a very big year for Broadcom on NFC. Our products have been in design for a while. We were working with customers. It should a significant ramp for us next year as a new technology.

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In the Home, there's a very exciting technology, 4K x 2K. If you remember, the very first time you saw an HD display, okay, you've been watching ever since you grew up as a kid, you watch these TVs and then you saw a 1080p display, you said, "I want one of those." Okay. 4K x 2K, you will have that experience again because it's another doubling of the resolution, okay. It's equivalent to 4 HD sets all-in-one, okay. We think it doesn't require any glasses, so we think it's going to really drive a lot. If you're going to CES this year, look for it. I think it will be very impressive.

On the technology side, we also drove a technology called DOCSIS 3.1, dramatically increasing the bandwidth for cable operators. We also worked with the government of China to create a Chinese version of DOCSIS where Broadcom is right now the sole supplier of that part in China as they roll that out for high-bandwidth cable deployments in China.

On the infrastructure side, 40 gig and 100 gig are really important. They're driving much higher bandwidth. You saw that previous chart talking about the growth of communications. One of the ways we provide that is 40 gig and 100 gig connections in the data centers and in the networks driving that forward.

And then a new area for Broadcom is automotive ethernet, and if you think about the car for almost forever, it's been its own sort of isolated technology, it hasn't related to the technology in your living room or on the network. We believe cars are going to be broadband-connected. There are going to be networked inside the car. All of the technology that Broadcom has in the living room and in our networking and all those other capabilities are becoming applicable to the car. So a very interesting market for us going forward. And Rajiv will talk a little about how we're getting into that, and some of the drivers in that space. So fast-growing communications, faster in emerging markets and then accelerated, yet again, with new technologies.

So let me talk now about how we manage Broadcom's portfolio in the face of these opportunities. How do we make sure that we can continue to outperform. This is an interesting chart. Let me spend a couple of minutes on this. These icons of chips here, there are about 50 of them, they represent all of the A0 tape-outs we had this year for SoCs. Let me explain what is that a little bit. An A0 tape-out is the initial tape you send to a foundry to manufacture a chip, okay, these are for SoCs. And it represents the culmination, if you will, of tens or hundreds of man years of engineering, taking that important step to go to manufacture. So it represents the transition to doing R&D, to getting paid for it. So very important for us.

Now I would bet there are probably no other companies or very few that could show a chart that shows that they did 50 brand new designs, okay, in a single year for SoCs. Lots of people do non-SoCs, jellybean parts, there are lots of those. Okay. There are people who do SoCs. But I bet there aren't very many who do 50. Now we actually tape-out more chips than that. We do variations, we do respins, we do multiple foundry things, so the number of tape-outs we have is actually much larger than 50, but this is 50 brand new products this year.

Now what do we do with those products? About half are for our core markets because we want to take existing markets. We want to do even better, drive better products, defend our share, enable our customers to do even more. But about half of those are also for driving new markets and taking Broadcom into new spaces. And this really is the engine of Broadcom's growth, so very important slide here. Let me give you some examples. We taped-out some of these chips this year. One of them is the Trident 2, the Trident 2 is an incredibly powerful chip. It is the best-in-class network switch chip. No one else can touch this design. Okay. We believe we'll probably get pretty close to a clean sweep across all of the platforms, okay, with this chip versus our competition. It really moves our core up a notch, keeping us extremely competitive in the network switch space.

In set-top box, we've got a great chip here, it's a quad-core chip, Dan will say a little more about it, incredibly powerful chip, no one else besides Broadcom can build that chip because of the amount of IP on it and the capability. It both helps our core business and will help us win some additional customers. 5G Wi-Fi, I think, you know about that, a success story there. Pretty much clean sweep across the access points in the world today in terms of new products and we see that driving very strongly into mobile. The 4335 is the mobile version of that chip, okay, driving for next year, we'll see significant sales ramp on that.

Now the XLP II, very, very powerful processor, embedded processor. Really, the first embedded processor to sample in 28 nanometers. It will take Broadcom into new markets. Digital ODU, Dan will talk about that, we've got a very strong business for satellite set-top boxes. This enables us to now get the outdoor units, the thing attached to the dish that goes on your roof, okay, to get a share of that silicon as well. So it's a growth opportunity for us expanding our footprint in that space. And then LTE, you'll hear more from Bob later today about LTE. So these are the different products. This is what a large part of what you get for spending \$2 billion in R&D and doing it very well and very effectively with that relentless execution I talked about before.

So let me talk about how we view the portfolio of Broadcom. We have 3 businesses, 3 business units as we call them, the Home, the Infrastructure and the Hand. In the Home, we've done a great job there in terms of taking share, in terms of building great products, enabling our customers. You can see our revenue here on the chart, about \$2 billion

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this year, and we believe that our total opportunity in the market is about \$5 billion. So we have an opportunity to grow here over the next few years in that market. Take additional share, do additional great products.

The strategy for this business unit is what we call profitable growth. That means we want to grow, we want to continue to take share, we want to grow faster than the market and we want to do so generating great profitability. And I'll talk about how that group is doing in terms of that metric.

In infrastructure, we have a great opportunity in infrastructure by increasing the SAM to drive leverage in the group. We've done a number of acquisitions in this space, and there's a great Dilbert cartoon, I don't know if you've seen it, it has these guys arguing about what the best strategy is, and Dilbert says, "Well, the best strategy, why don't we just figure out what makes most money and do more of that?" Okay. So that's our strategy in a nutshell in infrastructure. We have a great opportunity to expand our opportunity there.

In the Hand, we have the largest SAM opportunity. Okay. It's the biggest market in semiconductors. It's growing at a very rapid rate. Our strategy here is invest to win. Okay. We have a great business in wireless LAN, combo chips, Bluetooth, NFC, great opportunities there. We want to extend that franchise into the baseband space and do the whole cellular platform. Now these 3 strategies tuned for each of these businesses is how we think about resource allocation.

So in our first business unit here, the Home, okay, those people will fund the growth, drive their business, continue to go forward. In Infrastructure, we will use our balance sheet to acquire companies to see how we can grow the SAM there and drive that going forward. You've seen us buy NetLogic and a number of acquisitions in this space. In the Hand, we invest to win, a lot of our organic dollars go in this space. There aren't a lot of acquisitions that help you in that space. We invest organically to win in that space. And so that's how we translate strategy into resource allocation.

So let me talk about how we're doing on each of these strategies. In broadband, broadband had a really good year. We said profitable growth, revenue growth this year is 9%. And to put that in perspective, most of the competitors in broadband have lost significant revenue this year. They've declined significantly in revenue. Overall, in that space, we've taken considerable share to grow 9% in that space. At the same time we grew, we increased our operating margin by 450 basis points, okay. That's pretty impressive to both tremendously outgrow your competition and increase your operating margin at the same time. The business unit has done a great job in terms of products tuned to markets, moving to 40-nanometer, other things contributing to that basis point improvement. And as a result, they've achieved \$131 million, which is record quarterly segment operating income in this space. So I think this group is doing tremendously well in terms of delivering profitable growth.

If we look at our infrastructure group. Last year, when we looked at the product portfolio, it was essentially in 3 areas, switch, Fi and controller, with a SAM of about \$4 billion. What we've done with the acquisitions over the last couple of years is dramatically increase that SAM. And you can see here that we estimate 2015 SAM around \$9 billion, including these different technologies. We've added to switch, Fi and controller. We've added businesses in the wireless infrastructure like DSE and microwave, and in the overall networking space for knowledge-based processors, network processors and multi-core processors. And we expect that this additional set of opportunities, growing our SAM, gives us the ability to turn a group that used to be a great profitable single-digit grower into a group that we believe now has a CAGR opportunity of double-digit. Okay. So over the next number of years, we expect this group will now grow in the double-digits, which is tremendous improvement for this group, gives us great opportunity and leverage for Broadcom as a whole.

I want to take one area in particular, which is the network processor space. We've got some tremendous technology from NetLogic. We looked at all the different companies and we evaluated their technology. We're looking to buy one. And we decided NetLogic was by far the best, so we bought them. And how has that done? It's gone very well. We're shipping our 40-nanometer product in volume today. We're sampling our 28-nanometer product, which we believe is best-in-class in the space. We're ramping a lot of new customers, seeing good traction. We've grown that group every quarter since we acquired it. We're gaining share and we're expanding from the data plane into the control plane. So an opportunity to grow into a new space, okay, with those processors. So we're very excited about this technology. We think it's doing very well. We have very high hopes for it going forward.

A year ago, when I was up here, a lot of you had questions about our connectivity business. One of our competitors had announced a new product and a strategy to attack our connectivity business and some of you were questioning, can you hang on to your share? Are you going to see a lot of share erosion? How bad it will be? When will it be and stuff like that? And I told a year ago, we said, well, actually, we think we're probably going to hang on to our share and we might even grow it. And let me tell you what we did. We grew share over the last year in connectivity despite competitors coming into this space. And Bob's going to talk about a lot of the underlying reasons for this, it has to do with innovation and execution, okay. But we've done a great job. And so I'm going to tell you now that this year, going forward, we expect to gain or grow share in connectivity. Again, due to execution, innovation, new things.

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One of the other agendas for us is to accelerate our roadmap in cellular. And you can see here some of the transitions we've made going forward, moving from single-core HSDPA processors to multi-core processors, moving up to the high-end of 3G and moving to LTE. This is very important for us, okay, driving the agenda to have the entire platform in cellular. And let me say a little bit why that's important. If you sell connectivity in handsets, in a smartphone, the opportunity there is maybe \$3 to \$6 per smartphone. And given how many smartphones are made in the world, you multiply those 2 numbers together, it's pretty interesting number, okay, and reflects why we've been so successful in connectivity. But if we can sell the entire platform, we have an opportunity to quintuple the revenue we get from the platform. That's a lot. That's not like double. That's 5x. Okay. So for us, it's an imperative to make sure that we put together all of the technologies in the smartphone, okay, and we will both benefit from growing in the smartphone space because smartphones are growing very quickly. We will also benefit from taking share from some of the existing guys who were there. We're already doing that. We expect to continue to do that going forward. So this is why. What was the saying? Why do you rob banks? Because that's where the money is. Why do we go into the cellular platform for the whole platform? Because that's where the money is. That's where the opportunity for the biggest growth for us is and why we believe that is so important to do.

Now we've made a large investment in order to go into cellular. Let me talk a little bit about the context of that investment. Over the last 5 years, we've invested in baseband, and we've grown that investment about an average of 17% per year, faster than our revenue growth, okay, a big investment for us, again, because of the opportunity. At the same time, you can see the company's operating results over on the right, and we've pretty much kept the company within our profit margin target. And so this year, for example, despite having spent the largest amount we've ever spent on baseband, we will do model profitability for the company. And I think this is important because it reflects that the underlying strength in our businesses is there. It's very strong. It enables us to make big bets, okay, for the future, which we believe are going to pay off and return a lot of value. At the same time, today, we can deliver good profitability and good return for our shareholders. Threading the needle of investing in baseband to win in the future, while at the same time, delivering good results is very important to us and a big focus as we think about doing both at the same time.

I'd like to talk a little bit about investment priorities. When we think about the most important things to invest in this year and next, what are they? And to put it in the context, 2012 has not been a particularly high-growth year for the industry. We've done better than the industry, but not a particularly fantastic year for the industry. We don't think next year is going to be a particularly fantastic year for the industry. Probably kind of muted on growth, could be a surprise, could be a great year, a lot of unpredictability on our industry. But we think it will be muted. And in that context, you need to be very judicious about where you spend OpEx. And so we have 3 focus areas for OpEx this year and next. And they are: Improving our position in the hand; improving our aggressiveness on processed technology; and investing in the systems and infrastructure of Broadcom. And let me say a little bit about each one of these.

In the Hand, we've made significant investments in improving our cellular modems and moving to advanced cellular modems, and you'll start to see some of the results of that when Bob talks later today. We also want to move our performance on application processors in that space because we believe basebands and application processors naturally integrate together. I know there are some guys out there who only do processors who don't believe in that. But believe me, if you can do both processors and basebands, you see why it makes sense to integrate them together and we believe the vast majority of all phones going forward will tend to integrate these over time.

At the same time, we also want to continue to invest in our innovative technologies for connectivity. It's a great business. We want to continue to grow share, defend that, drive new innovation in that space, and I think you'll see that's a very rapidly evolving business. It's not like you do wireless LAN check and you're done. It's a very rapidly evolving space and very interesting to drive new technologies there. So those are big investments for us in the Hand.

In process technology, for many years, Broadcom has been fast follower. We've been a generation or 2 behind many of the other guys in terms of what silicon process node we use. We believe it makes sense, given some of the acceleration in the industry, to move closer, we're not going to be the first guys in on a new process, but we think it makes sense to move closer to that. It will enable us to do more competitive processors in networking. It will enable us to do more competitive processors in basebands and cellular. Those are a couple areas in set-top box. Again, moving closer to that edge, more competitive products. So we'll make some investments in that space.

And lastly, we believe that as a company, Broadcom has grown from basically \$0 to \$8 billion in about 20 years. And we want to make sure that we invest in the infrastructure and underpinnings of the company so we can continue to scale as we continue to grow at a rapid rate going forward. Now these investments are largely in our 2012 numbers today, so these are not all new incremental investments for next year, these are in our run rate today, by and large. We will make some modest increases in these next year, but we are investing in these as our priorities and making sure that we are spending our scarce OpEx dollars on the stuff that matters most.

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So let me give you some signposts for what I think you might want to look to for next year. How can you judge -- you've heard me talk about what we're investing in, where we're growing, what we're doing, how can you judge whether we're being successful? Here's what I suggest you look for. In the Hand, I suggest you judge us on are we indeed maintaining or growing our share in wireless combos. Do we win new designs? Do we develop new technologies? Do we drive that forward? And are we achieving meaningful progress in LTE? We think that's very important. We think LTE is the next clear important technology in basebands. We need to be there. We're not there today. We need to make some progress in that space. So please judge us on whether we do indeed make progress there.

In the Home, I think there's some very interesting things going on and if you're coming to CES, I think you're going to see some interesting stuff, CES, Mobile World Congress, some of the shows next year. One of the things we want to do is we want to launch small cell designs. We're going to launch both the 3G ones we have today, but also new LTE small cell designs. Broadcom is in a unique position because we have that last mile technology leadership, okay, for gateways in the Home and other things and that's a very natural thing to tie with small cells, okay. So it's a very logical connection for us. Many of our competitors want to be in that space so they spend a lot of slides talking about it, but they don't have that connection with the last mile technologies that we do. So I think you're going to see some very compelling integrated gateway opportunities to drive that.

4K x 2K, important technology. I mentioned, look at CES, you'll see a lot of that.

Dan will talk about why that's so important to us and how we're going to benefit from that. But look to see significant progress there. And then, next-generation gateways. We believe that how people are getting content in the Home and how they move it around the Home and deal with all the network and intellectual property rights of the content they move around, we think that's very important stuff. And so look to see us launch a number of new products in that space.

In infrastructure, we've got absolutely fantastic network products there. The Trident family, doing extremely well. Look to see those products roll out with a number of customers, okay? We believe we'll have close to a clean sweep on that pretty much every single customer in the market, pretty much using our Trident product. Very, very strong product. Again, we think that's a great opportunity to roll out next year. The other thing that's important is we made a large investment in NetLogic. We bought it, primarily for their network processor business. Look to see, are we gaining share in multi-core processors in the networking space? Are we indeed growing that business and achieving the targets we set there?

So these are the signposts. Please look for us next year, and I'm very excited about the opportunity we have. Great growth business, great execution, great opportunity going into the next year. I now have time to take a few questions from anybody in the audience, if you have them. We have some microphones, I think, going around. If you raise your hand, we'll pass our microphone to you. Please state who you are and your affiliation and your question.

Question and Answer

John W. Pitzer

Crédit Suisse AG, Research Division

Yes, Scott, it's John Pitzer with Credit Suisse. 2 quick questions, how do you design meaningful progress in LTE? Do -- should we expect to see a commercial product in the market next year? I know you guys usually don't preannounce product introductions. And secondly, relative to moving from it, is it becoming a faster, fast follower? Can you get into a little bit more detail as to why you think that's the right decision, given that a lot of the audience has always viewed you as more of a design company, and not needing to lean on Moore's Law? And if you had to lean more on Moore's Law, what's the profit implication for that?

Scott A. McGregor

Chief Executive Officer, President and Director

So on your question on LTE, what are the signs of meaningful progress, very logical question, given my presentation. I think I'm going to defer that to Bob in his presentation. I think we're trying to thread the needle. We generally do not announce products before they ship. Today, we're going to try and give you more insight than we would otherwise. So Bob's going to thread the needle a little bit on that, but let me just stop there and let him do that. In terms of why are we becoming more aggressive on process generations, a number of the chips we do are increasingly benefiting from some of the power savings and some of the other benefits you get from smaller geometries. So for example, in our set-top box space and in our network switch space, we physically cannot build the chips unless we go to a smaller process. And Rajiv is going to show you a chip, for example, that, boy, we need to push the process generations to do that. Some of these chips sell for many hundreds of dollars, or are big opportunities. It advances our leadership. I think the chips that we choose to go into these new processes, okay, will have pretty good margins, okay, and will drive leadership. So I think they'll be probably on the higher edge of margins for us, so I think the return on

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investment is high. But there is something different, and I've said this before, Moore's Law is going through an interesting phase in its life cycle. In that, it used to be that you could take it for granted, that every time you went to a smaller geometry, you would get an improvement in cost per transistor. And we're seeing that, that's becoming less and less true. And I think with 28 nanometers, it's probably starting to come down, and I think with 2014, it may even start to come back up, okay. And that's going to be a shock, I believe, for our industry, our customers, consumers, everybody, that's an interesting phenomena. But for some of the products we're doing, it make sense to get there for power reasons or just because the number of transistors you need to put on a chip. We have chips now that have, in excess of 4 billion transistors on a chip, okay, and you just need that for, just the power so you can deal with the heat that comes off the chip. So there are some reasons for us to drive that. I think they'll have positive economic implications. But unlike in the past, when we went to 65 nanometers, there was sort of a wholesale migration of our portfolio. We basically moved everything, we told you guys we were going to spend a lot of money on masks, and we basically moved our entire product portfolio to 65 nanometers. I don't think that's going to happen, going forward. I think you're going to see us judiciously move products to new process geometries where it makes sense. I think 28 nanometers is going to have a very long life as a node, and there are some products that simply don't make sense to move, maybe ever, okay, from where they are now, and that's very different, okay, than what you saw in the past.

Anil K. Doradla

William Blair & Company L.L.C., Research Division

Scott, Anil Doradla from William Blair, a couple of questions. Since the acquisition of NetLogic, from a strategy point of view, from a product positioning point of view, have you guys made any fundamental changes in terms of focusing maybe on the higher-end or on the low-end, has there been any change? And the second question I have on the application processors, clearly, there's some issues with standalone application processors, given some of the largest guys are doing in-house. So how would Broadcom position themselves in that process? And can you share with -- how do you move into maybe infrastructure and some of the other areas?

Scott A. McGregor

Chief Executive Officer, President and Director

With our NetLogic business, we basically work with them on a strategy. We have not diverted from that strategy from when we acquired them. The goal is to create great products, to keep pushing knowledge-based processors, drive the market forward there. We've announced 28-nanometer knowledge-based processors, the best world-class products. We don't think anybody else can touch those. In the processor space, the primary strategic reason for buying the company, we've continued the roadmap that they had, it's a great team. Great set of products. The toroidal process bus is a great innovation. We think it'll deliver best-in-class performance. And our customers are confirming that with their design wins. So we're rolling that forward. So no fundamental change in direction for that group. Yes, so another question about standalone application processors. Yes, we see a number of competitors doing that, some customers doing that. I think that's something we certainly could do, I mean it's actually easier to do a standalone application processor than an integrated one. But it's hard to add value in that market because again, ARM used to deliver a product that required considerable work to get it ready to go-to-market, that's their historical model. Today, ARM delivers a pretty good core out of the shoot, hence, the reason you're seeing so many companies pop up what these standalone multi-core processors is because you can take the stuff you get from ARM, synthesize it and you're mostly there, okay? So for us to add value doing that, that's a little questionable. I don't think that's going to be high-margin business. I think that's going to either you build -- do it internally as a customer, or guys will try and do that as a business, but it's really hard to differentiate taking ARM's product and simply synthesizing it and making a chip out of it. That's not a high-margin business going forward. The best business going forward is to integrate that with other things, create a lot of value, okay, and believe me, there are a lot of good technical reasons to integrate a baseband in an application processor, power consumption, board space, fewer signals going on and off chip, there are all kinds of beneficial reasons if you care about battery life, so other things. That's where we can add value. So that's why we will focus on integrated application processors in the cellular space, not standalone.

Ambrish Srivastava

BMO Capital Markets U.S.

Thanks, Scott. Just -- Ambrish from BMO -- a follow-up on the earlier question on the operating model, and you alluded to it a little bit on the ASP side. Are you already seeing that, for instance, in connectivity, where the die size has shrunk to the point where you're not able to drive any more reduction, and hence the ASPs are not in the 10% normal decline than we are used to seeing on the semi-side? And then my second, unrelated question is for Rajiv's business, we've heard MIPS is kind of, if not already on its last legs. It's kind of going in that direction, and ARM has made a big foray in that com space. When we look at Rajiv and Ron, next generation NetLogic, is that going in the ARM direction?

Scott A. McGregor

Chief Executive Officer, President and Director

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Your question on the connectivity chips, if you're doing a standalone Bluetooth chip, just like Bluetooth-only, it's probably pad limited today, and so the benefit you would get if, hey, he mapped to smaller geometries, you wouldn't save any money, okay, if the die wouldn't get significantly smaller. So things like that don't make sense. One of the benefits of going to the combined connectivity products we do, the combo chips that we do, is the more different things you aggregate together, the better chance you have for scaling, for sharing, for other kinds of things, so you would get benefit for going for other processors. So that's one of the trends driving the desire to integrate more different things together, to get benefit of those additional process nodes. So I think the very basic stuff in the low-end markets where we compete less, that's becoming very process limited, not the others. In terms of our infrastructure market, we do great products on MIPS today. We'll continue to do that going forward. People are generally insensitive to what the instruction set is, in that market. It's an embedded processor. It's not like something you write external applications to, so that market is much less sensitive to instruction set than you would see in, for example, a phone market, where they're extremely sensitive to instruction sets. So we don't see any significant pressure to move from MIPS, that being said, Broadcom, we do everything, we do MIPS, we do ARM, we do custom internal processors. We are a processor company. So if the customer were to ask us to do things and other things, we can certainly do that. A lot of our technology would carry over to other processor families. But today, we haven't announced anything in that space. I think I have time for 1 more question.

Unknown Analyst

Really simple question. On the 50 tape-outs that you highlighted, a couple of quick questions. Can you share, process technology-wise, what that divide might be between 28 nanometers and 65 and 40? And secondly, out of those 50 tape-outs, varying steps [ph], how many of those, what percentage went to production with a dash stepping versus an all layer?

Scott A. McGregor

Chief Executive Officer, President and Director

So I can give you a little bit color on that. Most of those are 40-nanometer. A small number are 28-nanometer. Next year, we expect a much larger percentage to be 28-nanometer. But still, the number of 28-nanometer is relatively small for us, again, because not every chip benefits from that, so it won't be the wholesale wave like we saw in previous generations. We also some -- have some in 65 and we have some in even bigger process nodes for things like power management and other things. So majority, 40-nanometer, some 28, a little bit of 65. And going forward, imagine that moving forward a little more towards 28. You asked how many go to production on A0's, we're pretty proud of that, actually. We have a significant percentage. I don't happen to know the exact number, but it's a, it's definitely a double-digit percentage of those. Henry, do you know that number?

Henry Samuelli

Co-Founder, Chairman and Chief Technical Officer

No, no.

Scott A. McGregor

Chief Executive Officer, President and Director

Well, we'll get it for you. We think we're doing best-in-class there. A lot of those guys do. We celebrate when somebody takes an A0, requires no steps, no metal steps, no all layers and goes to market. By the way, for those of you who don't understand the nomenclature, when you come out with an A0, that's the very first step. If you have to fix the metal because you have a bug or need to fix something, enhancement or whatever, that becomes an A1 or an A2 or whatever. If you have to do all the layers and by the way, that's getting pretty expensive, if you have to do that, that becomes a B. Occasionally, we'll have a product that's a C something, that's not good, we don't like that. Okay, rarely we have Bs, mostly we have as that go to production. I say the majority of our products are A0 or A something that go to market. Again, reflecting the quality, the people and the quality of the tools we give.

Hey, we'll have time for more questions. Thank you very much for this. We'll come back later in the day and make sure we can answer most of your questions. Thank you very much.

Chris Zegarelli

Director of Investor Relations

Please welcome Rajiv Ramaswami, Executive Vice President and General Manager of Broadcom's Infrastructure & Networking group.

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

I'm here to talk to you about the Networking group here and let me start by giving you a very quick intro to what we do here, because you don't see many of our products. We sell products into the service provider infrastructure, data centers, campus networks, which we call enterprise and also some small and medium business projects. So while you

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don't see those products, believe me, you will see them, or you will hear about them if things don't work. Because whether you're at home or whether you're at work or whether you're on the road, the way you access content is by going through the network. And that's really what the power of our products. Now this is a fairly highly differentiated business, it's cost a lot of performance, a lot of robustness, a lot of inspection and intelligence in these products. And as a result, it's the highest margin business within Broadcom. And due to the attractive margin profile of this business, we're always constantly looking at how can we expand our portfolio, how can we do more in this market, where can we go? And let me start with a slide that Scott showed you. If you look back again, let's reiterate the same point here, looking back even a year ago, these are our core markets, Switches, PHYs, Controllers and we work actively to expand that fact. And we've done so with both organic efforts, as well as acquisitions and we prioritize, as Carl mentioned, using our balance sheet dollars to acquire good companies. And if you look at where we're at, we still anticipate significant growth in our core markets, our Switches PHYs and Controllers, we'll continue to grow in the next few years and we expect that side to grow. In addition, we've laid out new products, multi-core processors, network processors, knowledge-based processors microwave backhaul, digital frontage.

Now if you look of the vast majority of the new products that we have added to our portfolio, we are entering a fairly large market, which I'll talk more about where we have relatively little share. The exception, of course, is the KBPs, where we are the leaders. But in all these other markets, we're looking at large markets with fairly low share, which gives us a lot of room for accelerating our growth. And this is really the foundation for our future growth.

So here's the outcome of the presentation for the next 30 minutes or so. So I'll talk about how we are accelerating first our core growth opportunities in our core markets across all the different segments, service providers, data centers. We'll talk about how we are progressing, in terms of expanding into these new markets that we talked about. And then, let me summarize by telling how we are positioned, related to our peers to outperform.

So let's start with our core markets. Now you are probably wondering here, I mean, the infrastructure market has been a little bit slow this year, but service product CapEx is coming down as an example, enterprise is clamping down on spending, and you're probably all wondering when this is all going to come back, and I don't have a better crystal ball than you do to answer that question. But I can tell you is that the fundamental growth drivers are very much still in place. If you look at everything in the slides here, again, the same as what Scott showed, the fundamental secular trends are still there. People are going to be consuming more bandwidth, whether it's through smartphones coming into the network, whether it's tablets, whether it's increasing speeds in broadband coming to your home, a transition to LTE, and then the enterprise markets migrating to private clouds and public clouds. All of these things are going to drive networking demand. And so what I can tell you here is, I feel pretty confident that demand will come back, and there is going to be a continued need for higher performance, more intelligent networks that deliver more Ethernet, more bandwidth and the fundamental technology at the base of all of this is going to be Ethernet.

Now, if you look at the service provider market, let me give you a little bit more color on CapEx spending. So the reality is, while CapEx spending may be down this year, it really hasn't been on a tear over the last several years, either. If you look at the overall carrier CapEx, it's kind of middling, for the most part, been flat over the last few years. And it's not likely that this CapEx is going to go explode over the next few years either, right? But, I think if you pay attention to what's going on within that CapEx, and understand where carriers are spending their money, here's where they're spending their money, and here's where they're not spending their money. So if you look at the ones in green, carriers have been spending more, the CapEx that have deployed in these areas, carrier, Ethernet or others, 3G, 4G wireless, fiber optical, these are other areas where they have been spending more. And if you look at whether they're spending less, they've been spending less on Wireline Voice, they've been spending less on SONET SDH, and some of the other legacy technologies.

Now by choice, Broadcom's portfolio is positioned exactly to where carriers are spending more. And these are also the areas where they're going to be spending more in the next few years as well. Now if you look at that historically, in terms of how we have performed, our service product business, while it's already lumpy, given the nature of the demand, has grown at a CAGR of 20% over the last few years. And so you can see why, the combination of our strength and product portfolio, along with being in right places in the market have allowed us to perform the way we have.

Now within that service provider market, as well as in the broader data center and enterprise market, let's talk about the technologies that are at play here. We have been very focused on Ethernet. And if you look at the history here, Ethernet has been the winning technology, and in my view it's going to be the leading technology, going forward as well. Going back in history, you can go back to the '90s and you can see there was Token Ring, and then there was FDDI, and then there was ATM, and each of these had their days of fame, and they were all kind of -- subsequently declined, Ethernet has pretty much replaced all of them. If you look at the last 10 years, here we have Fibre Channel, which has made a good niche for itself, and block storage applications and enterprise. But things are just transaction processing. And that's about a \$2 billion equipment market today. Mostly flat to slightly declining. And you look at

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little sliver over there, that's InfiniBand, and that's about a few hundred million dollars of equipment market today. And that's had its niche in high-performance computing.

And you look at Ethernet, it dwarfs all of them. It's over \$20 billion in revenue. Why is that the case? The fundamental reason here is Ethernet has a set of open standards. Ethernet has a large open ecosystem with multiple providers, where you can go buy solutions that are interoperable. A large OEM base, the architecture is very scalable. Ethernet has the ability to work across many different applications. It's not a niche technology. It can be used across all these segments that we talked about. Scout around on an enterprise campus, LAN technology, it's molded to data center, it's molded to service provider, it's everywhere. And then, by the way, it's now moving into cars, which I'll talk about. And the fact that Ethernet is so adaptable, that it can be evolved, that there is such a broad ecosystem, is really what's driving Ethernet to win. If you look at some of these other markets and what happens with Ethernet is it gets good enough, right, over time. So capacities continue to grow, performance continues to improve, latencies continue to come down, to the point where the majority of applications can be met with Ethernet. Relegating the other technologies toward, as we see here, to relatively niche technologies.

So now, if you look at the Ethernet market, and you look at the semiconductor suppliers, we are a leader in Ethernet, Broadcom. And here's a market data from Linley that showed, in -- where we are, relative to our top 3 competitors. And how have we been able to win here? The fundamentals -- the way we win here is by enabling better economics for our customers. We allow our customers to get products to market quicker, with lesser amounts of investment on their part. And we do that by combining the best in class IP that we have across many different portions of technology that's required for this market. Being able to put all those things together into leading-edge chips. Having a very broad product portfolio and a roadmap to go with it, and really providing complete solutions to our customers. And I'll walk through examples of all of these as we go along here. This is really why, fundamentally, we have been winning and we will continue to win going forward.

So let's start looking at the markets one at a time here, and let's start with the service provider market. Service provider market is a complex network over there, access, backhaul, aggregation, core, and we have a broad product portfolio at every space, every portion of this network. And we have been driving innovation in this market at an expanding pace. The products that we bring to market here fundamentally changed our customers' bill of products. If you look at, this is the chips over here, these are all just new chips that we introduced this year. And this is going to be foundation for our growth in the next few years. You should expect to see products coming to market from many, many different customers in 2013 from these chips, using these chips as a foundation.

Let me highlight a few of these chips, okay? And talk to them a little bit more. So the first chip that I'll talk about is our 100 gig fabric solution. This came out of our June acquisition. And here's an example where we acquired a company that was best-in-class in terms of the fabric solution, the switch fabric solutions that they had and we've continued the development of those products and here's the next generation product that we introduced from that team as part of Broadcom, done completely inside Broadcom. This is the only game in town when it comes to a molten silicon solution for building very large scale modular systems. Yes, you can look at building systems with thousands of ports, thousands of 100 gigabit ports, whether it's all on a single large chassis or whether it's distributed across multiple boxes. The only way people could have run this was to invest in very, very expensive ASICs. And even those folks who invested in expensive ASICs, some of them have switched over, Tier 1 customers have switched over to using this solution. And so what this is fundamentally enabling, is it's enabling a number of customers to go build these large-scale systems out there, for service provider networks, core routers, EDGE routers, packet transport systems, as well as data center boxes.

Another example of a product that expands our SAM is 100 gig network processor that we that we introduced earlier this year. And by the way, you should be seeing all these products in production, right, with customers in 2013. So again, this is a product that's -- it that 100 gigabits of full duplex processing. Our nearest competitor's product about 40 gig, if you look at it as an apples-to-apples comparison, and again, this is a product that very well-positioned for further penetration into the traditional network processor market in EDGE routers primarily, as well as in some core router applications, as well as packet transport applications. So again, a leading edge product, best-in-class in the industry.

Now putting it all together, how does this come together into a system? So if you look at a router, let's take a look at the router, the router has a fabric LAN card, typically, and it has a, as I say, a line card, right? And we have the -- if you go back in 2009, we had solutions for the fabric, this is, again the June part that I show here. We had a solution for a portion of the line card, and we had size that we were selling for the I/Os. If you look at what we've done today, the portfolio that we provide is a complete platform solution. Everything inside the box can be built on top of Broadcom silicon, including the packet bus and the network processing, the fabric interface, the PHYs, the processor, the knowledge-based processors, all of it comes together and works very well together. So not only do we optimize the interfaces between all these chips, we also optimize how these chips work together from a software perspective. So for example, the software that's needed to control the switches, works very well on an XLP CPU.

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So this is how we provide, fundamentally, a platform solution to enable our customers to get to market quickly, and provide reference designs that they can put together and bring products to market quickly, with a lot lower investment than that they would have to make otherwise. And by the way, as we do this, our ASP increases, right, by a factor of 2.5 on that same line card than what we had before.

Now let's move on to the data center here. Now we're playing the same game in the data center. We fundamentally changed the game in terms of how people build products, in this data center. And again, this list of products that's shown here are all products that we introduced this year. And again, what we're doing here is enabling the transformation of these data centers to go from a gigabit to 10 gigabit, driven by a network virtualization, enabling things like software-defined networking which I'll talk about going forward. And really changing and transforming how data centers get built. And here's an example again in -- of a place where, using some of our chips we have been able to make significant inroads against the boxes that would have to be built with ASICs otherwise.

So to follow along on what Scott said, let me highlight the Trident 2 chip here, and talk little bit about that. So this was a chip that we introduced earlier this year. It's a big chip, you can see this year, I mean the fact that you can see a chip like this, that's this size, it's a huge chip. It's got 4 billion transistors on it. It does a terabit per second on a single chip, right? So it supports a 40 gig -- you can mix and match, 10 gigs and 40 gigs. It's got a bunch of other features. It enables network virtualization. And I want to correct one thing that Scott said here. It is already the de facto solution. With the Trident family, with, this is our fourth generation already. We had a chip called [indiscernible], then we had Trident, Trident plus and now this is Trident II. We have essentially run out of sockets, they are there to be won in this market. It's become the de facto solution. You should expect to see a large number of products coming out in 2013 using this chip in the market, and this will again be accelerating our growth in data center looking forward.

Now let me talk a bit about software design networks because there is a lot of hype and buzz in the industry about it, and let me give you our perspective on the way we look at this thing. If you look at this as a house here, there is a foundation for the home, and the foundation really is built around the chips that we provide. It's whether it's chips like Trident that do the switching function, it's chips like our XLP processors that do all the control based processing that's needed for this, and, as well as the controllers that sit inside the servers as part of the data center ecosystem. Now, on top of this foundation, what we provide is a comprehensive API, and an STE key, using which, a variety of people can program directly into the network. This is really what STE is all about, right? At the end of the day it's about making the networks more programmable, more accessible and it's also about potentially changing the way networks get sold and deployed in an ecosystem. And we are working with a large variety of other players to create a broad ecosystem around our silicon. In fact if we were to look at most of the so-called STE implementations that use OpenFlow today, they are working on top of Broadcom silicon today. Now, the layer above the chips in the foundation is the Network Operating System and you have a number of OEMs that provide that, people like Cisco or Juniper are just the -- it's retired Dell, provide the operating system. And then above that, you have a number of players who are working on applications, as well as controllers. They include people like VMware, with their Nycera acquisition, network virtualization, for example, is one application that can run on top of this network. This is a good thing for Broadcom, right? The development [indiscernible] of an open ecosystem, like this is a good thing for Broadcom, because what we are doing is we're enabling this entire thing to be built on top of our silicon, and this means more and more opportunities for us, to sell our silicon into a broader ecosystem. And so we are optimistic, to the extent that [indiscernible] copier, they're going to be a good beneficiary of this trend.

So let me next move on to talking about the new markets that we are focused on. So I want to start by looking at the multi-core market. Multi-core processing is, after cellular, the next biggest investment opportunity for Broadcom. If you look at the market here, we're looking at a market that's north of \$2 billion in SAM, and it's a market that's fairly broad-based across many different segments. You have processors being used inside security devices, firewalls, intrusion protection, load balancers, these are all [indiscernible] on appliances. We have processors that are inside every networking box that they had built, whether it's switches, routers, wireless access points, controllers, all of those use processors. They're all moving to multi-core.

Storage, all the high-end storage areas in enterprise, storage Gateways, storage they all use storage control, they all use multi-core processors. And then finally, last but not the least, wireless infrastructure, base stations, radio network controllers, all of these, again are great opportunities for us to sell these products into. Now the, the interesting thing about this is, Broadcom, with our switches and routers, have a presence already in every one of these segments today. And so we, again, have the opportunity to sell platform solutions into every one of these markets, and they're also are being sold for the most part, into the same set of customers that we already call upon with our other products.

So how are we doing, with respect to processors? So it's all about execution. The first thing is, we started by having a very high-end processor core. We have a processor core that's a server-class processor core, there's that -- and we'll

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talk a little bit more about this, but it's a core that has quad-issue, quad-thread, [indiscernible] of execution, full Layer 3 cache, it runs at 2 gigahertz, so really, it's a state-of-the-art high-end server class CPU core.

We combine that with the process nodes, the right CPU at the right SoC in terms of combining them with a bunch of accelerators and using the right process nodes. If you look at where we are today in the market, our 40-nanometer products are selling in volume. They're ramping, they're in production right now. We've been sampling our 28-nanometer product here and this is our first 28-nanometer chip at Broadcom. This is an XLP processor here and it's been sampling now for a little bit. And what we've done here is the migration to 28, and we're not stopping there, right? As you can imagine here, processors of the 180 are where we can really benefit by going to the lower process nodes because what happens there is we get better power efficiency, we get better performance. And many of the applications that we sell, people will take as many codes that we can deliver and they will take all the performance we can provide and their concern about PARC [ph]. So this is clearly an area where we can benefit by going to new process geometries. And as Scott pointed to, we are very active about not stopping at 28 here but going beyond that as well. So we have been ramping our investment in this area.

In terms of design wins action, we've been doing very well. Across every one of those segments that I showed you last, we have design wins at Tier 1 customers. And those are all going to be -- I think that's a long life cycle in this business, right. So you win a design and it's going to be 18 months before you really see it in production. But given where we are, we are very, very confident about the outlooks for this business going forward. And, in fact, even looking into this year despite all the headwinds we have in the microeconomic situation here, this business have been growing year-over-year and we had been gaining share in this market.

We already had record quarter revenue from multicore this year in Q3 and we continue to grow. And again, we have every intention of being the #1 player in this market as we go forward. And given where we are in the market and given the product portfolio that we have, we feel very good about that. Why are we going to win? So let's look at the different dimensions of a processor design win, right? What are the people going to be looking for when they choose a processor? So the first thing they're going to look for is high performance, right? And you look at high performance, who can deliver high performance in the CPU core? When you look at that, it's all the guys who build server-class CPUs. So you have Intel, you have IBM, you have Sun, right, and you have us. Our CPU has world class performance and there's nobody else on that list.

The next thing you look at for this market is, are you doing the right SoC? We have all the accelerators that are needed to optimize these processors for communications applications. Things like encryption, decryption, deep packet inspection, content inspection capabilities, these are all things that you need to embed into the solution to make it work at high performance and go above. And again, here, we do that along with a few other people. The last piece is the rest of the IP, networking IP that's needed to integrate into a SoC. Things like 30s, 2 or 25 gig 30s, that's as an example of moving forward. We have all that technology in-house.

If you take these 3 different pieces and try to put them together really, we're the only ones in the industry who have the ability to really bring these things together into a solution. And what we've done is done that exactly with XLP 2 and we're going to be doing that with newer products going forward and we have been expanding our product portfolio to go after the entire market. Not just high-end data plane applications but also other control plane market in addition. So we're optimistic about where this is going to be. It's going to be, of course, a multi-year play for us because we have a lot of share to grow into in this market.

The next market I want to talk about here with you is wireless infrastructure. And I'm going to focus on the macro portion of the wireless infrastructure. And Dan in his speech is going to talk about the small set [ph] portion. And of course, we are working together to create a platform for this and that as well, and Dan will talk about that. So if you look at this market for wireless infrastructure, again, we will only looking at a portion of this market that we're actually playing into. There are other portions of wireless infrastructure but these are areas where we are targeting our products right now. Within the base stations, again, the opportunity to sell processors. There are also the opportunity to sell integrated solutions that combine process would be DSPs into those baseband units.

If you look about that in terms of the radiohead that's connected into those base stations. Inside the radiohead, we have a platform opportunity with our digital front-end chips, the DFE chips, where we can essentially over time integrate most of the functionality in that radiohead. That's about a \$400 million set. The last piece here is a backhaul that's needed for this. And there's many different kinds of backhauls. Microwave is about half of that right?. At about 70% of the revenue actually in backhaul goes towards microwave because it's easier to deploy, you don't need wires, you don't need fibers, but it's also more expensive which is good thing for us. So we are the leading [indiscernible] provider for microwave solutions as well -- and that's another \$500 million fab.

As I look at this opportunity, it's an opportunity where we have a lot of room for growth. We are not the incumbent in any of these markets. But we have good products, excellent products leading-edge products and we have been capturing design wins at most Tier 1 OEMs in this market.

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The less longer-term opportunity that I want to talk to you about for us is the automotive market. Scott talked about this a little bit, let me give you a little bit more color into this market. So here's an opportunity we saw many years ago to drive connectivity within the car. The car is getting more and more connected. And there's a number of systems inside a car, inside a modern car. And if you look at over the last few years, a lot of automakers have become really, really interested in Ethernet and particularly the Ethernet that we provide. We provide Ethernet that's done from a single pair. And the reason this is very attractive for most of these automakers is that it's a good thing that reduces their cabling weight and that it reduces their cost. And they can leverage technology that's built for other markets as opposed to sitting with niche technologies like [indiscernible] that will level up just for the automotive market. So there's been a huge interest in this from the auto industry. It's still early days. I don't want to [indiscernible]. The automobile industry, it's a slow process here. It takes a long time for cars to get into production, there's all kinds of qualifications to go through. Today we have products that are fully qualified for deployment in cars. And you should expect to see the first cars come into production in mid-2013 using Broadcom's Ethernet.

If you look at the application for Ethernet in these cars, you start out with adaptive driver assistance. So if you look at the example shown there, there's the 360 camera view. Here you have high-end cars with -- you have surround cameras all over and they're all interconnected. That can be done through Ethernet. The next application is infotainment, where you have head end units inside your car, you all have the [indiscernible] unit that's connected to amplifier, the speakers and everything else inside the car. So that's the other opportunity. The on-board diagnostics that's connected. And over time, you can expect to see that expand because there's a lot of other things, the number systems inside the car that are all connected and all of that stuff can eventually one day run over Ethernet.

What we've done here is to create a forum, an industry forum to standardize the use of Ethernet. It's the One Pair Alliance, One Pair Ethernet Alliance. And this is based on the technology that we created it. It's called our BroadR-Reach technology. Today on 100 megabits per second, it's fully auto qualified and now this consortium here is going to be figuring out how to take that beyond 100 megabits to multiple hundreds of gigabits to a gigabit and beyond in terms of capacity. And as you can see here, most of the major auto manufacturers are members of this consortium, and all of them are of different stages at this point of building Ethernet to their cars. And BMW, for example, has publicly talked about this. We talk about an announcement, but we had an announcement Sunday about driving this into the car. So there's a number of others that are also getting closer to adopting this over time into their production model years. So we are excited about this opportunity, it's a longer term opportunity for Broadcom, but it could be a very large one over time.

So let me summarize in terms of where we are at the end of all this, right? This business is well positioned for double-digit growth. How, right? I mean we have expanded our product portfolio significantly over the last few years. We have continued with very strong innovation velocity in all the markets, both in the core markets that we're playing in, as well as the new markets. But the products that have been introduced just this year, you saw a sense of the breadth of products and they're all new and they're all being designed and as we speak into new systems, new products coming out over the next few years. And the ability for us to gain share in many of these new markets that we talked about here, and you if take those 3 things put together, this really positions us to outperform our peers and provide double-digit growth over the long-term with this business.

So with that, let me stop and I'm happy to take questions, we've got time.

Ross Seymore

Deutsche Bank AG, Research Division

Rajiv, it's Ross Seymore from Deutsche Bank. Just a couple of questions about those financial targets. First and foremost, do you need additional acquisitions to hit the targets for the double-digit growth rate or are those based off what you've already done? Kind of playing off of that, are the acquisitions that you and Scott talked about more likely to be the small private companies you've done historically or more than NetLogic's side for any reason? And then the final part, what's the operating margin implications for this faster growth rate? You have to invest more to keep that growth rate going, or do we get some leverage actually fall through to investors?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Okay. So the first question, let me answer them one at a time here, Ross. So first answer to that is the number that I talked about are based on products that we have today with the portfolio that we have today. We don't need more products or more acquisitions to get to that, right? Now having said that, do we see -- we're always on the lookout for additional opportunities to bring leading-edge companies into our portfolio. So are we going to be doing a lot of big acquisitions? Probably not. Our typical modus operandi is to do smaller ones that are at the kind of leading-edge things like Dune, things like Provigent. NetLogic was somewhat of an exception. And of course, we remain open to doing more of that over time as we need to. Now in terms of operating margin, right, I mean we are committing to remain invested and they also got to manage, is it a carpet level. And you can imagine that as revenue that's come

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back up significantly in my business. We do have somewhat of a leveraged model and you should see the operating income going up.

Unknown Analyst

[indiscernible] from CLSA. A couple of questions, Rajiv. Is there a way to kind of put the ASIC opportunity at your customers in perspective, especially at your largest customer. And as you look out to the next 2 to 3 years, to what extent your counting on the ASIC delays as we transition to achieve your double-digit growth? That's my first question. And the second question as you talk about SPN, if you can maybe give us some idea as to what are some of the hindrances in terms of adapting this technology? And again, taking a 2 to 3-year view, up what percent of the switch market do you think we'll go the SPN route?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Okay. So on the first question on the ASIC, ASICs represent perhaps almost \$1 billion market opportunity. Not all of that is necessarily addressable by us. As you can imagine, Cisco is one of the largest when it comes to ASIC market. Our strategy around that is, we are here or we try to go after the ASIC market in 2 different ways. First is, of course, the space in the ASIC by merchant and we do that where we can and places where we succeed are places that you meet 2 criteria, right. First criteria is we are out executing in our solutions and which, by the way, we do pretty much across-the-board, right, and almost all the markets that we play. So the solutions that we bring to bear must be better than what they can do in house and that's usually the case. So you can imagine that's happening a lot. But then not all of that necessarily result in displacing in ASIC because the other thing that has to happen is that our customers who are doing ASICs have to feel the competitive pressure. And what that means is there's typically a market that transitions are happening fairly quickly. And the fact that they cannot innovative at the same level as we are is costing them business. And that's absolutely the case, for example, in the data center, right? It's happens in the data center transition from 1 gig to 10 gig and we've been able to deliver 10 gig silicon with the Trident family, as an example, where the in-house people have not been able to keep up and they're feeling a lot of competitive pressure. And so there we have one. Okay, similarly in the service product market, not too many people have the dualcore products, the products that I showed today. That, again, has been displacing some in-house ASICs because there's other ways people can build a large modular platform. But having said that, we don't think that there's going to be a mass migration from ASIC to merchant [indiscernible] it's going to be a small incremental one step at a time. And where we can, by the way, we also do ASIC where we can add a lot of IP that we bring to the table. Last year, for example, Alcatel announced that they were shipping their core routers using Broadcom ASICs. So we do, we have a dual-edge strategic to go up to that market. The second question on SDN. I think SDN, again, a lot of interest and buzz in this. If you look at again, let me think about it as the changing model for SDN in terms of disaggregated solutions. Some of the large data center operators are doing it today. Okay. But it hasn't gotten out of that small number of large data center guys into the broader market. And I think that's going to be a slow transition, it's not going to happen overnight. And it's going to be an interesting transition to watch because I think what's happened initially a few more data center operators will go there directly. And then over time, you're going to start to see perhaps some mainland enterprise customers trying to adopt that over time. I expect that to be somewhat slow but it's an exciting time for us because this is an opportunity where the networks can change automatically. And how people consume networks are going to change quite dramatically. And so the question is again like anything else, in our space, it's probably a 10-year journey.

Vivek Arya

BofA Merrill Lynch, Research Division

Rajiv, Vivek Arya from Bank of America. Two questions. First on just growth rate. I think you mentioned on the potential for double-digit growth rate. How do we align that with sort of the mid-single-digit growth rates that we have seen in the industry over the last 2 years? And I think Scott mentioned in his remarks that next year, for the industry, the growth rate could be muted. So what gives you the confidence that you could grow double-digit? And the second one, you mentioned multicore as a growth opportunity. So there are a number of other competitors, yes, in that market, how do you differentiate? And is there any pricing implication, how's the visibility? If you could talk just about the competitor...

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Let me take both of those. So on the first one, by the way, the business is always going to be lumpy. And if you look at where we are now, which is where we were before, the big difference is that in some of core markets we see growth accelerating, right, 10 gig switching, for example, with Trident. I mean, this the market that we expect significant ramps next year, okay, given the products that we have in place. The Dune products that we talked about are ramping. Some of the ASICs that we did are ramping. In addition to all of that, all these new markets where we have relatively low share, the growth rate is going to be higher for us as we gain share in those markets, right? So it's really the combination of those 2 that allow us to think about double-digit growth in this market. Now clearly,

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we're not going to be immune from the macro situation. People have to spend, right, for us the benefit. But as they do spend there, I think there's going to be a very strong beneficiary of that trend. So that's the first question. Now the second question in terms of multicore competitors and clearly, if I look at our competitive dynamics, we have Intel, we have Cavium, we have Freescale, right? Those are finally, the main competitors that we talk about. Let me hit some one at a time here, right, to give you a high-level perspective. If you look at Intel, clearly, they have very, very strong processors but they're not power efficient. They not optimized for communications applications, right. And so, they're selling raw [indiscernible]. Okay, we are selling the right SOC with the right performance optimized, power optimized solutions. And in a lot of the markets that we're playing, power is an important factor. So that helps with give an edge over there. And we have all the communications accelerators. If you look at Cavium, they're still in 65 nanometers, they're shipping in 65 nanometers [indiscernible] in 2 solution today. We are 2 generations ahead of them right. 40 nanometers is ramping and we have 28-nanometer today sampling. Our CPU performance is much, much higher than a standard off the shelf MIPS than they have and we have all the accelerators that are needed to compete in that market. And if you look at there for a leading indicator in terms of design wins, we feel very good about where we are related to that. And Freescale is a viable competitor. For the most part, they've playing in the lower end of the control plane market, the single core, dual core solutions in the lower and we feel good where we are about our new products going after that. That's been a relatively new market segment for us to get into, . We were focused mainly on data plane. Now we've expanded into the control plane.

Unknown Analyst

[indiscernible] Gardner. Two questions for you. Earlier you on base stations \$500 million SAM. And as you look at the product portfolio of your competitors, they've done this approach of ASB and ASIC to address that market. Would it be fair to characterize your characterization of the addressable SAM as such also back to the ASIC question, where you're intentions are?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

In fact, that's a very good question here. I think that market is going to be a combination of ASPs and ASICs because some of the larger may -- if you look at it, there are really 5 Tier 1s out there, right, in terms of Huawei, ZTE, Ericsson Alcatel-Lucent and Nokia-Siemens. And there's always -- they're all looking at this combination. Many of them are ASP based today but moving to potentially more ASIC over time that you can combine processors along with DSPs, and we are in a good position to be able to do that. Therefore, I look at this as a mixed opportunity.

Unknown Analyst

A follow-up question would be, on this one, if I may, how much of a software investment you are making in order to address that market because your competitors significantly are investing in software to address that market?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Yes, indeed. So what are you talking about is all the, for example, the protocol stacks that are required to go work with this and we are actually working with a couple of key third-party software providers to go integrate the software on top of our processors and be able to sell the solution.

Unknown Analyst

May I ask one more question from you? On SDN, as it's defined, I mean obviously, it's variable definitions depending on who you listen to. It's still in an evolving mode. But the core concept is to move the control up to a higher level and make the other switches less of a controlling, having control of their own destiny. If you look at that kind of architectural hierarchy, you're talking about taking some dollars away from the basic switches, moving it up to that controlling top, how do you see that panning out because there's a lot of discussion of x86 being the impact there?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

So first of all, I think that deployment model, this is a lot of conversation, but -- and we should do that offline here a little bit. But that deployment model is on only going to be one potential deployment model. I don't think that's going to be the main deployment model for SDN that we talk about here. Jimmy, I look at SDN at a much broader context in terms of being able to open up the ecosystem. The center controller mode that you talked about is just one instantiation, which I don't think is necessarily going to be the main instantiation. Okay. But even in that mode where you have a controller and you're going to the switches, it's not like the switches are getting any commoditized. Okay, the switches still have to do all the datapoint processing, they have to do all the intelligent policy engines. And, in fact, one of the challenges, is that the switches actually need to get more intelligent with some of the open form model because they needs a lot more [indiscernible] for KBPs to go look at all the tables that are needed for that, right? So if anything, I think the switching, solutions at the bottom are still going to be intelligent. They're not going to go

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commoditize, you're still going to have to support things like all the tunneling protocols that are needed. So again, we can have an offline discussion more on details.

Joseph Moore

Morgan Stanley, Research Division

It's Joe Moore from Morgan Stanley. I just ask about micro servers and what could be the impact to your data center business? And is there in particular risk of CPU integration with Ethernet that you're...

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Yes. So does micro server market could veer off course? Watching it very carefully and it could evolve in multiple dimensions. It's still early days for micro servers. And so one potential micro server situation is where everything gets integrated together, s integrated with the I/Os and one big block that gets sold, right, a rack-level solution. The other scheme of that, by the way, is a completely decypher[ph] unit solution. If you look at what some of the other people like on Facebook is pushing it with open computing and stuff, right. The CPU now was actually very thin. It comes from PCI Express. There's no I/O and I/O is all separated, which by the way, will be very good for our model. And then the one in the middle is just higher density, more of the same as to what is consumed today but much higher density. And so the question to these 3 different models that I see in terms of how this market could evolve and of course, watching that carefully and we, of course, our desire is to remain a strong player on the networking side. We will look at the server side of the opportunity. We have the capabilities to do it but it's not clear how big it's going to be yet. Could be big and we can get in the right point as we choose do so. So we're looking at all these 3 opportunities.

Doug Freedman

RBC Capital Markets, LLC, Research Division

Doug Freedman from RBC. Can you talk, can Scott talk about a possibility of changing cores if the market demanded it? Can you give us your take on ARMS entering into the 64-bit market? What the economics would entail for you to change your multi-core over to that and just how you view that possibility?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Yes. So again, if you look at, first of all, they are particularly dependent on MIPS. We have our own architecture chair, of course, that we've been building for a long time. So whether MIPS takes it or not, for us really doesn't matter that much in terms of the ability to bring our products into the market. Now if you look at what we do, our fundamental innovation is in creating a high-performance CPU core, whether it's ARM or MIPS is a second order thing for us. So what we've done with our MIPS-based ISA, we could do with the ARM-based ISA, if we so choose so. The other piece of this is how it all gets integrated into the SoC. And that as -- the Interconnect that Scott referred to with the Trident Interconnect, the accelerators that we add and those are ISA independent. It's doesn't matter what ISA you use. If you think about it 50,000 foot level, it's about we have the SoC architecture in place with the interconnection and accelerators, and it's about a non-core or a mixed core and also enhancing those cores to get the higher performance that we need. So we can go either. And of course, we'll do what is needed to go win in the market. I think the economics of this are going to be very comparable. It's not really going to change whether it's MIPS or ARM.

Okay. Thank you. Thank you so much, guys. Thank you.

Chris Zegarelli

Director of Investor Relations

Please welcome, Executive Vice President and General Manager of Broadcom's Broadband Communications Group.

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

Good morning, everybody. Thank you for attending Broadcom Analyst Day. I'm Dan Marotta, I'm the General Manager for the broadband business at Broadcom. And as Scott mentioned, in his opening remarks, in terms of the technology trend, the drivers sort of the positioning of broadband within the company, going into a lot more detail. How did we do this year, what are the key highlights for the business this year, go through some of the growth drivers for the business now. What is driving our success in the market. And then also give you some insight into new technologies that are going to usher in new product cycles, content increases and areas that we're driving our business that you'll see in the market from us.

Starting out with execution. This year, Scott mentioned that it's been a good year for broadband, I think it's been an outstanding year for broadband. If you look at record revenue, record profit, we have done just a fabulous job not only in the design side but I think on the operation side. I think the operational excellence, the COGS reductions that our teams brought in really show in the area that you guys are very keenly aware of. And I think on top of that, we have done a very good job extending our reach throughout the world, focused on new operators, new opportunities,

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new customers, increasing our content. Those were all the things that we have focused on this year. And I think as I talked with you last year, I think we did have one area that we were not the leader in, and that was fiber. I think we have solved that problem with our acquisition of BroadLight. I'll talk about that a little bit more later. And that's allowed us to have a #1 fiber business, an end-to-end business that we're pretty proud of and to add that to our broadband franchise.

I think as we exit this year, our technology roadmap and our team have never been stronger since the days when we invented the digital QAM demodulator. I mean, we have never been in a stronger position, had a stronger team in place. And you look, as we exit, we're approaching almost 24% operating margin, which is outstanding, probably not something that we can continue to do. But with those additional profits come a more intense focus on regional expansion, new product areas, which I'll talk about. And I think just simply said, I think we're simplified our strategy, we're doing everything. And I'll touch on those areas in the next few charts.

I know a lot of you are very well versed in a lot of the market forecasts and so forth. I'm not going to go through those in my presentation. Let's not really how our broadband group kind of views some of our opportunities. This is the kind, of just to show why are we a leader and what are the opportunities out there for share capture. This is selective set of our competitors here, their quarterly revenue. You can see here if you add them all up, you get about a \$500 million revenue of our competitors today. If you add Broadcom or the broadband group into this, you can see that we have significantly overtaken this aggregate group and by a healthy margin. And that's something, obviously, we've been working out for a long time. But I think with some woes that these companies have put themselves into and I think with some very good execution in our part, we have significantly overtaken this group. And we kind of look at that aggregate amount of share out there as something that we're keenly focused to take and add into our company here.

Next, I want to go through some of the growth drivers that are driving the business today. So connected home, retail set-top boxes, modems, new modem standards, some of the outdoor units Scott mentioned. Just kind of go through those, how those actually impacting our revenue today? And yes, certainly everyone is well aware that these countries with these high GDP rates are very attractive from population, subscriber growth rates, new technology adoption, I think this is very obvious. We have been keenly focused in these areas for the past 3 or 4 years. I think 5 years ago, we focused on developed markets. We're turning our attention to this in a very intense way and actually having a significant impact. And I think if you look at India, last year, there's 6 DBS operators in India. Last year, we were shipping primarily to 2, now we're shipping 5 out of the 6. Last year, there was not a cable digitization mandate in India. There's one this year, a few months ago. That's spurring a whole bunch of operators to scramble for subscribers. Broadcom is involved in that today. And these are very, very large numbers I'm sure all you aware of. And we have specific products we designed for the India market, a.k.a., we can make decent money in India.

If you look at Brazil, we went to a trade show this year in Brazil and I think one of the more interesting things is the ARPU levels in South America are very high. They're almost North American levels. And that translates into technology. If you look at operators like [indiscernible], which is an American mobile property, they're doing connected set-top boxes in their plans, they're doing HD, all the things that go on in North America and Europe. And so I think that's very exciting for us. This is a very strong area for technology, something that we can take our products and build relationships with these operators and go prosecute that.

China, I think, is an older story. I think it's a more -- a market that has very wide, very complex market that we've been prosecuting for a number of years and have been very successful at. And then lastly, Russia. Lots of opportunities there, big satellite operators there. I always tell people I think the copper has been stolen by a lot of hoodlums that run around Russia so they have to go to fiber. So that's going to be a good market for us and something that we're prosecuting right now.

So that's very good. Before I talk about that digital home, I wanted to just touch on an advertisement that I pulled out. This is from Shaw which is an operator in Western Canada. And last year, I talked about the set-top box client server architecture changing where you don't have a hard disk in every box, you try to concentrate security into one box, and here's an example of that today. This is a real world example. This is an [indiscernible] gateway, it can support up to 6 clients. There's one hard disk in this configuration, and so this is something that is selling today. I mean, there's client server transitions happening.

It's affording operators lower subscriber cost, which allow them to drive a higher number of set-top boxes into the home. Saving money and they're providing the same level of functionality or better. And I'll touch on this later in my presentation, a whopping 250 megabits per second is something on Internet access that Shaw is offering today, which is pretty astounding. Most of us have somewhere 10 to 50 megabits coming into their home. I think this kind of data rates will be needed, given all the video and tablets and TV services that people have. This is where things need to go, and I'll talk about that briefly.

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Now turning to the connected home. Broadcom is the only company that is able to provide the chips in production, and all these chips today are actually chips that we're making and selling are in production, for every category of the operator digital home. There really -- there's no other company. And there's companies that are playing in maybe one segment, maybe the low end, maybe they're in the ODU. But no other company's in the position today from high-density servers with 8, 16, 24 channels of video, thin clients with MoCA, integrated.

Of course, you have the Bluetooth remotes from Bob's group. You have the 5G WiFi for whole home video coverage, all these tablets and mobile video requires a relook at how we distribute video, whether we use dual concurrent WiFi, all those new technologies are something Broadcom's putting together as a bundle for the operator. And obviously, with this level of confidence, it's a pretty significant opportunity for Broadcom that we've been prosecuting. And you can apply this to cable. You can apply this to fiber. This is a satellite example here.

And then last but not least, our new area that we're going into the digital outdoor unit, which I'll talk about later. It's a new market, new set of customers, and we're applying digital technology to basically enable this device to eventually be an IP device, and I'll talk about that later. So stay tuned.

Now the modem is changing as well. I think the modem is moving from this single function modem, which many of you have in your home, to a gateway device. And this transition is important and we've been driving that transition, which gives us significant content increases. If you look at the example board that I have there, you've got not only the modem, 2 WiFi chips, MoCA Chip from us and an Ethernet switch from Rajiv's business. And of course, our product roadmap has all these eventually being integrated. So you can see a very significant ASP increase. And operators are doing this because they want to be able to merge all their services together. They're offering voice, video and data service. All operators are offering some sort of mobile viewing option within the home. And to do that, they want to control the quality of the delivery. They want to control the WiFi access point directly. They want to make sure that they it's 5G WiFi with the best reach and power. They want to control the data service. They want to control the decked phone for their voice service. And so they're moving away from, "Hey, let's go buy a bunch of retail stuff and plug it together." Not that, that's a bad business, but given the amount of money you pay for Internet access in your home, operator want to sure they have the best solution and the best customer experience.

Now of course, that's all very exciting, big content increases. But with all this talk of over-the-top video, mobile video in your home, lots of TV, you just think of all different outlets you have in your home, eventually, you've got to increase the actual data rate coming into your home. And luckily, there are 3 standards on the way that are going to deliver gigabit video to your home. Gigabit, broadband access, I should say.

And today, those standards, DOCSIS 3.1, Scott mentioned in his opening remarks. We have GSF [ph], which is the DSL standard. And then of course, fiber, both 10-gig EPON, which is actually devices in the market today from Broadcom, and 10-gig GPON.

So there's standards across the board that operators are going to be able to take advantage of, to eventually have a gigabit modem in your home. And I think one thing that's interesting is Broadcom is participating across the board. We are driving these standards. If you look at our competitors today, they may be involved in one of these. And we have a huge team of scientists that are involved in writing these specifications and of course, working on the product so that we can be first in the market.

I talked about the BroadLight acquisition that we completed. Last year, we were not the #1 fiber guy. And I think Broadcom doesn't do well, unless we're in a leading position, I think, the company has a low tolerance for that kind of position. I think that's showing in our results. We had a pretty good fiber business. I think the decision was, "Hey, we've got to get to a #1 position." We acquired BroadLight. We took the tech novice team, which was an EPON technology, merged that together into a leading end to end fiber business. And today, that's primarily driven from China Telecom and from Verizon, the 2 biggest fiber deployments in the world. But Russia, India and South America are also going to be deploying fiber, and we're in a very, very good shape to be able to capitalize on that growth.

Small cell. Rajiv touched on more of the macro side, and with their acquisition of Purselo [ph], we have focused on the residential and the small cell side. Lots of course, hype in this market. I think with all these cellular data rates and with LTE going up 250 megabits, all the density's out there, certainly, small cells and indoor cells are going to have to increase substantially. And then used like this, you're going to have to be able to deal with large cellular data rates. You're going to have to use small cells and WiFi to somehow offload the data, or you're not going to be able to make phone calls, you're not going to be able to get our e-mail. And that's where these products come in. A lot of our competitors are out there, maybe hyping products. I've kind of outlined here, we're deploying products. The Purselo [ph] team is already in production with their 3G small cell products in a number of different operators. And we are prepared to do our LTE product. We'll have some announcements here in Mobile World Congress, plus other operator deployments upcoming.

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Rajiv also touched on the fact that for higher densities, we'll also be using the NetLogic processors to run users that are beyond the number of users that we can fit in our chip today. So there's a way to actually augment that and get into 32, 64, 128 users for some of these small cell devices that may be indoor or industrial. So this is so pretty exciting area for us. And I think, as Scott mentioned earlier, this just plays right into our franchise. We are the expert at building these residential modem devices. And I think with the Purselo [ph] cellular expertise, we are in very good shape to build, to prosecute this market and take advantage of it.

Retail set-top boxes. I kind of combined this with VoD just to show, this is an example of a Comcast ad where Comcast allows users to stream videos to their PCs, to tablets and smartphones as part of their subscription service. So they're going over-the-top, if you will. They've obviously got a lot of content with NBC Universal. And they're significantly improving and the look of their product and using 3D graphics, being able to talk to tablets. I talked about the drive of 5G WiFi to be able to increase the data rates and so forth. And Broadcom is ready with that technology, when they need it. And so it's affected us pretty significantly. You have the addition of 3D graphics into our products, transcoding to basically convert the format to something that's appropriate for your small phone. That's an additional ASP increase for us.

And not to be left out, Broadcom supplies these retail boxes as well. We have Roku box that has a Broadcom chip in it. The latest retail box I have here, this is a Boxee, which is built by D-Link and sold at Walmart. It's kind of the latest incarnation of an over-the-top box that uses 2 chips from us: A WiFi chip and a Broadcom set-top box chip. So we're playing on both sides. But I think this competitive dynamic has actually helped in terms of driving additional functionality that we're ready to offer operators.

The DBS outdoor unit market, Broadcom entered this market really in the seam in the market when there was a digital transition. And operators want to drive this device to a digital device. And our technology, which is based on our Full-Band Capture technology, allows us to eventually have this outdoor unit will be an IP device. You'll be able to connect to Ethernet or MoCA or powerline to this outdoor unit. And instead of coming in your home analog, you will be able to come in your home with IP video. And that's something that's attractive to operators. Our device also supports a vast number of channels and satellites, something that these analog solutions in the market today do not do. And of course, the scalability of the analog solutions just isn't there. Again, a new market. I think with increase profitability, we're spending that in new areas that are synergistic with our business.

And then last, in this growth area of powerline. Certainly, in the U.S. and Canada, MoCA is the predominant way that set-top boxes get connected other than AT&T, who uses another technology. But in Europe, powerline is typically used to connect the set-top box to the gateway for Internet access and billing. And we've been selling our HomePlug one solution from our acquisition of Gige for over a year today. And operators like SFR and Free in France have been deploying powerline for years to connect their products together. So this is also a very exciting area for us, it gives us another piece of technology to integrate into our set-top box platforms, plus other retail sales. And this, along with WiFi, with Bluetooth, with Ethernet, with MoCA, is the largest home networking portfolio of any company out there today. And we can use this, we can mix and match and we can basically deal with operators' individual preferences. We don't have to necessarily go push a technology. We have everything.

Now turning to some technology advances. Some of this stuff is working its way into the market now. Some will be paying future products, usher in new technology trends and so forth. I think it's important to take a look at that because the next few years, you'll actually see some of these technology popping out of chips, some cases sooner than later.

I want to start out with kind of our flagship SOC product that powers a lot of the advanced set-top boxes that are coming in the market in 2013. And this is a quad-core product, Rajiv mentioned some of the processor capabilities that our company has. This is a full-custom MIPS product today that's a quad-core designed by my team. We've got our own custom DSP in there that we design. And of course, the integration I just mentioned. The MoCA, the gigabit Ethernet that we can put in there to differentiate the product.

The transcoder, this is something that is for mobile viewing. And when we first started the -- adding transcoders to our chips, operators wanted 2, because they wanted 2 tablets. And of course, they quickly went to 4. And as you add more of these, of course, the content increases. And I think that's obviously a very thing for us. No competitor has a product like this. No competitor has the IP to be able to put a chip like this together. There are over 20 IP blocks in this device. And as we move to 28 nanometer, that's going to give me the capability to make it 25 IP blocks that I can put in my chip. So we're looking forward to a technology transition to 28 nanometer.

Now let me you give an example on how this manifests itself. Okay, it's a big chip. Rajiv has some big chips. I don't have one with me, we'd rather sell it than bring it to the stage here but -- at least, that's what Scott wants. But here's an example of a configuration. This is, today, this is for 2013, this isn't some old set-top box that I'm showing a competitor in a dim light. This is set-top box you would put together today with Broadcom that -- things that are

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coming out in 2013. It would take 2 chips. You'd have a cable modem and the chip I just showed you. That's all you need: 2 memory subsystems and a flash.

And if you wanted to do this with competitor chips today, you'd actually have 5 chips from 5 different competitors. And that's not very good. Of course, power, size, cost, all those things weigh on that. But then you look at the number of memory subsystems, as you guys know, those aren't free either. You've got many more memory subsystems in there. You've got 2 flash subsystems. And so we have a significant advantage with this integration. This is how this plays out today. I think this is obviously a big deal. And again, this is what our competitors are going to be trying to get in the market in 2013. This isn't some 3-year-old set-top box. This is next year.

Scott touched on 4K x 2K. This is something where the TVs are actually in the market today. So it's basically just on the cusp of starting a big transition. If you'd look at these TVs today, it is very stunning. And of course, this is something that's going to work its way through the market over the next decade, but it's just beginning now. As you might expect, here in Broadcom we'll have a chip to do this. We'll have one next year. I don't want to be more specific. I know my competitors are hanging on every word I say here, just waiting for critical competitive insights, so I'm not going to tell them when my chip's coming out, but we're going to have a chip.

And this is just a very exciting transition. I know 3D has not been the big pop in the TV business that people expected. This is very exciting. I'll show you in the next chart here why this could change the TV business and get you to go out and buy another television to upgrade.

A couple of things, right? Along with 4K x 2K, you're also going to have a new MPEG standard. Today, there's MPEG-4, that's what's in your iPads, your phones, your set-top boxes. The new standard today bears the name high-efficiency video codec or probably it will be called MPEG-5 and this is very important for Internet video because the same movie can now be downloaded in half the time. And with all the data caps, all the difficulties with over-the-top, all the storage requirements, this is a big economic advantage. And again, this is something that Broadcom will have shortly.

And we're going to lead it. So big advantages, but also future-proof. This standard also supports not only 4K x 2K but actually 8K x 4K, and you can build some very interesting configurations. Here's a picture I took at the International Broadcasting Conference in Amsterdam. This is actually a Sony display. And when you see this thing, it looks like you're at a soccer game in a box seat and it looks like you're looking at the field. This is an 8K x 2K stitched together, and they were broadcasting this content. And it just looked unbelievable. You could see the soccer ball, you could see the players, you didn't have to pan around between the goal post and follow everybody. So this is just an example of what you'll see out there with this new technology. Again, new technology, more content, Broadcom in the lead.

Software. I haven't talked about it yet. Half of my team are actually working in the software area. And more and more, we win designs because we have the right software, we have the right support model. Software is very sticky. Here, I'm just highlighting 1 key piece of software that we have a pretty substantial lead on, which is software to support multi-application frameworks. Today, you have HTML, you have flash, you have operator middleware that all need to coexist, and it's a nontrivial feat to be able to get those to all coexist simultaneously so you can run Angry Birds on your set-top box, you can switch to flash apps. And the Broadcom driver set-in software enables that to happen today. And it's a very significant lead that we have. And we're able to offer it to operators and customers so that they can enjoy a number of different applications from whomever that might be and games. It's something that we're deploying today.

Next, turning to the DSL market. When you have a big investment in a copper plant, you want to try to maximize that investment as much as possible. You want to try to compete with fiber and DOCSIS. And companies like Alcatel, ZTE have moved very rapidly towards vectoring. What vectoring does is it allows you to take your existing line and basically double the bandwidth with just a change on each end today. And that's an area that Broadcom has led, is being deployed today. Doubling your bandwidth and of course, we're introducing new chips to make this more cost-effective. This is a ZTE card that has 3 FPGAs under this gigantic heat sink there.

The FPGA code was designed by Broadcom for ZTE, and then we'll be introducing a chip that'll allow them to replace all those FPGAs with an actual hardwired device that actually has more capability, plus very significant cost savings. As you know, FPGAs are very expensive, and this gives them huge power savings, huge cost savings by working very closely together with a leading company like ZTE and Alcatel.

And in conclusion, I think, I've hopefully impressed upon you that we are in a unique position in the broadband access market today. I think by closing the fiber gap that we had through acquisition and through combining these teams together, across-the-board, we have #1 positions and we have an end-to-end solution that we can offer customers. No other company is in a position like this.

Same holds true on the set-top box. We're able to cover all the different product categories, but also work on these leading edge products. I've been talking about client server, retail. For years, those are now going to production. It's

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very difficult for our competition to be able to make these future investments while still battling it out on the low-end that we support, the midrange and the high-end set-top boxes we ship today.

And then in closing, I can't stress enough the portfolio leverage and what that means to our execution, I think, not only within my group, but throughout the company. I think the scale, if you take a look at some of the competitors who are in narrow product lines, I think the weight of the IP, the process technology that Scott's mentioned is just too much to bear in a very narrow business. Certainly, even a group like Broadband is very formidable, we couldn't alone bear that cost of IP, of process technology. I think Scott touched on the financial strength. We can outspend all the competitors put together. And of course, that's how we win, right? We get there first and just outrun everyone.

End to end systems, what does that mean? That means that we can drive these standards. Those modem standards that operators need to get to a gigabit, we're driving and offering those standards along with our customers. And that, of course, takes a lot of very key scientists and engineers to do that. And of course the market share, the profit and the technology roadmap, that's what keeps us going and will keep us atop of this market for the foreseeable future.

Thank you very much, and who has the first question

Shawn R. Webster

Macquarie Research

Shawn Webster from Macquarie. Two questions. One is on the content growth and then the other is just the set-top box. Generally, you talked about how emerging markets were an important growth driver for the business. So I'm wondering, if you step back and look at the global market, if you could share your thoughts on what you think the market's been doing the last few years and what you could do in terms of unit growth? And then on the content growth side of things, I'm just trying to wrap my head around what the increasing content potentially is for the various business units you have. If I strip out like the TV business and the Blu-ray business, you're growing about 12% this year. If I was looking at that on a unit basis versus revenues, would it be similar or are you seeing an ASP increase this year?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

Well, Scott touched on the units for set-top box in his opening remarks. So let's talk about content increases because that I think they vary, right? I mean, I touched on, with the modems, that's really a new class and device. I think operators are moving to that device. And I showed today's unit actually has 5 different chips in it, that's a pretty significant content increase. And sure, we're going to integrate that over time to be more competitive. The same is true in the set-top box type, content increases there are transcoding for mobile viewing, okay. Gigabit Ethernet, more tuners. Typically a new set-top box today is 6 to 8 tuners where in the past, it's been 2. And those are all pretty significant. I'm not going to go into details on exactly the ASPs, but I can't tell you they're pretty significant. And if you look at our product today, it's a unique product. You can't go and get a competitor product that's identical. I think that's the most important point in terms of the content increases. We're not bundling together 3 different chips from 3 competitors. I think on the unit growth side, your first question, it's very dependent on geographies. I mean, the U.S. market is the most important margin pool. That's your make-or-break, and it always will be. If you look at my competition, their woes are mostly because they don't have the margin pools in the U.S. to be able to build their real business. But we need unit growth from India, from China, from South America. And I think we can probably talk above line in terms of that number and so forth. But they're all pretty substantial, and they're all important in their own way. And how we've tried to address that is just by building specific products for each of these regions. Back there in the middle?

Unknown Analyst

Dan, it's [indiscernible]. I have a question about -- if you look at kind of holistically, Broadcom, you've been there for a long time. Basically, every year, you show how you're getting more and more share. And basically...

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

We still have \$2 billion to get so that...

Unknown Analyst

Well, you didn't hear my question. I'm giving a compliment first. So you destroy these competitors gain more and more share, but the one market we actually exited was TV, it's a couple of years ago. Are you going to get back into the 4K, 2K market? In the TV market? Can you talk a little bit about that? How you're going to succeed versus MediaTek, MStar, well, now they're the same company, et cetera?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

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Yes. It's not maybe a confusing area. That's not a -- that's a set-top box product, it's not a TV product. Obviously, we need a TV to hook up to it. And Samsung will make those or whomever. But no this is a set-top box product for clarification, an operator product. So we're not getting back into that, the answer is no. Right here on the end.

Nathan Brookwood

Insight 64

Nathan Brookwood, Insight 64. Another 4K question. You mentioned that the 3D market never really took off the way the industry expected, largely because there wasn't a lot of content to drive it. Where do you expect to see the 4K content coming that's going to drive the growth of that market? And can you give us a feeling for the time frame when you -- how you expect to see that evolve?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

Yes. I don't think I touched on it. I had it in the words of my chart. But TV is already available, chips from Broadcom next year, operators launching services in 2015. And I think sports service is the #1 item. I think, obviously, you can upscale all the content coming into your TV. But also, there's other interesting configurations, I showed the 8K, 2K stitch. There's always a feature in your TV, which is the PIP, which nobody uses because it's on top of the TV, and you can't see what's underneath it. In this case, PIP will die and you'll have 4 TV channels you can actually place and actually see right on top of each other in a 2x2 matrix. And so I think there will be some cool things. We have -- we just got our TV in for CES, and it's just unbelievable. It really is. And obviously, today, it's a \$30,000 TV. Not many people are going to buy one. But guess what, how much do you think it'll cost in 5 years, right? A lot less than that. So we see it as a pretty dramatic thing. We think the content will be there and given the prices, are coming down on the HD, it's just the right time. The compression standards are coming out and so we're pretty excited about it. How about in the second row here near the end?

James Schneider

Goldman Sachs Group Inc., Research Division

Jim Schneider, Goldman Sachs. Dan, just a question on emerging markets to follow on to the earlier one. You talked about the growth opportunity there? But clearly, competitors like an MStar and HiSilicon, that's kind of their home turf. So you can talk about what you're doing to -- as they go up from a terrestrial area to the pay TV area, what are you doing to kind of fight them off? And what the margin implications the business will be?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

So you're talking China, okay, which I didn't go into too much detail. But certainly, those guys are very tough. HiSilicon, for those of you that don't know, is the semiconductor arm of Huawei. I think like anybody, like any vertically integrated competition, we just have outrun these guys. I think it doesn't get any simpler than that. I think we sell lots of products to Huawei. They buy our products because we're in the lead with technology. And if we're not, they'll probably buy something from HiSilicon. But more often than not, we're in the lead on these products. I think in the case of China and some of that CP products, the amount of IP needed makes it very tricky on the CP side. I mean, that of these set-tops want home networking built-in, all of these wide-band tuners. And so it's not quite as easy as on the infrastructure side, potentially, to go build on some of these products. But I think, it's like any vertically integrated competition. We've got to outrun them. We have to outrun the whole host of other guys: ST, Intel, Marvell, I don't think it's any different. I think on the MStar side, yes, they're getting in that market today. But, again, we have to outrun those guys and they're a pretty tough company, but so are we. How about behind you there.

Sanjay Chaurasia

Nomura Securities Co. Ltd., Research Division

Sanjay from Nomura Securities. One question on set-top boxes. Tim Cook recently talked about how we find TV experience really antiquated. And what changes could you see Apple -- when Apple gets into this TV business. You know we have some primary test in over-the-top boxes like Roku. So that's on -- what genius do you see from Apple, because that could have a major influence in this space. Second thing is, what is your ASP today in a box like Roku with set-top box?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

So let me rephrase the question. I didn't quite hear it. So one question was, what is Apple doing in the TV business and will that change things? I don't know what Apple is doing in the TV business, okay. But I'm sure they'll have something that -- they will want to look at how do they get into this ecosystem today and then put together something that's an end-to-end system that they have used in their other businesses. But I don't know what they'll do today in terms of entering the TV market. I know there was some news last night -- this morning. Now what was your second question was, what is our ASP in -- I won't talk about the selling price of it, per se. But what I will say,

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it basically got one of our IP set-top box chips in it, and it's got a WiFi chip in it. You got 2 chips that basically go in there. And it basically is the same type of selling prices that we would sell to an IP set-top box customer or WiFi product. So really no different dynamics are there in terms business structure. Right in the middle.

Sam Rosen

Sam Rosen, ABI Research. You spoke a little bit about video gateways in terms of the air of Shaw. Obviously, also the DIRECTV. Intel's answered some of the higher profile wins, Horizon, X1[ph]. Is that something where 28 nanometer is important? Or how do you see you addressing that highest end of the set-top box?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

Well, I mean, we're obviously working, and as I mentioned, the 28 nanometer is an exciting node for us. We could put some stuff on there. It doesn't really affect how we compete with -- you mentioned Intel. It doesn't really matter how we compete with them. I mean, they're obviously more looking at processor speed. We have the same thing today in our products. So I don't see that as a differentiating factor. I think 28 nanometer will be a competitive increase across the board for all competition, right. Power reduction, more processor speed, bigger processors. And that will play against Intel or anybody else for that matter. So it's not necessarily required to compete with Intel. Intel in the processor space Rajiv talked about, that's the process play. In my market, it is not. Let's do one more question right there.

John W. Pitzer

Crédit Suisse AG, Research Division

John Pitzer, Credit Suisse. A couple of quick questions. First on the demand side for set-top boxes. Clearly, emerging market GDP has been a lot weaker than I think a lot of people expected this year. Do you feel like that was a headwind to the business this year? And if that were to turn around, do you have a tailwind?

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

No. We, again, we're taking revenue from the more unfortunate out there. So for us, we're getting in that market. Those are new areas for us, and we're coming in very aggressively with specific products. I talked about the India market. Last year, we had a couple of operators. Now we have 5 out of the 6 direct-to-home guys and we're working on cable. South America, again, it's early days for us, but we see a lot of very key design wins in the South American market. Plus, of course, Sky Brasil, which is 60% of the subscribers in Brazil, which basically uses DIRECTV equipment.

John W. Pitzer

Crédit Suisse AG, Research Division

And then on the small cell opportunity, it seems like every year we talk about this being a big opportunity 12 months from now. Do you feel like the deployment of LTE is somehow a tipping point in small cell deployment? Or how do you think about the size of that market relative to...

Daniel A. Marotta

Executive Vice President and General Manager of Broadband Communications Group

Well, the chain rates going up so dramatically. And I think everyone is aware of just the densities. I mean, in this room alone, I mean, you just can't operate in some of these urban areas or hotels and even people's homes. So sure, it's a tipping point because there's more bandwidth required. But, certainly, the same is true on the 3G side. There just needs to be more cells, more WiFi. I mean, people are going to throw everything they can at it to deal with users that are basically carrying around a television. I mean -- and they're just going to have to deal with that. And sure, the market's in the early days, and the market is fragmented. Rajiv talked about the Metro side. That's a different market, right? The big thing up in the palm tree looking thing, right? We're looking at residential small side, that's for the new marketplace. But we've got a great product today. We're shipping the product. It's not some paper tiger. We have a business, and we're focused on LTE and LTE multimode products as well. And working with all the gateway providers, all the modem providers that are in the market today. And I think we'll have some interesting announcements on Mobile World Congress as well. Thank you very much everyone.

Operator

We will now take a 15-minute break. Please be back at seats at 10:50. Our next speaker is Robert Rango, Executive Vice President and General Manager of Broadcom's Mobile and Wireless Group.

[Break]

Operator

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Please welcome Robert Rango, Executive Vice President and General Manager of Broadcom's Mobile and Wireless Group.

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Good morning. We're going to talk about the Broadcom Mobile and Wireless group now for the next 45 minutes and 15 minutes of Q&A. Broadcom's Mobile and Wireless is truly hitting on all pistons. We have expanded our wireless connectivity franchise. We've kept the market share, grown our market share, introduced new products. I'll talk about how we're going to continue do that. We've also expanded the breadth of our IT with 4G LTE, NFC and a lot of new connectivity products. And then finally, we have improved our engineering execution on our 3G complete platform solutions. And I'll talk about that all during the presentation, okay.

Very exciting because Broadcom is playing in the most attractive market in the world. In fact, Broadcom's changing lives with our mobile and wireless technology. It touches your life just about everywhere you go. In the morning, you can wake up and get on the exercise machine and make sure that the exercise machine is connected to your smartphone so you can upload over Broadcom WiFi to the cloud. You might be driving to work using a Ford SYNC which has Broadcom WiFi inside. At work, you may use an Epson printer which has Broadcom WiFi inside. And your kids could be playing or learning how to play the piano on an Apple iPad Mini, which has Broadcom connectivity inside. And then you could drive home and watch your kids play on a Nintendo Wii U, a new gaming console for Christmas 2012. 5 Broadcom chips inside in the new Wii U console. So we touch your life and whether you're at the home, whether you're at work or whether you're mobile. Broadcom's chips are very, very, very apparent.

Now exposure to all of these markets allows us to make better decisions and make better decisions about what features we put in our future chips. So the breadth of our footprint is very important for our business going forward. Now one interesting tidbit, too, is that third-party analyst, Lindley Group, now has given us an interesting piece of data that Broadcom has shipped more mobile wireless chips with integrated RF than any other company on the planet.

Okay. So let's talk about the format of my presentation. I'm going to cover the favorable market dynamics. We're playing here in the most important and the biggest industry in the world for consumer electronics, wireless and mobile are touching just about every consumer electronics device. Broadcom is #2 in this space. And we've continually rose up the ranks to that #2 position, okay. And this one market segment, mobile, smartphones is growing even in light of economic problems in Europe or economic problems in fiscal cliffs in the U.S. This will continue to grow.

Now let me talk about connectivity, wireless connectivity. Scott mentioned that we were -- we're #1. We've kept our market share, in fact, even grown it. I'm going to talk to you about new technologies that are going to continue to bolster our franchise and wireless conductivity, which includes WiFi, Bluetooth, GPS, NFC and FM. And then I'm also going to be talking about Broadcom's accelerating cellular roadmap. Our 3G and 4G cellular SoCs and of course, I'll be talking to you about our 4G LTE plans. Okay, let's start with the favorable market dynamics.

So in my world, smart phone is the center of the universe and certainly a huge focus. But in Broadcom, Mobile and Wireless, we build chips for all of these markets that you see on this slide. Whether it's TVs, thermostats, routers, tablets, set-top boxes, home appliances, healthcare, all of these categories will benefit from Broadcom's wireless connectivity technology and cellular technology. Let me just point out a few things that the devices on the periphery really do adopt wireless connectivity first and then cellular technology over time. So most of the initial Wireless adoption in these areas will be on Wi-Fi and Bluetooth and things like that.

Now what we've done is we've come up with a new initiative called Wireless Internet Connectivity for Consumer Electronics Devices. It stands for -- we call it WICED, the codename Wicked. And what it is a technology and a design kit to allow companies like Honeywell who are not Wi-Fi experts, to integrate Wi-Fi into their devices. And same thing with home appliances or security cameras or healthcare. So this initiative is very interesting in a number of points, right? One is, first, it enables these companies to quickly adopt Wi-Fi. Second is, it has the significant amount of R&D leverage for us, because once we offer the design kit, we do not have to spend a lot of money supporting them. They can quickly integrate wireless connectivity into their platforms as witnessed by the Honeywell thermostat on here, which is Broadcom Wi-Fi.

Now, we've expanded that even further. Recently, we partnered with Apple on their made-for-iOS initiative. They have a program called MFi which stands for made for iPhone, made for iPad development program. And you probably -- most of you probably own a device that is made for the iPhone or the iPad, something that you plug an iPhone or an iPad into. Those devices will increasingly become wirelessly enabled, and our wireless connectivity chips are in the base reference design. So those devices now become more enabled by control with a smartphone, it will be Broadcom on the other side, so now Broadcom on the iPhone. You guys all know that Broadcom has got 100% of the iPhone and the Apple connectivity at this point for iPhone and iPad. Broadcom, on the peripheries of those devices. So it makes it

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better for consumers, better for the people who are building the devices, okay, and better for the applications supplier. Okay, so good news all around.

So let's look at the smartphone market. The biggest market in the world, the most attractive market in the world. If a consumer was stuck on a desert island, what single device would they have with them? A smartphone, right? Because a smartphone would keep them entertained and they can actually call for help on a desert island. So smartphones, they're at the center of the universe, growing at a 29% compounded average growth rate. These estimates, and in this case Morgan Stanley, have been revised upward year after year. So even from 2011 to 2012, these numbers have come up. And the numbers for the feature phone market continue to shrink. And you can see in 2015, 1.385 billion smartphones are forecast to be sold.

Now if you look deeper inside of this number, what you'll see is that in the next 3 years, probably 3/4 of these devices will be sold into developing nations as the developing nations, the BRIC countries, convert from feature phone to smartphone. And that's very important because that's why 3G continues to remain as a very important technology for Broadcom. 60% to 70% of the world's cellular networks are HSPA+ or below, okay. And then if you look within these 2 numbers, if you look within these numbers here, you'll also see that 3G and 4G are both growing. 4G makes up about 25% of the market by 2015. So a fast growth rate and an area that we're investing in to make sure that we hit that market in a timely way.

Okay. And then, if you look at the attach rates for wireless -- mobile and wireless technology in all kinds of things, and all kinds of consumer-electronics devices, whether it's smartphone, tablet, PC, gaming, TVs, digital still cameras, set-top boxes, automobiles and healthcare, you can see that from 2012 to 2016, the attach rates are continuing to rise. And I show this slide year after year and I've updated it, and there's more room to go. If you fast-forward to 2020, there's a lot of room to go. New types of consumer-electronics categories and, again, wireless connectivity is there, too. So this is a rising tide for our connectivity business as well as our cellular business, as these devices also start adopting cellular technology. And again, as a footnote, 5 billion units in 2016.

Now let's take a look, let's take a little closer look at just the tablet space. Whether you call it a tablet or a fablet, maybe the fablet being the 5- to 7-inch category which is something that's very interesting because of the high-growth rate. But whether you call it tablet or fablet, Broadcom's inside. Broadcom's inside the Apple tablet, inside the Amazon Fire, inside the Google Nexus 10, and also inside of the Samsung tablets that they produce, all based on Broadcom connectivity, okay. So we have a significant share in this space. And cumulative analyst forecast for the next 3 years range from 500 million units and above for tablets.

Let's see what we're doing to stay, to increase our ASP and our footprint in tablets, just in connectivity, okay. So I just mentioned 500 million units cumulative, growing at a compounded average growth rate of 40%. So let's look at what we can be doing to increase our ASP and our content. First thing is 2x2 Wi-Fi, okay. Wi-Fi is the most prevalent connectivity technology in a tablet. And going to a 2x2 configuration, a MIMO configuration raises the ASP for us, increases the range and the data rate for the end-user. GPS in tablets. And in this case, what we're referring to, a GPS in non-cellular equipped tablets. So as tablet vendors want to start offering location-based services, they need GPS or a hybrid location system in their tablet, we can provide that to them. And we see that growing at a 35% compounded average growth rate.

And then of course, NFC, near field communications. I'll talk a lot about NFC during the presentation, but this is a very interesting area for us, for both e-commerce and for machine-to-machine communications, simple pairing. So a lot of opportunity just within the tablet space to grow attach rates as well as our ASPs within the tablet space.

Okay, so let's switch gears. It takes a lot of technology, a lot of IP to compete with Broadcom. All of these areas are where Broadcom is investing in our mobile and wireless suite, okay. And a lot of companies ask, a lot of our customers ask us, how do we know when to integrate? How do we know when to integrate these things together? Well, it is an art and a science because every one of these technologies has a different cadence. And we do it in a way that makes sense to our end markets. So a lot of different technologies. But let me just point to some interesting pieces on here that you might not have seen. So, application processing. Application processing has been an area that has been highlighted as an area that we need to improve in mobile application processing. In 2012, we announced a partnership with ARM to be an early-access supplier on their v8 version of their instruction set. That's the A53, A57 class of app processor, ARM's most powerful application processor going forward.

And then on NFC, I think we've clearly now established NFC leadership. Our NFC is the lowest powered, it's the only 40-nanometer device that's out there. Our NFC is based on standard interfaces, whether it's interfaces above our stack or below our stack. All these things are making our NFCs very prevalent. And what you'll see is NFC in the new Wii U, so our NFC is also in production already.

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Okay, so the point of this slide is we're working on a lot of different technology areas and I'm going to cover a lot on LTE and I'm going to cover a significant amount of my presentation on 3G, and I'll cover Wi-Fi separately and Bluetooth and GPS.

So as Scott mentioned, the big opportunity for us is increasing our content from just connectivity, where we're clearly #1 with some very commanding market share, to the platform play. And in order to be a platform supplier, you need much more technology than just a connectivity play, and Broadcom has it. Application processes, as I just mentioned, cellular modem, 3G and 4G cellular modems. PMU, RF, these are all part of Broadcom's portfolio of IP. Okay, so we are in a good position to start moving up this ladder onto higher ASP platforms, and I'll show you that during the presentation.

So let's start with winning in connectivity. So, one slide that kind of talks to our existing success story. Because every smartphone on the planet, almost all of them at this point have 1 or more Broadcom connectivity chips inside, okay. So the best way I would think to represent our success is to go look at editors' top choice lists. And this here, I added some interesting list. I added lists from Asia. So PCWorld, their editor's choice top smartphone list, 4 out of 5 have Broadcom chips inside. China org, 5 out of the 5 smartphones that they recommend on their editor's choice have Broadcom chips inside. CNET Asia, 5 out of 5.

PCWorld, 5 out of 5. Yahoo!, 4 out of 5. So 14 different smartphones, different carriers, different cellular basebands, but all have 1 thing in common, and that they have 1 or more Broadcom connectivity chips inside. So we have a very strong base of connectivity success. What's probably interesting though is what we're going to do going forward. But before I do that, let me also add an interesting quote from Linley, that according to Linley's preliminary 2012 data, Broadcom has gained 3 percentage points of smartphone connectivity share this year despite new challenges from the competition, okay? So even in a market where we have a very significant market share, we've been able to add more market share on top of that.

So what are we doing now to kind of increase, improve our position, even potentially improve, increase our market share from here? One thing we're doing is working with Google to improve the Android ecosystem. So what you see here are 3 of the Google Experience Devices, the Nexus devices, all of them have 1 or more Broadcom chips inside. But that's not really the point here. The point is that Android is a very important ecosystem. Google says that 1.3 million Android phones are being activated each day. And industry analysts have talked about things like 2/3 of all the smartphones sold over the next 3 years are probably going to be Android-based phones. This is the ecosystem that is one of the most powerful ecosystems, and how we are also contributing to it. Recently, we open-sourced both our Bluetooth and our NFC stack and added it to the Android ecosystem, okay. So this is not something that is easy to do because, in order for Google to accept and the open source community to accept code, it has to meet a lot of stringent requirements. And our NFC and our Bluetooth stack met those requirements, okay. And now that our code is built into Jellybean, Android Jellybean, and other operating systems going forward, it's good for everyone in the ecosystem. It's good for Google because our stack is the most interoperable stack in the world. It's good for handset companies because they can quickly bring things to market with our chips inside. And of course, it's good for us because these stacks were developed on top of Broadcom's silicon.

So let's take a look at the -- some other interesting, fundamental things that are going to affect our connectivity business going forward. LTE phones, which are starting to hit the market in the U.S. on a more increasing rate. I don't think any of you will argue that these 5 phones are some of the most popular LTE phones in the market. Apple iPhone 5, Galaxy S3, Galaxy Note II, HTC Droid and LG Optimus, okay. These phones are based on competitors' LTE solutions, both thin modem and SoC, but they have 1 thing in common again, Broadcom connectivity chips inside, okay. So moving forward, even with the most popular phones, and these phones arguably have 80% of the LTE share currently, all based on Broadcom connectivity.

Now, more interesting than this is I've actually created this success story with a chip called the 4334, which is actually just based on 802.11n technology. So moving forward, I have a lot of other tricks up my sleeve. And let me tell you about what that looks like. So what I've done here is show you a chart that I might show a customer. I might walk in a door and say, "Hey, here's why you should use Broadcom connectivity going forward". The first reason is 5G Wi-Fi. And not just the base standard 5G Wi-Fi, but all of the additional operating modes that are in the standard currently. And I'm going to compare our solution, this is the 4335 which we announced earlier this year, okay, and compare it to 2 competitors, okay. You can guess who the competitors are. But you can just see that this position we're in with 5G Wi-Fi versus our competitors, now this represents the smartphone space, okay. Then I can add to it, simultaneous dual band Wi-Fi. And I'll go into some of these in a couple of additional slides. Wi-Fi certified HD Miracast capability, Wi-Fi certified Passpoint capability, Wi-Fi certified Wi-Fi direct, certified NFC control

[Audio Gap]

Be attractive for handset end users as we go forward, okay. Now this also exemplifies another standard I talked about on that chart, called Miracast, which is now the ability to beam a video from a smartphone or a tablet or a PC onto the

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big screen. All standards-based, and as I mentioned before, Broadcom supports HD Miracast so we can download HD videos and beam HD videos onto a big screen, okay. So a very interesting capability.

So let me talk about another one of those features. Passpoint. And let me exemplify to you how Passpoint is going to make handset even better, okay? So Wi-Fi currently is the most prevalent and the most widely deployed small cell technology today. In fact, AT&T is wiring some places like Central Park and Battery Park in New York with Wi-Fi access points. Now, they're doing that mainly to keep people off of the licensed spectrum and move them on to the unlicensed spectrum, in addition to the fact that Wi-Fi downloads are better. So here's their network. And of course, one of the challenges with Wi-Fi is the need to reauthenticate. If you move from access point to access point in the past, you'd have to reauthenticate. Passpoint allows you to move from 1 hotspot to another hotspot to another hotspot without having to reauthenticate, okay. So this is a feature that we offer with a complete software load with -- for our customers, and we make sure it's interoperable. Of course many of those access points that we talked about which are really small cells also have Broadcom Wi-Fi inside and have Broadcom Passpoint inside. So a very interesting feature, bringing cellular-like capabilities with the Wi-Fi technology.

Okay, so moving on now to some other interesting trends in the handset space. If you're like me, you almost need a search engine these days to find an app on your phone. And here's a picture of my phone and it's got a lot of apps on it. And one of the things that I'd like to do is have my smartphone be smarter. I'd like it to recognize when I'm in this conference room or when I'm home, or when I'm in a gym, for example. And then when I'm in that gym, I only want it to give me the apps that are relevant to that particular context, right. So let's say I'm in the gym, and I only want a heart rate monitor or I want a music app. And then I move, I'm in my car. All I want in my car is a mapping app and say the traffic app, okay. And when I'm home, I just want to know what's happening with my favorite football team, or perhaps look up a recipe so I can cook my wife a dinner. So I want my phone to be smart. I want it to recognize where I am and give me information that's relevant. I mean, this is just a teaser to this because you could imagine how far this could go. If a smartphone knew that you were here in this room, what you want to be looking at is the Broadcom stock price, I assume, and it would give you that, without you having to ask for it. In order to enable the contextually aware smartphone, you need a great location system, a hybrid location system. In fact, if there's one thing that ecosystem companies can make money on, it's your location, okay? So application providers, ecosystem companies or handset companies can all monetize good location. And it enables this contextually aware feature that I just talked about. Broadcom's hybrid location system can do that. Creating a hybrid location system means taking information from all sorts of sources from in the cellphone starting with cell power, that might get you to within hundreds of yards of where your location is. Add to that GPS or GLONASS satellite system. Now you're down to, let's say, tens of yards. Add to that, Wi-Fi positioning. And now you're at the building level, for example, on the Broadcom campus, here's Building 5. But we add more to our hybrid location solution. We add inputs from NFC, BLE which is Bluetooth Low Energy or Bluetooth, and MEMS devices, sensors. So with things like altimeters now, not only can you -- not only can I find myself that I'm in that corner office up there in Building 5, but I can even tell you what my altitude is. That's hybrid location. And that's how you enable the contextually aware handset. So Broadcom enabled this with the Broadcom hybrid location solution.

So just to summarize. I mean, I've given you a summary, really, of some of the things we're doing in connectivity to win. But in summary, we have the broadest portfolio, whether it's FM, Wi-Fi, Bluetooth, GPS, NFC, just the industry's most comprehensive line up of products. The chips we build are customized to the platform, whether it's handsets, TVs, set-top box that are all customized for that specific platform. Our solutions are all capable with -- compatible with all of today's most prevalent ecosystems, whether it's Windows, iOS, Android, of course. We provide software on top of our solutions to implement some of these unique features I just talked to you about, like Miracast, like Wi-Fi Direct, like Passpoint, all from Broadcom. And all of the application guys are writing to our APIs. And then we work with them to make sure that compatibility is assured, okay. So this is a summary of why we win in connectivity, okay? I think these features are very key. I anticipate that into next year, you'll see a lot of 802.11ac and our Broadcom 5G Wi-Fi in many different handsets coming into the marketplace.

Okay, so let's switch gears. Let's talk about the roadmap, the cellular roadmap now. Broadcom has invested significantly in 3G and 4G technologies. And I'll cover both of those shortly -- in fact one of my demo phones is ringing up here. So I'm not exactly sure how that happened, but that's the ringing you hear. But I'll show you those demo phones in just a moment.

So Broadcom's focus is on 3G and 4G. The reason we're focused on 3G is because we see the 3G market continuing to grow. We see it being very important for emerging markets. And we see the 3G market taking over the feature phone market going forward. So for emerging markets, our focus is on 3G. And then the 4G market, of course, for developing regions like the U.S. Big investment in 4G, a lot of progress to report, and I'll get into this in my presentation. So focused on both because these -- this is where the growth is, and this is where the action is in the market.

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So 2 years ago, we had 1 3G smartphone SoC. That was the 21553. And you can see that's the 7.2-megabit modem, single-core device. It could address screen sizes, say, from 3 to 3.5 inches. And this was the device that last year I talked about that powered the Samsung GALAXY Y, which was one of the most popular smartphones in India. Now, over the last year, we added 2 chips that we announced earlier this year, the 21654 and the 28145. We switched from 65-nanometer to 40-nanometer, and we went from single core to dual core. So -- and you can see that it helped us address a bigger part of the market. We were able to move up to the 4- to 5-inch phone screen size.

Now today, with the announcement of the 21664 and extension of the 28145 to the 28155, we now have a full family of solutions on 3G. We can cover anything from 3 inch, all the way up to 7 to 10-inch, which would be a tablet. More interesting actually is the 5 to 7-inch category, because the Fablet is growing at a 93% compounded average growth rate. And Fablets turn out to be one of the biggest growth areas for phones in Asia, okay? So Broadcom has the ability now to address this entire market. And again, why is that important? Because once a customer invests in one of these chips and picks up the Broadcom software suite for one, it can quickly be applied to an entire family of products.

Now, again, 3G market is very competitive. We all know that 3G is probably the most competitive segment out there. The reason that we can win is because we have a family of devices here that offer different feature points, different cost points and allow us to make money at these various cost points, okay? So a full range of 3G for all of the segments is now complete.

Now, let me highlight one other point. So 82% of the volume is in this 5-inch and below, but I did mention the Fablet being an important segment. Now, let me highlight our multimedia capability. I just wanted to compare the 28155 on the right to the HTCOneX on the left. So HTCOneX is a phone you can buy today. HTCOneX is the phone that has been touted to have a lot of multimedia capability, world-class imaging, world-class image signal processing. This is the post-processing that goes on, on the pictures to make the pictures look good. A console gaming capability, good browsing experience, a 720 HD screen, Miracast capability that I just described to you, this ability to beam videos from your phone to a TV as well as Wi-Fi Direct. All these are the multimedia capabilities touted by the HTCOneX.

Now last year, I talked about the economics of the chips that we were announcing. For those of you who were here, I talked about how Broadcom's ability to integrate with -- change the economics of the smartphone business. And here's a perfect example of how it changed it, okay? So HTCOneX, tear it apart, what do you see inside? Three different chips. A thin modem chip, a quad-core application processor, discrete application processor, and a discrete ISP chip. Tear apart one of our 28155 phones, what do you see inside? One chip, integrated modem, application processor, graphics and ISP. Okay. So I told you I would exemplify the power of the 28155, and I wanted to talk today about Samsung's -- Samsung is going to be announcing a series of phones based on Broadcom's 28155 dual core HSPA+. I'm holding the first one in my hand. This is the GALAXY S II Plus, okay? And again if you look go back and look at the GALAXY S II, you'll see a similar architecture, GALAXY S II Plus, based on 28155, is based on the Broadcom chip, the integrated chip. So those economics that I was talking to you about, they come to play right here with the Samsung GALAXY S II Plus. And in fact, there's a series of phones that Samsung will be putting out based on the 28155 over the next couple of quarters.

So and then beyond that, what have we done in 2012? We're working on customer diversity. And in order to achieve customer diversity in today's 3G market, you need what's called a turnkey device, a turnkey design. And you might ask what's the difference between a turnkey and a reference design? Well, a turnkey is something that can quickly be put into production by a customer. So I'm holding up Broadcom's 28155 turnkey design. And you can see it's very thin, it's very light, it's the kind of phone that you'd want to carry with you. We have a design file that we can offer a customer. And it can reduce their investment from 6 to 9 months of time, down to 30 to 60 days. Where it used to take 200 to 300 engineers to put a design in production, now it's something like 20 to 30 engineers because we've done the turnkey design. And this design is so complete, we have second-sourced the major components, the panel, the sensor, the memory, and we picked suppliers that are favorite suppliers for companies in China who are really building, taking advantage of these turnkeys. So what we're doing is we're enabling our handset companies to focus on what they do best, brand and distribution, and we focus on what we do best, which is engineering execution, okay? And we now have turnkeys for 21654, which is our single-core device, 40-nanometer single core; 21664, which is the part we just announced yesterday, which is our low-cost dual-core device, HSPA+ capable; and our 28155, which is what I'm holding up right now, which is our high-end dual core HSPA+ device. Okay. So a lot of activity has been spawned by this -- by these turnkeys and, again, this is a capability we've put in place in 2012. So it's hard to measure the progress yet, but I tried to do that with this chart. And you can see, even in the short time that we've had the turnkey capability in place, the number of designs have gone up significantly, almost threefold. So significant number of designs that are currently going on, 15 from last year to 44. So you can see the power of the turnkey design because it enables companies -- handset companies, to quickly adopt our platforms.

So talk some more about our expanding cellular SoC share. If you focus on that first row now, those are the phones that I'd like to highlight. Of course, I just mentioned the Samsung GALAXY S II, and I mentioned that there'll be a series of phones based on Broadcom's 28155 dual core HSPA+ coming from Samsung. The other phones you see

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here, GALAXY Chat, GALAXY Music, GALAXY Pocket Plus, are the beginning of a series of phones that are coming out on our single core HSPA+ device. And I'd also like to point to some of these interesting carrier-branded phones, okay? Kind of a blessing our 3G technology in the world's biggest carriers: T-Mobile, with Concord, this is our first 3G phone in the U.S. market; Vodafone, with the Smart II and Orange. All phones based on Broadcom 3G SoCs, okay? And then all the phones in the bottom row, all in production still, all rolling along with our first 3G SoC, that's the 21553 that I talked to you about last year. Samsung GALAXY Y is still selling like gangbusters along with a number of these Samsung smartphones in the developing countries, okay? So a lot of progress on 3G. And you can see a number of Chinese vendors on the chart, TCL, ZTE, G'FIVE, Sprocomm. Those are all customers and certainly, there's other customers in China now working on our turnkey designs.

So exemplifying that growth we have in the 3G space, this chart shows that from Q3 2011, Q3 2012, we grew our 3G business 500%. Pretty big growth. More important to me though, is the market share that we command. You can see that Strategy Analytics has now recognized that Broadcom has 15% of the 3G/4G Android smartphone SoC ecosystem, okay? 15%. And we haven't started shipping our 4G LTE solution yet, okay? So again, significant market share gains over the last 24 months in the most important ecosystem for us, which is Android, 15% market share.

So let's switch gears to LTE. Obviously, everyone's heard of LTE and how important it is. It's more spectrally efficient. I'll just spend a minute just to highlight some of the things in LTE which make it so important for us. It's more spectrally efficient, which attracts operators because they can get better utilization out of their limited license spectrum. Obviously, for the end user, it makes downloads that much faster, it makes everything faster. Also enables some other interesting uses, use cases, it's, for the first time, can improve the quality of your mobile phone calls, because on 4G, you can use a better, higher bit rate speech coder than you can use on 3G, okay? So HD Voice. And then of course, because call times are faster, call setup times are faster, that's a nice feature for end-users, but it also opens up new opportunities for push-to-talk services for operators. So LTE has a lot of benefits for operators, has a lot of benefit for end-users.

Okay. So Broadcom has been working very busily on our 4G LTE technology. I'd like to show you the chip that is come back from fab, 28-nanometer chip, I mean I'll hold it in my hand. It's kinds of small. It's a little smaller than the chip Rajiv showed you, which you would expect. But this is our 28-nanometer chip back from the fab, RF and functionally, ready to go in terms of being ready for a lot of different operating modes already working, okay? And I'm going to show you some of the attributes of the chip. This is a chip we plan to sample to our customers in 2013, okay? So let me continue and show you now the features of the chip. Okay. One of the interesting attributes of an LTE chip would be the size. Okay? Smaller is better, of course. And what I did here was show you the key component board of one of today's most popular 4G phones, the Apple iPhone 5. And you can see there the dot -- the board area kind of consumed by our competitor for their multimode 4G solution. So if I compare the solution I just held up, it's 37% smaller than what's currently out there. Okay? Smaller is better, lower power is better. So for the first time in the history of the industry here, we'll be using a technology called Envelope Tracking, which has some very fancy algorithms on the baseband controlling the power of the power amp. And if my chart here shows the red as wasted power, Envelope Tracking allows you to remove that wasted power and get better use out of your battery. So our chip will support Envelope Tracking.

Another interesting feature is Voice over LTE, okay? For those carriers who are using proprietary 3G technology and want to move on to the standard 3GPP track, Voice over LTE is the way they're going to get there. So Voice over LTE eliminates the need for some of these proprietary legacy technologies. So moving forward, Voice over LTE is important, our chip will support it.

And then finally, intelligent coexistence. We were the leaders in coexistence between Bluetooth and Wi-Fi, we're going to extend that leadership now with coexistence between Wi-Fi, Bluetooth, GPS and 4G LTE. You might ask why this is important? It's important because a lot of the LTE bands sit right next to the Wi-Fi band. And having great coexistence just -- it makes the chip work better, has better performance, better utilization of the frequency spectrum that you do have. So this is very important to our customer base, making sure that when you turn on your Wi-Fi, your LTE still performs very well. So we're going to solve all these problems with the chip I just held up. And then in terms of operating modes. This chip will support FDD for most of the world's networks, and then it will also support TD-SCDMA and TDD-LTE for legacy WiMAX operators as well as carriers in China, okay? And of course, we'll have fallbacks to 3G and 2G. And the lines that I've drawn between these things kind of represent the in-or-out modes that we'll have to make work so the chip will have all of these features inside. And then the chip is also capable of handling the band's complexity that we see on 4G -- on the 4G side. And this chart shows you that the band complexity moving from 2G to 3G to 4G LTE has significantly increased. Okay? Wherein the 3G domain, you had to deal with just 5 frequency bands, now there is 25 different primary bands that have to be dealt with in order to build a phone that can operate around the world, okay? And this chip is capable of supporting all these different operating modes and the in-or-out and the band complexity. Now, in a lot of cases, carriers don't have contiguous bandwidth, and in order to provide the 4G experience -- the 4G experience is delivered using 20-megahertz channels or at least 10-megahertz channels. And in order to provide the experience of 100 megabit per second and above, you need the wider channel width. But

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a lot of carriers have disaggregate bandwidth. Okay? So the chip will also support a feature called carrier aggregation which is one of the advanced LTE features of the chip. So carrier aggregation allows a carrier to aggregate together and provide that's -- aggregate the carrier -- these bands together and provide that 4G experience of 100 megabit or above. And then back to that band complexity. Again, I won't go through this in a lot of detail. But certainly, the band complexity on 4G LTE is very significant. You can see 25 primary bands, actually there's 40 bands on this chart, our chip will support the band configuration for North America, for Europe, and with -- and for APAC with the appropriate front end in front of our RF. So our chip has a very, very sophisticated RF system to be able to deal with the band complexity on LTE. Okay. So in short, if I compare our solution to what we anticipate our leading competitor will have in the future, this chart summarizes it for you. Okay? Category for LTE on the FDD operating mode, TDD capable, China TD-SCDMA, carrier aggregation, Voice over LTE, world band RF and advanced power management in the form of that Envelope Tracking. And this is all implemented in the 28-nanometer process technology node, okay? So very capable solution coming from Broadcom, and our plan is to sample this in 2013.

Okay. So I want to summarize. I hope I've shown you the leadership and connectivity and the new products that are going to drive our growth going forward. This includes things like 5G Wi-Fi. We're the only vendor out there with a complete connectivity suite as well, as having open sourced our NFC and Bluetooth stack in the Android ecosystem. Okay. I anticipate significant growth ahead.

And then, on 3G, a very important market, growing over the next 3 or 4, 5 years. A full family of products that will help us diversify our customer base further from here. Turnkey designs that will facilitate the diversification of our customer base.

And then finally, on 4G, engagement in 2013 with the chip I just held in front of you, Broadcom's 4G LTE solution. Okay?

So with that, I'd like to open it up to Q&A. And we have a question right here I guess, close to the mic.

Vivek Arya

BofA Merrill Lynch, Research Division

Thanks, Rob. Vivek Arya from Bank of America. 2 questions. First on the connectivity. Obviously, very strong position that Broadcom has maintained, has gained share. My question is on ASP trends, especially when I compare sales growth in your connectivity business to unit growth in smartphones and tablets. So I know you don't give out all the numbers, but from what we have seen, sales have sort of somewhat undergrown unit growth, so if you could just talk about ASP trends and in terms of mix, et cetera? And then on 4G LTE, when you say engagement in 2013, should we expect to see an actual product customer rollout in 2013, or is that engagement and then we get to start to use the product in 2014? Any clarification would be helpful.

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Yes. So as far as ASPs are concerned. The goal of my team is to continually add these features that I talked about to bolster the ASP. And moving forward into 2013, I think we have a good year ahead in terms of dynamics. I mean, there's perhaps in any given year there's more things happening. 2013 is 1 of those years where there's more things happening. 5G Wi-Fi is being rolled out, and we see double-digit percentage at or on top of our 11 end solutions in the 5G space. And then things like NFC helped to add to our ASP -- our total ASP. So I think during 2013, I don't see any specific event happening that would reduce our ASPs more than average, in fact, on balance, I would think there is more of things happening that would help to bolster our ASPs, okay? And then, as far as your second question goes on LTE, we're not talking today in a lot more detail about our LTE solution other than to say we'll be sampling it to our lead customers in 2013. And I think -- so you have to stay tuned because I think there's a lot of news to come on LTE. Obviously, it's a super important technology. It's going to be a technology that runs for the next 5 to 7 to 8 years. So I really believe that the investment we're making is the right investment. And I'm absolutely aware of the fact that Broadcom is investing heavily, a lot of our R&D, a bit -- propensity to invest is going in LTE. The team goes out and the team is executing very well. Gives me the confidence to say that we'll be sampling in 2013.

Amrish Srivastava

BMO Capital Markets U.S.

Rob, Amrish from BMO. On the China and the turnkey solutions slide you had, you actually laid out the blueprint for how you would compete with the big boys there, you called Qualcomm and MediaTek. Just a little more granularity on the number of design wins. And you said 15 in '11 and 44 in '12, so how many new customers have you in that 44? And then second quick follow-up as well, how many of those phones go into production and when?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

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Yes, I think that roughly 15 different customers that make up that 44. And if you talk about when products hit the market, I mean, I think, they're starting -- they're going to start hitting the market in -- over the next 3 months. So I think you'll start seeing things happen pretty quickly from here. And then all the way into 2013, I think you'll see more of the designs that are based on our turnkey.

Unknown Attendee

[indiscernible]

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Perhaps we had 5 customers that you could -- in China going to 15 based on sort of turnkey or turnkey reference designs. I mean, we finally have a full turnkey this year, where last year, it might have been just a reference design. Yes?

Mike Burton

Brean Capital LLC, Research Division

Mike Burton, Brean Capital. A couple of quick ones on the competitive front. Can you talk a little bit about your relationship with Samsung? Obviously, a big partner of yours historically. What is the view of the threat of them becoming more of a competitor, both internally in basebands, and as a merchant vendor going forward? And then secondly, on Qualcomm integrating their Wi-Fi MAC going into more of their portfolio going forward, how do you plan to compete on that?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Okay. So the first question, Samsung. I mean, of course Samsung is one of our biggest customers. We have a good relationship with them. I think you're asking, should I worry about the vertical integration at Samsung? And I think anything Samsung does on vertical integration only applies to 1 segment of their business. I mean, if you look at Samsung's business, it's very broad. Everything from entry-level smartphones, midrange 3G smartphones, 4G smartphones, they have a very broad portfolio. In order for them to make money in all these areas, they need chips that are optimized for each one of those segments. And I think I exemplified that with the 28155 for the GALAXY S II Plus. So I think the risk of vertical integration is kind of overblown because you just need to apply the best solution to the particular class of product you're building. Okay? That's answered your first question. Answer to your second question is, how are we going to compete with companies that are talking about integrating Wi-Fi and Bluetooth into their basebands? Well, integration has to be done at the right time. It has to be done when technologies are stable and features aren't changing that much. And I think what's happened for those companies who have tried to integrate before it was time, whether it be a company that tried to build the Penta combo [ph] connectivity chip and stranded their GPS technology inside because they did not have Glownet [ph] capability, or other competitors who didn't have other important features. What happens is they get stranded on that chip. It could even be a boat anchor in terms of cost and margin. So going forward, we're going to keep the pace of innovation high. In fact, there's a lot of new features coming on the connectivity front. I mentioned just a few of them here that are all very interesting features. Of course, at the top of the list for 2013, for this crowd, is 5G Wi-Fi. That next phase of rollout on our 5G Wi-Fi story into smartphones. Okay? So -- but it's not just one thing, it's all of it, and making it work very seamlessly. All right? Making it very easy for a Samsung to adopt our Miracast or our Wi-Fi Direct or our Passpoint technology. All those technologies have a tremendous amount of interoperability that has to be solved, so when you walk into a customer, you have to have solved all those problems. All those are reasons why we think we'll continue to win. Okay. Some on this side, yes? We start back there and then we'll work our way up to the front.

Srini Pajjuri

Credit Agricole Securities (USA) Inc., Research Division

Srini Pajjuri from CLSA. Just to follow-up on the topic, Bob. Obviously, it makes sense to keep Wi-Fi and baseband separate in the high end because the technologies are not mature. But if your focus is going to be on the low end, especially in China, I would tend to think that the Chinese market doesn't require the fancy Wi-Fi or fancy Bluetooth, so why not integrate all these and then come up with a low-cost solution? Why isn't that a focus for you?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Well, that's a good question, I mean, why isn't it a focus? Because, yes, when we make decisions about which products to build, we're making them based on the biggest TAM that we can go attack. And we see Wi-Fi changing very rapidly and it will change even in the China market. So we don't see the need to go integrate it. We believe the idea of having a connectivity island and a SoC island with app processor graphics and cellular modem, is the right partitioning for the next couple of years. Okay? It would take me a lot longer to explain all the dynamics that go into that decision. But we are confident that, that is the right way to partition things. So stay tuned because you'll see us

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make announcements on things that we're going to go integrate. Where today, things are 3-chips, 4-chips, and they'll be shrinking down to fewer chips as we do integration. So you'll see announcements from us over the course of the next 6 months talking about things that we're going to integrate. Yes, we will keep going to the back and we'll give Arnab a shot.

Arnab K. Chanda

WJB Capital Group, Inc., Research Division

Bob, maybe I'm asking the same question every year, I apologize for that. My processor isn't that strong like yours. Question about your cellular business, kind of a big picture, you obviously have been very successful in connectivity. Every year, people are afraid that you're losing share, you end up gaining share, more competitors leave. So that's going very well. But if you look at the cellular side, it seems like we're asymptotically approaching the market where we were x number of years late in 3G, now in 4G maybe 1 year or 2. My question is, I guess, is do you think your timing -- it seems like now, you'll really going to hit the market, 2014 is when you get any significant revenues. Is that -- are you going to really miss out on the profit pools while you're fighting it out at the -- with MediaTek at the midrange and low-end, meanwhile your good buddies in Southern California capture all this profit and then use that to attack you elsewhere?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Well, I really believe that, if you look at the 3G space, it's a lot more than just China. Right? I mean, I just showed you all the different phones from Samsung that are still coming out on 3G. So I do not believe that there's not money to be made in 3G. Okay? Having said that, a big investment in 4G, absolutely recognize the importance. We're moving very fast we have a big R&D investment in 4G. We think we're going to get there in time to hit the sweet spot of the 4G market. And 4G will last for many years to come. So I believe we're doing the -- balancing the investment appropriately. Maybe we should take this gentleman. He has been -- he raised his hand first actually.

Shawn R. Webster

Macquarie Research

Shawn from Macquarie. Two quick questions, one quick one. In terms of your overall mix in the Wireless business, can you give us a sense of what is smartphone, tablet today versus all your other, let's call it, embedded segments? And then the second question is there's been a lot of discussion on AC and how it's an important catalyst for your company over the next year or 2. Can you give us a sense of how you see it that ramp happening over the next year, for example? Do you think 20% of the phones will be AC-enabled exiting next year, for example?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Well, I mean I think the first question was what's our mix in terms of smartphone and tablet versus other? Yes. I mean we don't break out that revenue. Maybe that's a question you can ask Eric. But certainly, a significant part of our revenue is coming from smartphones. Connectivity for smartphones, baseband for smartphones. It's a significant part of our revenue stream. And then as far as AC goes, I think we've been able to convert the entire router base now over to 802.11ac. I would say that over the course of 2013 and say, the next 12 to 14 months that probably 50% of our business converts over to 802.11 ac and 5G WiFi.

Anil K. Doradla

William Blair & Company L.L.C., Research Division

Rob, Anil Doradla from William Blair. When I look at 2012 and from your perspective and from your segment's perspective, how would you characterize some of the areas that exceeded your expectations? And some of the areas that perhaps disappointed you from whether it's technology or end customer?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Okay, well, in terms of what exceeded my expectations, I would say that our ability to deliver 802.11ac and WiFi into the market and how impactful that has been in all different segments, I think that's definitely exceeded my expectations. So every segment whether it be tablet, smartphone, PC, routers and then moving on to embedded applications like set-top boxes and over-the-top kind of boxes, all are very -- moving very rapidly towards 5G WiFi. So I would say that even exceeded my expectations. In terms of what didn't my expectations, what was interesting is that I think NFC is just really on the cusp of exploding now that it's been adopted into the Android ecosystem. But I would say up until this point, it hasn't really been a big, material driver. But moving forward, now that it's part of the ecosystem, all of the Android guys are going to be -- handset companies will be adopting it very rapidly. And I mentioned the GALAXY S II plus, that device I held up here, Broadcom NFC, Broadcom WiFi, Broadcom Bluetooth, Broadcom GPS, Broadcom app processor, Broadcom graphics, we do our own graphics internally. What's the -- why is that important? Because I don't have to pay a royalty to somebody else, but I've mentioned. All this technology. I see

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NFC growing very rapidly from here. So I'd say that's something that maybe has been a little bit of a work in progress. But going forward now that it's part of that ecosystem, I think it's going to take off big time.

Unknown Analyst

[indiscernible]

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Well, I mean -- okay. Your -- the next question. You didn't have a mic right now, but you're saying on the baseband side what's succeeded. I think we've turned the corner on Nokia. I think many times in the past, many quarters and many discussions we've had, we've talked about our Nokia business. Obviously, Nokia's lost some significant market share. We have been able to grow our business through that entire decline of our Nokia business. So I think that's a good thing. And I think now that we have turned the corner and really applied all of our resources on the smartphone space, I'm starting to see some very good things happen. I think our customers are recognizing that if they invest in us, it will be a long-term investment. So I'm very happy with the way that is now going. Okay? Yes, take this gentlemen right back here.

Doug Freedman

RBC Capital Markets, LLC, Research Division

Great. Doug Freedman, RBC. Can you talk a little bit about your position on the RF side of the equation? You're building full turnkey solutions now, there's a lot of complexity on the RF side of the handset and whether you have the applicable tool kit to do more integration on that side. That's something I just want to get your impression on.

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

That's an easy question because we have one of the world's most capable RF teams in Broadcom. Broadcom pioneered CMOS RF, implementing RF in CMOS. And you can -- as witnessed by our patent portfolio, which is second to none. We have a very capable team. The team has built RF chips for all of our devices. And I mentioned earlier that we sell more wireless chips with integrated RF than any company on the planet. So I'm very confident in the capabilities. They are doing the RF for all of our complete platforms that I showed you. So whether it's 21553, 21654, 21664, 28115, those are complemented with Broadcom RF internal, 100% Broadcom IP. And again over the course of time, we can integrate all these IP into a single chip. That's the reason these big OEMs, these big handset OEMs want to work with Broadcom because they know eventually all these connectivity pieces will integrate into a single connectivity island, and same thing with the baseband island. Yes?

Harlan Sur

JP Morgan Chase & Co, Research Division

Harlan Sur with JPMorgan. As it relates to the wins that you had earlier this year with the single-core platform like let's say for example going into Samsung, I think the rough dollar content is about \$10 to \$12. Because you're not only supplying the baseband, you're supplying the power management, RF, integrated connectivity. And I think you've told us before that as the team moves to the dual-core platform, very similar to the GALAXY S II plus announcement today, that it's roughly about a \$7 to \$9 increase in dollar content. So first question is, is that still the case? And then the second question is, as a team rolls out the turnkey solution, my sense is that there is still a lot of customization that has to be done on the software and the firmware set for your customers. So question there is does Broadcom have the resources in place to support customization of firmware and software? Or is that something that has to be added as 2013 unfolds?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

So the first question, I think you're asking is can our dual core -- our 28155, for example, which is our high-end dual core, okay. As I mentioned, this is part that has integrated ISP. That's the same ISP engine that Nokia used for their 41-megapixel camera that's on board our 28155 device. We also have very high-end graphics on that device. The graphics on Broadcom 28155 rivals lot of the 4G SOCs that are out there. In fact, it surpasses a number of them, okay. So when you compare the price of that to the single core, absolutely the price delta would be in the range that you mentioned, okay, the ASP uplift. So what was your second question?

Harlan Sur

JP Morgan Chase & Co, Research Division

Turnkey reference [indiscernible]

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

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The turnkey reference design. Yes, so you asked about the customization on the turnkey. Well, I mean the idea behind the turnkey is not to have a lot of customization. The way that a company -- a handset company could take advantage of our turnkey is to perhaps change the color, perhaps change the idea a little bit, but not change it. And that's really what's important. So there isn't a lot of customization needed. We do all of the Android integration, all the tests. And we make sure all of the Android certification tests pass when we deliver that turnkey design. So if somebody wanted to put their own skin on top of it, we could do that, but would really prefer when it comes to the turnkey that they don't touch anything, that they use this as their experience phone, if you will.

Unknown Analyst

Two questions, Bob. Bob, the first one would be as I look into 2014, 2015 and how you look at how the LTE market is going to shape up. Right now it's only a high-end market. Do you expect that's going to segment into high, medium and low end, and you would plan on attacking all of the different parts of the LTE market? Second question would be what are the technical projects or programs you would like to invest in that you're not investing in today? So if you had another \$30 million or \$50 million, where will that go next?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Okay. So first question will the LTE market kind of segment out the same way the 3G market that it will. And building the chip, this chip that I showed you, this LTE chip, it's very capable and even implement some LTE advanced features. From there, we can tier it down to these lower tiers. So we have the capability and we've designed it in a way that allowed us to be modular. So we can tier it down to cat 3 or to applications that don't require a carrier aggregation. Okay? And what is your second question?

Unknown Analyst

If you had more OpEx?

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Okay. If I had more OpEx, how would I spend it? So Eric is going to come up and talk about that. But I honestly believe that we are spending enough money. And I think we're doing all the right things in terms of making the right investment choices. I think over the course of many years, I stood up here and said, here are the things we're not investing in, and they turned out to be the right -- a lot of the right decisions, right. So it's not about what you invest in. It's also what you don't invest in. So I really believe that we have significant amount of the investment on 3G behind us. We're reusing a lot of the IP that we already have to build this family of devices. So a lot of our investment is already there in 4G. And as Eric mentioned or Scott's going to mention -- I mean Eric's going to mention and Scott has mentioned which is if we deliver, if we land a big customer and we need to invest more, I'll go to Eric and Scott and ask them if that's the -- if we can spend more. That would be the case that would justify a bigger investment, okay. Another question. Just one more, I think, after this.

John W. Pitzer

Crédit Suisse AG, Research Division

John Pitzer with Crédit Suisse. Can you -- if you talked about this and I missed it, I apologize. But the content you get in the turnkey solution and the profitability, and maybe as a broader question and maybe you disagree with this premise. But if 12 months from now, most of the growth of the smartphone market is coming from emerging markets, much lower-end mix, can you help me understand how that impacts the content, the pricing, the competitive landscape, the profitability? Is that China market really going to be it's a Broadcom turnkey solution or it's a MediaTek turnkey solution and whoever has that turnkey solution wins it all? Or help me understand the dynamics within that market.

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

I mean, okay. Good questions. I mean first of all, every handset company, any smartphone handset company is -- are spinning their 3G offerings today. So in order to -- for them to take advantage of the growth in 3G, they're all having to reduce their costs. They are all having to move to more integrated solutions. So I don't see it as just a China play, okay. So I see it's a worldwide event. And that certainly in China, I think the turnkey does help significantly because if you look at Tier 2s and Tier 3s in China, they don't have as much engineering resource. So I do think it's a big swing, an advantage to have a full turnkey and be able to supply this multi-sourcing capability to those Chinese customers. But again, the 3G turnover is going to happen across the world, not just in China.

I think I'm going to run -- I'm running out of time. So with that, I'm going to turn it over to the next speaker. Thank you very much.

Presentation

Unknown Executive

Please welcome Eric Brandt, Executive Vice President, Chief Financial Officer.

Eric K. Brandt

Chief Financial Officer and Executive Vice President

Thank you, Adam. Where's Benjamin? He's not even in the -- there he is, okay.

Okay. Tough act to follow with Bob's presentation, great stuff. So what I want to talk about is I want talk about economics of success. And I want to talk about how we think about our economics in terms of how we drive returns to our investors and how we use our economics to drive competitive advantage and do the things, many of the things that you saw Scott talk about, Dan, Rajiv and Bob talked about in our business and why Broadcom continues to do as well as it does.

I'm going to split my talk into 3 pieces. I'm going to talk a little bit about enhancing value through M&A. Over the course of the year, many investors have talked to us about use of capital, about M&A and how we think about it. And about every other year, we do a review of our M&A internally. And I want to share with you some of the results of the M&A. So we actually take a hindsight sort of looking-back view of M&A we've done over the last 5 years, and I'll talk more about that.

Second, I want to talk about outgrowing peers and driving advantage. I spent a lot of time talking about it. We continue to look at how we are driving advantage and the importance of that, and it's pretty clear that we are focused on this as a company. We provide incentives. Our incentive program focuses on outgrowing the market and driving profitable returns, and I think it's important. And I'll spend a little bit of time talking to you about what that is and why we think right now, we're probably seeing some of the real fruits of that focus.

And then lastly, I'll talk about managing economics and how we are managing our economics tightly. I will give a little bit more color behind the aggregated numbers in terms of what's going on inside our P&L and the degree to which we are really, really focused on the economics we deliver and the returns we drive as a company.

So let me start with M&A. So when we look at M&A, we look at M&A in 2 buckets, right? We start with thinking about the strategic value and the technology value, and we think also about the economic value. Within strategic value, we spend a lot of time when we look at deals talking about, does this transaction enhance our footprint? Does it give us markets that we aren't in? Does it give us competitive differentiation? Can we integrate a piece of technology which makes our other part even more competitive than it would otherwise be? And we spend a lot of time talking about, is this the best technology asset in the market, right? Have we bought the right asset? Now that's all nice. That's qualitative and typically when we present this internally, someone says, "Well, that's all nice, but that doesn't feed the monster." The question is how have we done economically? And so economically, we spend time talking about the standard return questions, right? What is the return on investment? How is it done on a DCS standpoint?

Now that's the traditional financial analysis. We also try to have a hard look, and I think it's notional by its very nature because of the vagaries of the market, we try to figure out whether the transaction that we do -- does or transactions as a group, as a portfolio add value to the overall market valuation of the company?

So actually, when I showed the Slide to our Head of M&A he goes, "You're actually going to show deals?" I said, "Yes, I'm going to actually show deals." So over the last 5 years, these are the deals that we've done. And arrayed them on a 2 by 2, looking of them strategically and from a technology standpoint. On the x axis, I have technology; on the y axis, I have strategic value.

And so when you think about strategic value on the y axis, by definition and hindsight since we exited the consumer electronics business in Dan's area in terms of the digital TV and Blu-ray business, you can see in hindsight that they added strategic value to the company. In fact, they did not. We exited those businesses.

If you separate them from a technology standpoint, the Sunext acquisition actually gave us technology, which made us #1 in Blu-ray. Just turned out that the economics of the Blu-ray business were not sufficient to justify the R&D investment. And that's why we exited. We were able to bring together the front end and the back end. And while the ATI acquisition from AMD gave us a fair bit of technology, it was not really sufficient to vault us into a #1 position and hence, why I put it in the low, low category.

The one deal that's up in the high strategic value, low technology value, 2Wire, 2Wire was actually a deal we did, which was we took over a roadmap for someone and transitioned that roadmap to our product. So in essence, if you will, sort of picking up a roadmap and adding a customer, we didn't really take that technology in-house. We just

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transitioned that customer set to our technology and enhanced our market position and footprint. So strategically valuable but not really valuable on the technology side.

If you look of the deals, the vast majority of those deals are in the upper right-hand box. And again, I didn't do this for you. We did this internally for ourselves. And if you look at those deals and you could pick various deals, whether it's looking at things like the BCM ware, we've got meaningful technology, advanced our LTE and you saw the chip today. Or whether it's Dune and that 88650 that Rajiv showed you, which is the 100-gigabit switch fabric chip, which nobody has in the market. These are clearly deals that enhanced our technology, enhanced our strategic position, enhanced our footprint. Global Locate, probably one of the best deals we've ever done in terms of enhancing our wireless connectivity portfolio and the economics that it's driven on the back of it. Octalica, bringing a local in-house, integrating it into the chip, taking a socket off of the board, differentiating our SoCs, all deals that have enhanced either our strategic position or technology position. And in fact, as we look back and asked ourselves, did we buy the right company? Should we have bought a different company? I think all of the people who sit in the executive group can look back and say, these were the right companies. We would not have bought a different company. And hence, you can see the majority of the deals in that bucket.

Let's get to the heart of question of economics. So what I've laid here is all these deals. I haven't laid out who they are other than to tell you that the 2 red ones are the deals we exited. So they would be 0 by definition. And I wanted to point out a couple of things on this chart. So we've arrayed them from high to low. There a couple of deals that have asterisks next to them because they're still too early to tell. And what they really reflect is our view for our strategic plan this year of how they are aligned or stack up and as compared to what we saw they would do when we actually did the transaction.

I've put 3 horizontal lines on here. I put our weighted average cost of capital at about 10.5%. That thing oscillates. It oscillates probably between 10.2%, 10.4%, 10.5%, round numbers, I put 10.5%.

I put another one on here, implied yield. Implied yield is one of our P/E. Obviously, that moves. But number's about 8%. And so if you would ask yourself, what's your alternative use for that cash? You could go buy back your stock, and so that would be the return. You'd get buying back your stock versus buying somebody else's stock or value in the market. And I put that on there. Obviously dividends fall into that category as well when we pay a dividend. But I wanted put that up there.

The other thing that I put up on this chart is the cost of the debt and the return on -- the return that you'd get on the cash. So if I were actually to use the return on the cash we actually get and include the debt, that number is closer to 1. But since we've taken debt, I use debt as the number at 2.5%. And I realize we are not in the real estate business. But if we were in the real estate business, if all of you were in the real estate business and you could have access to funds at 2.5% and you could generate returns of 8%, you'd do that all day, every day until you ran out of deals to do, okay? So just put that up there. That's not how we think about it. But I think it's important to sort of understand the capital that's being used and the alternative of the capital that's being used, and the importance of sort of why that implied yield is up there.

So if you look of those deals, the vast majority of those deals create value. They are all, with the exception of 2 red ones, above the implied yield. And only one of them is slightly below the weighted average cost of capital. And that's the 1 deal, and I will point it out because I'm sure you'll ask me. That is NetLogic over there. And so despite the fact that the market has dropped in the service provider segment, as much as it has dropped since the first half of 2011 to where we are today, we are still hovering pretty darn close to our weighted average cost of capital on that deal.

So if I plug all those in and recognizing that a couple of them are 0 and one of them's below the line, and I run at that weighted average cost of capital, these deals have created about \$1.5 billion of value above the purchase prices we have paid cumulatively.

So now, the question is it, okay, that's finance. That's straight financial analysis. The question is, so does that add any value on a market basis? So I showed this chart last year. And this is a market value chart and it's sort of a notional analysis to some degree. But I think it's important to think about it this way. And so what this chart is meant to show on the x axis is the products of gross margin and revenue growth. And why do I put gross margin and revenue growth? Because if we're all sitting here today and all things are equal for a company, and one has a higher gross margin versus one has a lower gross margin, you'd pay a higher multiple for the one with a higher gross margin. And all things being equal, if one company had a higher growth rate versus a lower growth rate, you'd pay more for the higher growth rate. Now we could argue about operating income and operating margin, et cetera. But fundamentally, the economic power of a company is the revenue growth and the gross margin that, that company produces. And so that's what I put on the x axis.

I showed this chart last year. I showed this chart this year. Typically, that correlation of P/E can be anywhere between 45% to 75%. There's all sorts distortion in the market data in terms of whether people have done acquisitions,

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divestitures, whether there's M&A and their gross margin, whether they pay a dividend or they don't pay a dividend. So despite all of that noise, you get a fairly decent correlation in this analysis.

And so the question is hopefully, right, does this market-based analysis look similar to what you'd expect from a financial analysis? And I think it does. And so let me tell you how you get there. If we look at our strategic plan over the period of time that we look at it, typically deals we have done in the last 5 years contribute about 1/3 of our growth rate. So if our growth rate is 15, they're about 5 points of that growth. If our growth rate is 9, they're about 3 points of our growth.

In addition as we look at the deals we have done over the last 5 years, we added about 100, 120 basis points of gross margin through the deals we've done, as you can imagine, because those deals have been primarily in the infrastructure space. If I were to take those out, and we can all think of companies who have, if I go back to that prior chart, use their cash to buy back their stock or used their cash to make acquisitions to fill debits, what would happen? Well, our growth rate would go down, our gross margin would go down and we'd slide down the curve. And you could probably think of companies, I told you who they were, who were down there on that part of the curve.

What's interesting is if you plug that in, net of the purchase price, so take the purchase price out, that creates -- that's about \$2 billion of value or about \$4 in stock price. So as we step back and look of the deals and look at the competitive advantage we get, the technology advantage we get and the economic advantage we get, we feel pretty good about the deals we've done. We'll see how we feel the next time we do this analysis in 2 more years, so we do this every other year.

So now I'm going to shift gears and talk about our growing tiers and competitive advantage and why it matters and why we spend so much time focusing on it internally and talking about it externally. So if I start and just map companies, fabless semiconductor companies, over the last 5 years and look of the compound annual growth rate of revenue and the compound annual growth rate of R&D, you'll see on this chart that they tend to fall pretty close to the line. Further to the right is better obviously. Better revenue growth means there's leverage coming in the model, and further to left means there's less leverage. But the important thing to note here is in the last 5 years, the average revenue growth and the average R&D growth are the same at 11%. Now I'm going to ask you to remember 2 numbers. The first number I want you to remember is that 11% because it will come back later.

So on average, companies are actually investing in R&D at a rate roughly similar to what their revenue growth is. Now remember we did have a very strong 2010. So when you deal with a year like 2012 and quite frankly like 2011, it becomes very painful for companies to operate. And there are precious few companies who've been able to grow their revenues and in fact, grow their earnings per share as a company in the current environment in 2012, which is why so much emphasis is placed on outgrowing the market. You can't have as your strategy to be in a market where I'm just going to wait for it to grow. You have to go out. You have to drive your growth, you have to choose your markets, you have to gain market share. And so that's what places a premium and particularly, in environments like today and last year in 2011. Why it is very important to outgrow the market? Because without it, you can't make that kind of investment in R&D, and you can't broaden your portfolio.

So let's talk little bit about R&D for a minute. So part of managing the cost structure of a company is understanding the components that drive the costs of the company. And I know there's a lot of conversation about OpEx. I get lots of conversations when I'm on the road. And so part of being able to manage a cost is an understanding of the cost. And so the nature of this analysis actually comes from an management theory that is almost 100 years old, okay. It comes from the DuPont equation. For those of you who are not familiar with the DuPont equation, in the 1920s, DuPont said they are going to manage themselves to return on equity. That was great. The investors loved that. The problem with that is nobody in the company understood how to manage return on equity in terms of what their function did to contribute to return on equity. And so the contribution to return on equity is return on sales, multiplied by asset intensity, multiplied by balance sheet efficiency. First one is the sales and marketing R&D folks, second one is the manufacturing folks and the third one is the financial folks. But you can do the same thing with R&D, but really what we're trying to do is go one derivative path.

So you want understand growth elements. So you can do the same multiplications. But if I take the first derivative of that to understand growth, I can split R&D growth into 3 pieces in this industry, growth in tape-outs, right? Scott talked about our growth in A0 tape-outs. That really is sort of what defines new products. It really is the new product data of a company and how they do on one end of the spectrum.

On the other end of the spectrum, you have inflation, right? It's your cost per engineer. How much do your cost go up? How much do you give people a merit increases? Are you shifting your engineering work force to lower-cost locations, which appears good to start but you see those lower-cost locations have much higher inflation rate than the inflation rate in more developed markets.

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And then you have in the middle what I will call the growth in engineering complexity and engineering intensity, which I spent a lot of time talking about, and I'll talk little bit more about today. And that can be measured in growth in engineers per A0 tape-outs. How many engineers do I need for these new products on average?

And so let me take a moment and go into each one of these. But I think it's important to understand that when you look at this, that as you look to the left, that's really competitive advantage. And as you look to the right, that's really the inflation of your business. And to the extent that you can do something better than the next guy in the middle, that's competitive advantage. To the extent that you cannot do something better than the next guy in the middle, you're in trouble. So let's look at the first one.

So Scott showed this chart, 50 A0 tape-outs. I'm sure you guys walk out here and say, Broadcom talked about A0 tape-outs and some small company in the processor business is going to say, "Well, we do 50 A0 tape-outs, too." The truth of the matter is there very few people who do A0 tape-outs, 50 A0 tape-outs, small number of companies. Very powerful in terms of the R&D, okay? What's also interesting and another number to remember. I said remember the 11%? Remember that we do 50 A0 tape-outs okay, and we spent about \$2 billion on R&D. So that's about \$40 million per A0 tape-out. That will become important in a minute.

The other thing that's important is, gee, your taping out 50 A0 tape-outs, so you're doing better. Well, here's the data for Broadcom. So, over the last 5 years, our A0 tape-outs are growing at a compound annual growth rate of 8% per year. We are increasing our footprint of new products by 8% per year, okay? And that divot you see there is typically a process node transition of 40 and some timing, but fundamentally running at about 8% per year. And in fact, if you look of that curve, you might even concludes it's actually accelerating.

Let's look at complexity for a minute. So, here's a chart. This isn't my chart. I've seen this chart a lot of times. You guys have seen this chart a lot of times. This is the cost of R&D at the various different process nodes. Okay? And what drives this, obviously, is more cores, more verification, more software, et cetera. So, the first thing I want to point out on this chart, that you should look at it, is -- I said we do 50 A0 tape-outs. We do \$2 billion on R&D. That's about \$40 million per A0 tape-out. That would be right at roughly that 65 line. Yet, as Scott mentioned earlier, 80% -- more than 80%, particularly of the A0 tape-outs, are at 40 and below. So, why are we 50% more efficient than what this chart would suggest, given the number of A0 tape-outs we do. And the way, I might add, Scott, that we do a lot more. We probably do 80 additional tape-outs that are A1s, B1s, B2s, second sources, different ball-outs, different variations for products. So, we do well over 100 tape-outs. The A0 tape-outs is what I'm talking about.

So, why is that different? Well, it's interesting. If you take a look at this data and you assume that process nodes come every 2 years, and you ramp into the process nodes over 2 years and ramp out of process node in 2 years. So, it's kind of a 4-year cycle and you sort of run these waves across, and you were plug that in, what would the growth rate of engineering complexity? It turns out the hard close to what industry's growth rate of R&D has been in the last 5 years, 11%. So, to the extent that you could slow that down and to the extent that some people have slowed that down, they might be a little bit below that, but fundamentally, that bar chart translates into about 11% growth rate. Question is how has Broadcom done? Broadcom's growth rate, in number of engineers per A0 tape-out is growing at 7%. That is 50% better, depending on how you look at which one's the number, maybe 30% better than what the industry would normally do. Very powerful. That's what drives competitive advantage. Why is that? Because we reuse cores. We drive integration. It's the heart of what we do. We measure this data. I showed you, a year ago -- maybe it's 2 years ago, that reusing a core and having a broad footprint for a core could be 40% to 60% more efficient than the initial development of the core. So, the sheer breadth of our business, the breadth of our IP, the ability to reuse it, the technology that's in a set-top box, the technology that's in a switch, the technology that's in a phone and all the various chips, that reuse drives competitive advantage. That's what separates us from other people in terms of our R&D performance.

Why does that matter? Well, in that chart, as things move up, right, it's very clear that the economic barriers are increasing. The cost of R&D to do a chip has gone up, the IP requirements, because smaller line width to fill up that die size you need more IP blocks, 20 IP blocks going to 25 IP blocks. Critical mass becomes important in terms of your ability to use it, and the ability to leverage those cores across the business. Now, what I've shown in this chart is a series of competitors. And I've draw a line at 5 projects at 65-nanometer. And the reason why we drew 5 projects at 65 nanometers, because that's principally what people are shipping today, it's historically what you could look back at in terms of the R&D investment that's being done. And truthfully, if you do 5 projects, you probably have some core leverage and 5 may have the virtuous benefit of the fact that you could do 8. The problem is, that level of R&D only supports 1 to 2 projects at 22. And the ability to do 5 projects at 22 has gone up. And there is, now, precious few companies on the right-hand side of that chart who will be able to keep up with the technology transitions and make the investments. And one of the reasons why Scott talked about moving our process technology forward is, at the leading edge of the product, not the process technology, the most advanced switches, the most advanced set-top boxes, the most advanced base bands. Where you're going to make your hay, where you're going to make your gross margin, where you're going to have that best ASP and competitive advantage is going to be in those process nodes.

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And where you're going to separate yourself from those companies, on those products, is there. And so, what you see is that this really is becoming a last man standing game. And there's very few companies left to the right on that chart.

Let me talk about managing economics. And by the way, in case you were wondering, we were the red dot. Managing economics and how we manage our economic as a company. Tactically speaking, in terms of what we're trying to do as a business, is pretty clear in terms of the aggregated financial numbers you see. And so, over the last 5 years, our revenue has grown at about 16% per year. Our operating margins, I use trailing 12 months because what's financially disclosed data, is up about 350 basis points. That would be about the same on an annual basis. And our EPS is up 18% over that time period, on a non-GAAP basis, on a compound annual growth rate and about double that on a GAAP basis. So, clearly some strong performance, over the last 5 years, on the financial metrics of the company. What's interesting is it hasn't been that easy, and let me tell you what hasn't been that easy. At the heart of the economics I talked about, is gross margin. We have seen, over the last 5 years, our mix of consumer-oriented businesses, which are below our average corporate gross margin, generally speaking, and Bob's business is -- grow 1,600 basis points. Here, our gross margin has been pretty much rock solid through that time period, with the exception of the dip in sort of that 2009 time period, and in fact, in recent quarters, is drifting up. Why is that? Because there is a very high degree of focus on the things we believe drive value for our company, gross margin and growth. I've talked a lot about growth on gross margin. Optimizing the die size, shrinking die size, developing products that make sense for a particular market, that are margin-optimized for a particular market and leveraging our balance sheet to enhance our high-margin business by growing the businesses in Rajiv's area, as Scott talked about, strategically. So, despite the fact that we've actually been able to see this effect in our mix of business, our gross margins held in well, and that comes from a very tight focus, of the people who design the chips and manage the businesses, on gross margin.

Secondarily, let me talk about a chart that Scott showed. So, I want to make a different point. So, we have increased our investment in the base band side of the house. This is the reported operating segment, operating margin of the company. And you can see that our investment in cellular has cost us somewhere between 300 and 600 basis points of corporate operating margin. And today, closer to the high end of that. What that means is broadband, infrastructure, wireless connectivity are running 4 to 6 points higher than what we are reporting. If you want to know whether we're optimizing our P&L and we are paying attention to how we're spending our operating expense. You betcha, we are. Okay? And we as a company spend a lot of time thinking about how we use that leverage to drive it into new areas to drive growth. And leveraging in the competitive advantage I showed you, on the R&D side, to enter the new market or -- well, really to build into the largest market of cellular. So, that's the core strengths of the business. Tactically speaking, last year I stood in front of you and said we were going to invest in 3 things. We're going to invest in LTE. Good news is we had an LTE chip, it's in this box here, Bob. We're were going to invest in connectivity. We brought 5G WiFi in our market. We had a clean sweep in the router market, typically not where our strength has been. And we were going to invest in wireless infrastructure, and you can see the breadth of what Rajiv has done with his portfolio. If I take that, and the M&A we've done, 92% of the incremental spending we spent in 2011 was just in those areas. If you want to know whether we are focused, we are laser-focused on what we are spending on. And Scott gives you the focus of what we're going to do in 2013.

So, where this take us? I'm going to end where I started last year, although I ended on this bubble. But I want us -- I want to end where -- to give you a perspective of how we think about where we are strategically. Our goal is to outgrow the market. Why do we outgrow the market? We want to build -- we want take those economics and build IP and broaden our portfolio so that we have portfolio strength and differentiation. What does that enable us to do? More SoCs. More SoCs, broader footprint, 50 A0 tape-outs, brand-new products. And that drives profitable growth and share gain. And this is the virtuous cycle that we're trying to manage to. And I think we've done a pretty good job. Those who cannot do this, it ain't pretty, right, those people of the left-hand side of that curve, they will grow slower than market. They'll probably have to reduce their investment capacity. In this business, cutting people -- we're not even growing the R&D investment is going to be difficult, it's going to make your IP portfolio very static. You have less tape-outs done because, inevitably, there are more engineers required per A0 tape-out. You can't put those -- more engineers against those tape-outs. You're basically going to have to shrink your tape-outs. That is not a winning strategy, which is going to cause you to grow slower than the market. And I promise you, this is probably what it feels like to compete against Dan Marotta. Okay?

So, just in closing, before I invite the management team up for Q&A, strategically, what are we trying to do? Strategically, what we're trying to do is we're trying to drive our business to build competitive advantage, build critical mass and be the last man standing in the spaces we're in, which offer better-than-average economics. Tactically, what are we trying to do? Tactically, we're trying to manage our investments, deliver optimized performance on the businesses, that are at critical mass, so that we can leverage that investment into the opportunities that'll drive significant growth for us. And I -- and as Bob showed you, we are at the door.

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So, that's my presentation. I'll invite Scott up to give a couple of closing remarks, and the rest of management team will all then we'll all take questions together. So, Scott?

Scott A. McGregor

Chief Executive Officer, President and Director

This brings us to the end of our formal presentation. But I'd like to share a few thoughts with you. I hope you see, today, that we've demonstrated consistent outperformance. And the strength of our core businesses in our broadband grew, in our infrastructure group and in our connectivity group. Really good strength of those businesses. That we're investing in enhancing advantages going forward, and in particular, in the cellular space, moving to accelerated modems and moving to accelerated process nodes. And then finally, in Eric's presentation and all the presentations, I hope you get a sense that we're very focused on driving our leverage going forward and continuing to excel.

So, with that, we'll stop here. I'd like to invite all the management team to come up and we'll take any questions you have. By the way, we're going to cut the questions a little short and then we'll be available, also, in the reception area, so we get can get back on time a little bit.

Question and Answer

Christopher J. Muse

Barclays Capital, Research Division

C.J. Muse with Barclays. Eric, very helpful info on R&D stat. I guess, I was hoping to dig a little bit deeper on the leverage, on the SG&A side. Last 3 years, that part of your run rate has been growing about 4x your rate, top line. And curious, when do you expect we'll start to see leverage there?

Eric K. Brandt

Chief Financial Officer and Executive Vice President

Yes, it's interesting. You see that, actually, it hasn't. I mean, if look at a non-GAAP, it has actually -- in terms of the growth rate of SG&A, it's actually been almost flat. There's been some legal ups and downs in the middle of it, and most of that has been sales and marketing as we've tried to hold our sales force as a constant percentage of our revenue. On the G&A side, actually, we are drifting down.

Unknown Analyst

Just going to a slide you showed on the op margins for the investment on the cellular side. And my math could be off by \$50 million, \$100 million. If I take her up to the \$500 million top line, that gets me a \$500-million operating loss for cellular. So could you help us put that in context with the IRR chart you showed us? And how long do you keep investing in -- and I don't mean to pour cold water on Bob's presentation. It was very tight, very compelling. But then, as a CFO, you look at that and say, when do you say, at what level does it get to profitability and how long do you invest in it?

Eric K. Brandt

Chief Financial Officer and Executive Vice President

Look, we have actually seen the business come to profitability. In fact, it was at a profitability point when we were at the peak of the TG side. But, obviously, with that business, with what happened with Nokia, it went away. We wouldn't be investing in the business if we didn't think it would drive value and drive earnings per share, and we've actually modeled it out. It depends on your assumption on the ramp of 4G. But, with any reasonable market share, as even the #2 player this business pencils out, it's the right thing to do.

Unknown Analyst

Just 2 questions for me. One more tactical and one more strategic. On the tactical side, you did a nice job under-earning your OpEx for your Q4 update. Can you talk about the level of uptick we would expect, seasonally, for your Q1? And then the strategic question is, Eric, we take your analysis, on M&A, to the natural conclusion, a few years down the line there should be the very few attractive assets to actually go acquire. So how do you think -- I mean, are those assets going to be picked over by that point? And how you think about your willingness and ability to do M&A, going forward, over the long term?

Eric K. Brandt

Chief Financial Officer and Executive Vice President

So, with respect to Q1 -- and I don't have guidance, because I don't even have a number, really, that's hard for Q1. I would say that, it appears that the consensus estimates have calculated this accounting adjustment for Q1 correctly. Now, finally, after a couple of years. And the dollar number that's in the consensus estimate for Q1 is probably a good place to start for now. So, I think we're going to see a similar seasonal uptick in Q1. I can't tell you how big it's going to be. But if I look at the dollar number that's in there, it doesn't look far off from what we would expect.

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In terms of the M&A side of the house, it's an interesting question. Our suspicion is, what will happen is, for a lot of the smaller players that they will be forced to merge to build IP portfolios. And rather than sort of building value and sort of augmenting businesses, piece by piece, as we've done over time, you probably won't have the same level of attractive assets that are out there. What that does to do, and one of the things that we're still discussing is, it causes the balance sheet to generate a ton of cash. And so, one of the things we'll have to think about, if there are things to use the M&A, is how we will productively return that capital to our investors.

Unknown Analyst

Eric, a couple of questions. Relative to this last man standing, is there an end game to this? Where, actually, you will be the last man standing and there's operating leverage that we all want to see in the room. And if there's an end game, can you give us a baseball analogy of what inning you think we're in? And as a follow-on to Jim's question on the M&A activity. If the M&A activity slows down, does that mean that we should expect more organic R&D spending to drive your growth or not?

Scott A. McGregor

Chief Executive Officer, President and Director

So, what inning we are in? I think we are probably hitting sort of a fifth and sixth inning right about now. I think 65-nanometer was probably the first place we tried to dump in much as we could and integrate. Maybe were not as efficient at doing that, with is one of the problems we had in gross margin. I think 28 and 22, or 28 and 20, are going to give an opportunity to leverage IP like you haven't seen before on leading edge products, and that will begin to separate out a lot of people, which will relegate them to the lower half of the markets they compete in, which is not going to be particularly attractive, economically. And the people who are serving the high end of the markets will see that. And by the way, that's part of our experience in the cellular space. Right? By serving the middle, low end of the market, it's much more a challenge, economically, than going after the higher end of the market. I think, if you look at our P&L and you look at those 400 to 600 basis points of -- a lot that's consumed by the cellular business, when that business begins to ramp, even if it went to 0, that adds 400 to 600 basis points to our ROI. I think the average place you have to look, as you look at the infrastructure business, which is probably, in and of itself -- and again, you have to multiply it by about 1/3, is probably running about 8 points below what it should run at when the market's running. All of these things would give us some comfort that there is an opportunity to drive some increased leverage on the operating margin line. I don't think that -- inside the next 24 months, I think that's more -- in the next 24 months, you're going to see more pain in some of the small companies. But I think, once you get past that and it washes out and you have sort of one guy with significant market share and broadband, and you can see the kind of margins that broadband can generate in its business, at 23%, 24%, and you can see what ING can do when it hits sort of its high-end run rate, at 31%, 32%, I think getting to the critical meaningful critical mass side, on the cellular side, in addition to the connectivity side, will benefit our P&L.

Alex Gauna

JMP Securities LLC, Research Division

A question for you, Dr. Samuelli. Alex Guana, JMP Securities. I'm wondering, besides just saying 28-nanometer, with the process nodes coming, are there any particularly fascinating or interesting, or exciting, new capabilities you're getting with the new process nodes? Or maybe even with some of the IP blocks that Eric and Scott had given you to play with, in your sand box, with their acquisitions. And the second question. Is it any bit problematic that your supplier base is consolidating? I mean, you don't have that many foundry partners to work with going forward here, that can keep up with what you want to do.

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Sure, well, you're right. The Foundry business is certainly an interesting one. And I think the good news about 28-nanometer is it'll be around for a while, and it's been discussed, many times, by the previous speakers. Because of the challenges going 20 and beyond in cost, we're going to see a lot of products. I'd say several generations of products probably sticking with 28-nanometer. And it's going to give us a big jump over where we are today. I mean, it's roughly a factor of 2 improvement in density over the 40-nanometer. So you're going to have massive SoCs that Rajiv and Dan are building, and Bob will -- of course he's already moving to 28. So, I think, many years of exciting integration available for us in 28. We'll start, potentially, even looking at moving the connectivity products there, down the road. So you'll have interesting combinations of super-chips that you can develop. So, I don't even think you need to think about 2014 yet. I think 28 will give us a nice sandbox for years to come. And then, in the very high-end products that Rajiv and Dan work on, you'll clearly need to go, as process technology evolves to 20 and 14 with fewer suppliers, as you point out right now you have a reasonably broad base, but the number of suppliers who can do FinFETs, for example, maybe Samsung, Intel, TSMC and maybe a fourth, maybe Global. Who knows? So it's going to reduce our options going forward in the very advanced technologies, but Rajiv will have to do it for the multi-core and for the switches. Dan will do it for the very high-end set-top boxes, and Bob for the very high-end apps processors. And rest products will stay in 28 for a long time.

Unknown Analyst

I guess anybody can answer this question. Maybe even Eric. Who knows? A question about internal designs versus third parties. So, it seems like every few years, OEMs decide to undergo this kind of maybe a fad or insanity where they try to design their own chips and then eventually that doesn't succeed. Is there anything different this time versus the last few times? Apple and Samsung are trying to do that, Huawei's trying to do that. Cisco seemed like they were not doing it, then they were. Now, maybe they're not. And does it present any different challenges this time around because the industry growing smaller, the OEMs are more consolidated. So this is really for anybody.

Scott A. McGregor

Chief Executive Officer, President and Director

Rajiv or Dan or Bob, do you want to jump on that?

Rajiv Ramaswami

Executive Vice President and General Manager of Infrastructure & Networking Group

Okay, I'll take the first crack and Bob you can enhance it. I mean, I think that the guys that are it doing internal silicon, today, are only the big guys. And they're clearly guys who can afford to do it. And, to me, it boils down to whether they can continue to sustain it. They do it for -- why do this? They, fundamentally, do this for 2 reasons. Right? One is because they think they can get sustainable differentiation in the marketplace, versus their competition, that they could not get by buying merchant products. And second is that they may think that they can get cost advantage, which I'm not so sure about whether they actually do get a cost advantage at the end of the day or not. Certainly not clear to me whether that's big enough a reason to do it. I think the dynamics certainly haven't changed. These big guys, I think -- our is more of, they'll continue to invest. And where they -- I think it's going to be mixed. Every one of them is a mixed environment. All right? They're not all [indiscernible] merchant, they're somewhere in the middle, and they're kind of -- that probably keeps changing over time. And I think, fundamentally, for us, it's just a matter of -- we have to continue R&D securing [ph] and we have to continue having the best products in the market. And far as -- our products are significantly better than what they can do internally, and they feel the competitive pressure, they're going to favor our products. If they lose that edge, then they're going to go back to basic.

Robert Americo Rango

Executive Vice President of Mobile & Wireless Group and General Manager of Mobile & Wireless Group

Yes. I mean, the only thing I'll add to it, from a mobile and wireless perspective, is the amount of IP it would take to bring some of these things to market or even beyond the scope of what any of the companies that you mentioned in any vertical aspiration plan that they have. Right? I mean, you need all kinds of wireless technology to build the chip of the future, and I don't see that they have that. So I think, long term, you still require a bigger IP portfolio to deliver these future chips across all the mobile and wireless products that matter.

Scott A. McGregor

Chief Executive Officer, President and Director

I think these guys summed it up pretty well. Eric, what do you think?

Eric K. Brandt

Chief Financial Officer and Executive Vice President

I agree.

Unknown Analyst

Maybe, Scott, one question for you. Just as we look at the next year, I know there's a lot of uncertainty right now. What are you hearing from your customers? Where do you have visibility, right? What parts of the market do you see encouraging for next year? And then one question for Eric. One thing, as I look at the stock price, I know you don't control the stock price, per se. It sort of peaked back 2 years ago, and that's when your margins also peaked. And one concern that we hear from investors is just that there is operating leverage, that they need to see more operating leverage, but that they also see a growing gap between GAAP and non-GAAP, whether it's gross margin or earnings. So, if you can address that issue, that'll be very helpful also.

Scott A. McGregor

Chief Executive Officer, President and Director

So, in terms of the forecast for next year, we all see the analysts' forecast that show low to mid-single-digit forecast for next year. We all read the headlines. There's not a lot of good macroeconomic news. And I think our customers read that too, and so they're cautious about next year. So, in terms of what of our core businesses will grow just because the economy grows, we have a muted view on that. It could do better. We don't know. We're not economists, not that helps to get a better view. But if we were -- but I think that's hard to see. Now, what is good though, and you heard from you guys is that we are going to gain share. We are getting into new markets. We will take share

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from existing guys and we will get into new markets. And that growth will happen, pretty much, no matter what the economy is. So we have both new drivers, new products taking share. And then we also have, on top of that, what can we do based on a little bit of favorable help from the economy. So, it's a mixture of those 2 things. Eric?

Eric K. Brandt

Chief Financial Officer and Executive Vice President

So, we absolutely understand that stock price moves up with growing revenue and growing margins. Right? And certainly growing EPS. And I've made the point, internally, that our P/E is what our P/E is. And if you want more P we need more E. Okay? And it's almost that simple. In terms of your GAAP gap question, which we talk about a lot. There are 2 pieces to this. Right? One is the systemic element of the GAAP gap, which is stock-based compensation. And recall, 4 years ago, I stood in front of you and I said our stock-based compensation was running 14% of revenue, and that our goal was to get it to about 5% of revenue. If you look at where we ended Q3, and you take out the NetLogic effect, which has a step-up impact to stock-based compensation, and I'll come back to acquisitions in a minute, we're actually at about 5.1%, 5.2%. So we are pretty much where we need to be. Now, some people say, well, gee, shouldn't you go lower? But our friends to the south run at 5% of revenue, and that's with a -- whatever it is, a \$4 billion or \$5 billion licensing business. And we think that the model that we produce at 5% is probably the right model. Maybe it'll drift a little bit below that. It really does depend on the growth rate. But it enables us to recruit the kinds of engineers to the kind of things which produce a level of efficiency which is substantially better than what the industry data would predict. The second half of the GAAP gap question you raised relates to M&A and the arcane accounting associated with M&A. And so if I stood here in front of you today and said, we really don't like this step-up accounting, the amortization of intangibles and write-offs. So we're not going to do more acquisitions because the accounting sucks, you guys should sell the stock. Okay? At the end of the day, we have to drive economics, over the long term, to put this company in a position to be the leader it's going to be and to be the last man standing, if you will, in the industry. And there are some arcane aspects to accounting that we can't deal with, one way or the other. And my joke on accounting is, it's the detriment of the doubt. Whatever the worst answer is probably the answer that you're going to get out of accounting. And it is what it is. But our goal, as a management team, is to drive long-term value. And walking away from M&A and using all our cash to buy back our stock, like people have done in the past, does not create value. And building IP, accepting the fact that you might break a few eggs when you make omelet, from the accounting standpoint, on a GAAP basis, it is what it is. Which is why we try to show you the underlying economics. And why, by the way, despite all of that, sitting here today, in a relatively flat year in the industry, and probably down overall flat for com semis, we will have record cash flow from operations.

Scott A. McGregor

Chief Executive Officer, President and Director

That brings us to the end of our Q&A session today. I'd like to thank you all of you for joining us. Please join us for a reception afterwards, and please fill out your evaluation forms, because we value the input, number one. But number two is, you get something cool if you turn it in. And I'll give you a hint, this year you will get to choose between pi and I. So, if you can figure that one out. Look forward to seeing you at the reception. Thank you very much.

Unknown Executive

And that concludes today's analyst day event. Don't forget to turn in your evaluation forms at the registration desk outside the main entrance. Thank you for joining us today.

Broadcom Corp. - Analyst/Investor Day

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