

**“Sterlite Technologies Limited
Conference Call with BofA Securities”**

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Analyst: Good day everyone & thank you for joining us for a call with STL's Head, Access Solutions – Mr Rajesh Gangadhar. On behalf of Bank of America, we thank you for giving us your time. The statements provided by STL are of those & not of BofA Securities & should not contain any confidential or material non-public information & there is no investment advice. Rajesh - please help us understand your role and profile in STL.

Rajesh Gangadhar: Hello everyone, good afternoon, good evening. Great to connect with all of you. I come from a background of telecommunication, I have been at various operators in my career of 20 plus years. I have seen the industry evolve from an analog communication, all the way to CDMA/GSM era, WiMax, LTE and now we have 5G. So I have travelled the entire journey and has always been exciting to be at the forefront of technology, it has never been a dull moment. I think now it is even more exciting because it is not all about connectivity and bandwidth, it is about enabling functions applications and services which previously could not be thought about. At STL my role has been to establish that practice, to bring the whole domain of virtualization, disaggregation and also openness, we will get into that a little bit during the conversation. And every product and solution that can enable our customers who happen to be telecom operators and ISPs globally, who have previously enjoyed the innovation on the fiber side continue to do that even today. But now we are bringing solutions that provide capabilities around the access, the last mile connect or the last 200-300 meter connect. Both on the fixed access which is a FTTX enterprise or consumers as well as for the wireless connectivity. It's incredibly gratifying for me to be in that space and be able to drive that not only for the STL but for the industry and the community as a whole. So look forward to the conversation.

Analyst: When we look at some of the new age telcos like Rakuten or Dish from US, they are not looking for traditional vendors to actually roll out 5G for them, but instead going on to something called as ORAN. So can you explain the thought process behind this by the telcos and more importantly the advantages that ORAN brings which is making these guys think like this?

Rajesh Gangadhar: I think may be the way I want to start with that is what has been the traditional architecture and also the solutions which all of us have experienced for the last 20-30 years. If you look at where the world was 2-3 years ago, it was a single or may be two vendors providing infrastructure end to end. What I mean by that is the base station infrastructure, the core network infrastructure, the radio that goes up on the tower etc. all came from a single vendor. It was not so much proprietary but in a way dependent on a vendor's closed solution even though the standards were defined to keep things consistent and open across all implementation. So if you went with just to pick some names Nokia, Huawei or Ericsson infrastructure you could not mix and match the network elements and that creates a little bit of a challenge for operators to be able to provide a homogenous or consistent performance across the network or across all of the user base that they have, because each vendor will have their own implementation road map, timeline and capabilities that were different from each other which led to inconsistencies in services and applications that were provided. Granted voice was the killer application and of course we have data now mostly streaming, uploads downloads etc. But as we look at 5G and what 5G brings, it is really all about bringing near real time application and services and bring content and user experience which was previously not possible on the hand held and other devices that we carry. So that requires the

agility, the scalability, the flexibility to deploy and manage across segments of subscriber base. Previously most of the subscribers were either enterprise or consumers but now, the entire customer segments are itself expanding. You can think of hospitality, hospitals, industrial automation, these are things that are now going to be connected thorough wireless means and for that each of these segments it has very different applications and use cases and requirement that mandate agility on the network in terms of how you scale and deploy. In all of this there is always a business side of things how much do I invest how one grows the network, where to put the investment first, all that comes with disaggregation and virtualization. Openness then brings the other element where the likes of us at STL can now participate in the domain which was previously difficult because the incumbents were very well entrenched, it was very difficult to penetrate and the barriers to entry were very high. Now with us bringing solutions, we can mix and match with the like of other likeminded solution providers and the operator now has the ability to choose as they would for their network elements from any one of us and if we did not provide a particular solution or meet a specific requirement which they had, they are more than welcome to choose another. That can only happen if you disaggregate software from hardware. Previously these were married and vast majority 98-99% of the networks today for 4G LTE are both hardware and software dependent and so the firmware that drives the hardware is married very closely and integrated tightly. With openness and desegregation and virtualization you separate it, you bring hardware from a certain third party and get the software from us or we could provide the hardware and the software can come from somewhere else. That opens up a completely new marketplace for the operators to now choose the best of breed, and makes us highly competitive and we ourselves have to be on our toes, to innovate and to have the best solutions available. So if you think about it from that perspective now you can relate to why a Rakuten or a Dish would come from that mindset because now they are the new companies and they want to establish themselves with the lowest cost per customer acquisition or a lowest cost per byte that they would want to deploy. At the same time being able to create an infrastructure platform that they can scale for the next 5 years without having to worry about having to invest too much upfront to be able to achieve a certain scale in the future. With Virtualization and disaggregation one can grow the network horizontally or vertically as one may require and also segment the deployment with agility, flexibility and scalability that comes from this architecture. I know it was a long winded answer but I just wanted to set the context, I hope that was helpful.

Analyst: Does ORAN always needs to be a virtualized network or could we have an ORAN which is not virtualized?

Rajesh Gangadhar: May be I will define what ORAN is specifically doing. See virtualization and disaggregation was already happening in some ways because even with the incumbents there were separation of the software and hardware but not on the point that you can switch or mix and match the network elements across the vendor ecosystem. What ORAN is doing is bringing interfaces that is the connectivity elements between various network element so be open and standardized which is if all vendors are implementing an ORAN complied interface it can communicate with each other, so that there is no interoperability challenge. You plug in a radio from say STL and a virtualized previously known as VDU but now in the parlance of open RAN the centralized unit, you can plug into a third party DU and it is almost a self-discovery process because the interfaces are pre-defined

and as long as everybody adheres to a certain principle of implementation things could interoperate with very little testing and validation. That is what ORAN brings to the table. It allows this communication of an STL radio with another party's DU platform or our fixed access network, in our case we are developing a software stack for the FTTX solution, we can talk to a white box solution a hardware platform and those can co-exist and collaborate without having to go through a very deep integration process. That is what ORAN does, it is basically on the wireless side bringing interfaces that are open between elements.

Analyst: Are the standards defined now or are we waiting for somebody like ITU to define all these interfaces?

Rajesh Gangadhar: ORAN has been around for almost three years now, sometime in 2018 it was first established. And since then a lot of credit goes to the operator community, they have lived through this challenge over the technology transformation cycle and they have always been behind pushing vendors to open and being able to communicate and interoperate with each other. They were the real push behind this whole enterprise. While some of the standards have been designed, for example the front haul interface i.e. the radio to the DU communication have been defined. There are several other interfaces that are in the process of being defined. We are in the fore front of it, we are participating and contributing in the forum so we understand the thought process and as we implement these solutions we are adapting those specifications as and when they become available. So it is journey through that specification process. With the right impetus coming from the operators things are moving in the right direction fairly quickly.

Analyst: Looking at some of the comments from incumbent telcos, we are not seeing them jumping on to ORAN. So what are the practical issues which stops these incumbent telcos from committing to ORAN?

Rajesh Gangadhar: There has been a considerable investment that the brownfield operators have made over the years on 2G, 3G and now on 5G. Lot of these operators continue to have operations in the 2G and 3G, some of them are turning off their 3G but are keeping 2G sites on because of the subscriber base they are serving. While they see this new thing that is coming and they see the benefits of this, it's a challenge for them to do a hard switch. It is a journey for some of these guys. If you look at some of the incumbents like Vodafone or Telefonica or Sprint prior to T mobile acquisition it was heavily looking at this. And recently the CTO of AT&T said that they are considering ORAN. So there is a journey for all of them and they are picking and choosing certain segments for their deployments whether it is rural or perhaps new expansion or perhaps a segment of their implementation for example enterprise where they may choose to start this journey of openness where they bring a new entity, vendor or a group of vendors that might bring the solutions. Also it is true that as an operator you don't want to chase after 4 or 5 vendors who are pointing fingers that it is not my problem. But how operators are getting around that is, for somebody like us, we are constantly under pressure to deliver and innovate and be nice to each other because we know that somebody else can replace us just as well. And because it is software, there is no direct dependency on hardware they can swap us out easily. You couldn't do that before, as the operators were stuck with a vendor. In this ecosystem the way things are going to be is there is going to be a team game

it is not going to be a solo performance. Players will develop ecosystems just like we are doing, we just announced an ecosystem for 5G radio. We are partnering with startups and other partners who are enabling this ecosystem. And you see this shall grow as it happens in a marketplace where individual companies that previously thought of themselves as startups will think about openness together rather than as an individual because that works well for everyone. Granted it is still early days. There is still lot of things to be done but that is the journey that we are on and eventually it will benefit the operators on an opex and capex basis.

Analyst: From a timeline perspective is it a 2-3 years or more than that where the operators get a comfort level and decide to deploy ORAN?

Rajesh Gangadhar: I think the journey has already begun. Rakuten with 4 G have started their journey, Dish has announced, they are the new players of course, but then also the announcements from Vodafone for their rural deployments in Africa they have started their journey, Airtel announced with AltioStar for their rural deployment, Vodafone Idea announced with Mavenir. Even six months ago things were not as bright as they are today. So I think it is a very rapid pace at which things are growing. I think 2021 would be the break out year. At STL we are seeing RFIs and RFPs coming from operators where they are asking very pointed questions about maturity and solution set etc. The awareness, the understanding, the deep knowledge that they had from the previous experience is now translating into this whole ecosystem. So I think the mindset change is happening, may be Rakuten just sped the whole thing up. The confidence that everyone else is getting that yes this can work and are using them as a model to take it forward. Dish is another poster child. It is only a matter of one or two successes that this ecosystem will evolve very quickly. So in the next year or two I have a very optimistic view.

Analyst: How should we look at some companies in China, Japan and Korea who already deployed 5G on the traditional system? Is NSA a time they can look to deploying an ORAN? Or they will continue with their traditional vendors?

Rajesh Gangadhar: Those who have committed with the traditional architecture, there is nothing wrong with it, it is a mature technology they all have to accept that it is in no way less effective than an ORAN. What operators will eventually realize is that even those who have already deployed the traditional architecture, as they look to scale and grow they will start to bring in elements of openness in certain elements, whether it is SA or NSA. Openness does not preclude NSA you can still do NSA and you can bring interfaces that may have to be tweaked a little bit to work with traditional architecture and the traditional guy will also have to work with the ORAN compliance solution and that integration may happen at higher layers and at the edge. So what that allows the operator to do is slowly phase in the ORAN solution for certain segments that they have previously not.

Analyst: Rakuten claims there are 30-40% opex and capex savings, but what as per you could be the practical savings when deployed commercially?

Rajesh Gangadhar: There has been several data available in the public domain, which say 40% on capex and 30% on opex. Every operator will perceive a different percentage saving, because the flexibility that the

virtualization and disaggregation brings and the ability to bring the best of class solutions from the vendor ecosystem allows the operator to get the maximum out of the spectrum that they have invested in and we bring that spectral efficiency, improve the user experience, improve the capacity that allows the operator to maximize the efficiency operationally as well as your capex spend. So not all operator might see that 40% but as operators start to look at incrementally investing in 5G they will start to see the ecosystem benefits of virtualization and openness and they will then have their own view of what that improvement is but for 5G if you look at the billions of small cells that have to be deployed worldwide the densification itself which means your spending on a per site basis is unfathomable for them with the current architecture. It is something to be done from a cloud native perspective in order to be able to achieve economies of scale. And that is why this architectural change, this transformation is a necessity. Some of them will choose to do it sooner than later but its an eventuality that all of them will have to address.

Analyst: Shifting focus to India – should we see mix of traditional and ORAN deployment in India or more of ORAN?

Rajesh Gangadhar: Going back to my point about operators having legacy infrastructure- because they will continue to support 2G especially in rural communities. Some of them are refarming their 3G spectrum and using that for LTE, by far the vast majority of LTE deployments are traditional. In fact there is only one network today i.e. Rakuten that is Open RAN or disaggregated and virtual. What you're seeing from the operators is that as they look to 5G, and maybe this is a little bit of a blessing in disguise in India, where spectrum auctions are yet to occur and if so there is some talk now of early next year, what operators are doing is- really now thinking about this in a more serious way because they have the advantage of time, there is no prior commitment. Having said that for urban and very dense deployments where there is scale and massive utilization of the network, we see a mix of the operator choosing the traditional player which is very well tested, they know exactly how it is going to work, and then start to build the ORAN ecosystems for those areas like the tier 2/tier 3 cities- where the networks are not as perhaps congested, or the demand on network is not so high. We will certainly see a transformation towards ORAN as not only the technology matures or the ecosystem matures, but I think by the time the time the Indian operators start to deploy with massive scale, open RAN and ORAN compliance solutions would be at a point of maturity that they could certainly deploy. Certainly we are in conversations with the Indian operators on this and it's a very strong engagement that we have.

Analyst: Jio is talking about made in India 5G. What does this mean?

Rajesh Gangadhar: Certainly Jio has done some investments, they've acquired Radisys in the past, couple of years ago. And also if you look at their current network, their traditional network, it is basically Samsung, for the most part that they've deployed. They have invested in certain capabilities for the virtualization piece, and now they're looking to use that investment as part of their rollout for 5G, that's the natural thing for them to do. But I don't doubt that even with that they would reach out to the other partners in the ecosystem in order to provide the flexibility and the ability to provide for various use cases and applications. So while they are sort of stating that they have their own

solution, they will work with their existing partners and new partners in order to achieve the scale that they will need- I don't doubt that very much.

Analyst: How much more fiber investments does India need to make before 5G rollout?

Rajesh Gangadhar: If you look at where fiberization is, by all accounts only about 25-30% of the towers are fiberized, and there are more and more towers being deployed every day. So in order to achieve the true benefits of 5G or even 4G, because today vast majority of the towers are connected with microwave backhaul, and microwave backhaul works perfectly fine up until maybe 200 Mbps and there are ways to get it almost to 1Gbps, with maybe some additional investment and maybe MIMO architecture for microwave, but there is an opex cost there, you are investing in the microwave links, there is a recurring opex cost. If you bring fiber, over a long run, depending on your tower utilization, density around the towers of users etc., you can justify bringing fiber into those towers- you almost need that for any real time applications, because there is always latency in the non-ideal backhaul as we call it. So there is tremendous scope for fiber rollout, it is absolutely a necessity, not a nice to have. But there is also a challenge now of bringing all of that within a timeframe that you would want to deploy 5G. So I see the operators; leveraging their existing backhaul architecture, whatever that happens to be, and then slowly migrating their backhaul infrastructure to fiber, where it absolutely makes sense- where the returns are justifiable for rolling out fiber. The other advantage with this ORAN or open RAN architecture, you have the flexibility to choose where you want to deploy your CU DU infrastructure. It can be centralized or you can bring the DU to the tower, because there is a latency requirement between the DU and the RU, i.e. the Radio unit that goes on the tower. Now with this backhaul or availability at the site, you can choose to either do it centralized- which means it is part of your IT infrastructure or you can bring the DU back to the tower site. And that flexibility in architecture is actually another advantage of disaggregation and virtualization. Yes fiber has a long way to go in India especially and I see that continuing to grow.

Analyst: When could we see commercial deployment of 5G in India?

Rajesh Gangadhar: Mr. Ambani just announced that by end of next year, he would have 5G, and what I would assume there is, of course there was also an announcement of the spectrum auctions sometime early next year, but even without that, my sense is that some of the 4G spectrum could be leveraged for 5G. If you bring the architecture or build the capability to support 5G in the network then you can actually share the spectrum between 4G and 5G, as you're growing your 5G subscriber base. And there is a concept called dynamic spectrum sharing (DSS), which is already deployed in the Verizon network and AT&T etc. where you don't carve out spectrum separately for 5G, but you have the ability to choose, or rather leverage your 4G for a 5G device as well, and it's a very dynamic approach of being able to serve both 4G and 5G devices, and that allows operators to start 5G service even without having a dedicated 5G spectrum. So that is of course one opportunity for operators to go that way, but ultimately its more about what is the use case that you're going to drive for that application. Because ultimately, it's nice to say that you have 5G, but then what is incrementally the benefit of having 5G- it comes at a cost obviously. So the use case is extremely

important and the application is extremely important. So I think that is what would drive the transformation to 5G even in advance of having a dedicated spectrum for 5G.

Analyst: How is STL positioned in the Indian & ORAN telco space, and what are the likely new opportunities with 5G?

Rajesh Gangadhar: STL for the last couple of years has been on this transformation journey of SDN and NFV. We started our journey about two years ago on the fixed wireline side, where we started to virtualize the last mile access- the FTTX piece, disaggregate and use white box solutions, and we're getting pretty close to commercial with that, and we're seeing a lot of traction in the market for that application as well. What we're doing on the wireless is sort of also happening on the wireline side, where the ecosystem is evolving for disaggregation and virtualization. And then in the last year, year and a half we've started this journey on the wireless side, where now we've fully established programs for the radio unit development, we just recently announced last week establishing an ecosystem for dual and multiband radios for 5G- with open RAN principles, and we're also addressing the small cell market with radios that can be used for enterprise- indoor and outdoor. So, we're getting ready for this journey and we're getting ready for this open RAN adoption, we see that as the opportunities evolve globally, we will have a suite of products and solutions that we will be able to position with our existing customers as well as new ones. One of the things about being in the business for 25-30 years is that we have great connects into tier 1 and tier 2 operators globally- in over 100 countries, 160 operators. And so that credibility and that established relationship really translates to us positioning the access solutions as well for the edge connectivity. We're very enthusiastic and we believe we're at the right place and the right time.

Moderator: Please signal by pressing *1 on your telephone keypad to ask a question.

Investor: Approximately how much would an operator in India be deploying for 5G (on equipment, not spectrum) and how could the cost vary vs 3G and 4G?

Rajesh Gangadhar: Don't have the numbers at the top of mind, but the savings that come from a traditional architecture to an Open RAN/virtualized & disaggregated architecture is re-ability to scale as & when required & create an infrastructure platform.

It's a given that everyone has to move to a cloud infrastructure for scale & that is already happening. Players are already aligning with either Azure or AWS and the cloudification of the radio infrastructure means that the player is extending cloud platforms to support software stack for 5G and even 4G. The incremental costs to be invested in infrastructure for purely wireless now combines with the investments being made for the cloud infrastructure. It just brings servers that are commercially off the shelf and the only investment that comes is a tower lease & the radio hardware that goes upon it. Even the radio has software in it that can be upgraded & can use CICD models that were previously well tested in IT infrastructure. So, this essentially brings an IT based solution towards a telco which was previously not even possible to envision. Operators are now going to run their telco infrastructure almost as if it is an extension of IT infrastructure.

- Investor:** What are some of the issues players like Rakuten are facing in 5G?
- Rajesh Gangadhar:** Not aware of the challenges, but know that they are in the process of transitioning to 5G and they have successfully rolled out their 4G network with a disaggregated & virtualized platform.
- Investor:** What is the role of system integrator keen in 5G? Could this be done in-house by a telco like Jio?
- Rajesh Gangadhar:** The disaggregation & openness brings an ecosystem of partners that have to work together. There is a need for somebody to put it all together & be able to manage end to end. That could certainly be an operator if they have the resources, skill-sets, have an IT team at the back end to bring certain cloud & telco skillsets with a team that can support that.
- From an actual workflow perspective, it is basically managing software related upgrades/changes & management around that – the capacity around the servers, load management on the cloud infrastructure are the things that a well-established operator with IT teams that doing for existing clouds - Jio and some of the other operators are capable of doing this. They may also bring in a 3rd party element like Wipro/Tech Mahindra etc to achieve a scale in a short period of time and to rollout the network on a certain pace that in-house teams may not support. The scale that may be required initially to roll out the infrastructure may decide whether an operator would want to do by themselves or chose a 3rd party.
- Investor:** Like the traditional vendors for equipment being Nokia, Ericsson & Samsung, who could be some of the new hardware and software vendors?
- Rajesh Gangadhar:** It's all in the public domain, in Open RAN ecosystem, there are players like AltioStar, Mavenir, Parallel Wireless and then there are radio partners like KMW, Comba etc. The beauty of openness & disaggregation is that now there is an ecosystem of several vendors that are going to be able to provide a certain niche products for various segments of deployment for operators to mix & match & not worry about having just one operator, this vendor ecosystem is evolving.
- How would STL stay competitive & also remain in the business – that is where innovation comes into play. The speed at which innovation will happen is now going to be at a not seen before pace. At the end of the day, consumers & operators are going to benefit as at the end of the day, they are going to wanting something different. These are more customized solutions to operator needs which was previously not possible as it was a homogenous solution worldwide. Now a European operator may want something different than someone in Asia/US – and it can be customized as most of it is software driven, which is very important aspect in the whole thing. That's how STL would want to be ahead in the game – to innovate at a pace and stay ahead.
- Investor:** In your view, what % of telcos globally could go to using O-RAN in 5 years from now?
- Rajesh Gangadhar:** See the transformation happening in the mindsets of all the technologists in the organizations & do not doubt in any way that that unless something catastrophic happens, there is enough traction in the market that Open RAN is going to be successful.

Even a year ago, there were not enough players to pull this off, now extremely confident that this is going to touch every operator in the world. It may not be 100% but there will be some touchpoint within each operator where certain use cases/applications/services will leverage O-RAN. This is going to become the norm eventually but how quickly it changes is up to the operators. In 5 years, the operators could be seen transforming in one way or another towards a fully virtualized or disaggregated deployment atleast in some segments of 5G deployment.

Investor: What kind of ROI would telcos see on 5G? Which are some of the applications that could pick-up in 5G both on B2B and B2C?

Rajesh Gangadhar: The ecosystem & applications are still evolving. There are applications like AR/VR and connected cars etc, realistically, it is all about bringing content to the edge & network intelligence to edge. Providing the consumer, the facility from various applications/services concurrently and be able to manage that. Most of consumers have become tech savvy are now moving towards cost cutting. Devices are being to watch most of the content - that is where the initial use cases will be around managing network resources efficiently in order to maximize the utilization of the infrastructure. That intelligence comes from software and that is where STL is also developing the RAN intelligent controller – that allows the network to manage radio/network resources in a very efficient manner, based on 10ms or less latency which was never possible previously. Those are the architectural changes that 5G and disaggregation brings which the operators will leverage initially & there will be other applications for industrial automation, connectivity of devices within homes, enterprises, hospitality, hospitals etc. For that a very strong backbone network (backhaul) is needed, some of those will be challenged in India, but in the metros one could see the adoption of some of these things. Operators will have the tools that they need to bring these to consumers in a rapid manner.

Investor: Could India see a SA 5G rollout instead of NSA?

Rajesh Gangadhar: One cannot say no, but also argue that incumbents would want to leverage their existing architecture (a lot of investment has gone into the 4G core). Most likely the initial rollouts will be Non Standalone and they will bring elements of 5G core as required. In US/Europe, Standalone has come into play where one has to address Enterprise use cases (where there are rigid requirements or SLA's for latency & applications etc), then there will be Standalone Core to support that segment of customer base. The advantage is that the infrastructure could be hosted at any one of local or central offices and may have only a pocket of Standalone & rest could be NSA. There has to be a reason for Standalone and there always will be a use case for operators to introduce Standalone (that is what Verizon did in the US where stadium connectivity was one of the prime reason & enterprise solutions). Over a period of 3-4 years, as the network scales, they could bring more elements of Standalone infrastructure into the networks.

Analyst: We appreciate your time & on behalf of Bank of America & everyone who is dialed-in, thank you for your time.