

# MulteFire opens LTE to the enterprise

A conversation with Nanda Menon,  
Director of Corporate Development, Athonet  
By Monica Paolini, Senza Fili

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**In some environments, the enterprise has been using LTE for a long time. But the scope of enterprise LTE deployments has been constrained by the fact that LTE is limited to licensed bands and by the need to work in partnership with a mobile operator.**

**MulteFire changes this. It allows every enterprise across the globe to use LTE in a private network, for enterprise services and IoT applications. I talked to Nanda Menon, Director of Corporate Development at Athonet, about MulteFire's role in expanding LTE to unlicensed bands and the value it brings to enterprises.**

**Monica:** Nanda, Athonet has long worked with LTE in the enterprise, using licensed bands. Why did Athonet decide to work on MulteFire in an unlicensed environment?

**Nanda:** Athonet is unique in the telecom industry because we have developed the only industrial LTE solution that's built by industry for industry. Most LTE solutions for enterprise or private LTE in the marketplace today are by legacy telecom vendors. To serve the enterprise, these vendors have repurposed a kit that was originally designed for the large telecom operators without addressing the needs of the enterprise

Our enterprise focus is what makes us different from our very earliest days. In 2011, our first deployment was for ENEL in Italy, and it was the world's first LTE smart grid – even before commercial LTE networks were launched in Europe. In 2012, we followed this with public safety deployments.

We're also a partner of ENEL, which is one of the largest utilities in Europe, with over EUR 70 billion in revenues. In close collaboration with ENEL over the last seven years, we have designed and built a unique product for the use of industry verticals, rather than purposed for telcos.

Industry verticals want an IT product. They don't have hundreds of telecom engineers who can manage complex CLI-based issues. They want a mobile LTE solution that's simple to manage and deploy. They're used to products like Wi-Fi, and they want an LTE product that is as simple, cheap, affordable, quick to deploy, and simple to deploy. They want an IT product that they're used to.

**Monica:** What do you need to do differently for the enterprise in terms of technologies or solutions? For instance, how did you develop a solution specifically for ENEL or for other enterprises?

**Nanda:** In 2011, ENEL was trying to reduce latency in electricity switching and distribution in their substations, which are spread across the countryside. In a digital utility, SCADA systems need latency in tens of milliseconds in a reliable, predictive, and deterministic way. It can't jitter all over the place. This is impossible to guarantee in a commercial LTE network.

A solution like fiber may work in dense, cosmopolitan areas, or where there is already a fiber footprint. But to cover 40,000 substations across a good-sized country in Europe, it becomes prohibitive.

You need a wireless solution. The macro network from the operator can't give you the required level of reliability and predictability. A Wi-Fi network can't give you the coverage and performance you need. Jitter is too high. You need the reliability and functionality of LTE to prioritize traffic and guarantee that the equipment will work. High latency and jitter may cause service interruptions and spikes across the whole grid system. With an LTE network, you can monitor the grid with millisecond latency and, if there is a fault, the smart grid can isolate faults to protect itself.

**Monica:** How does MulteFire help you as you develop solutions for the enterprise?

**Nanda:** Up until now, one of the biggest challenges that enterprises have faced in deploying a network is that they have to rely on regulators or mobile operators to have access to spectrum. Mobile operators run high-traffic networks, and they may have congestion in the spectrum they have. It can be quite difficult for the enterprise to get spectrum. Even when the mobile operator wants to help, it may simply not be able to do so because it may have coverage or interference issues in the existing network.

Enterprises would like to have a channel they can use to deploy private LTE networks in a predictable way, without having to apply for spectrum each time. For a large, multinational utility that operates in 34 countries across the world and whose core business is not telecom, dealing with 34 regulators, 34 telecom operators in 34 different countries, speaking 34 different languages, is not a practical thing to do.

Solutions like MulteFire can be deployed and work everywhere in the world, in every market, without having to deal with the complexities of negotiations with a different telco and regulator in every jurisdiction.

**Monica:** They still can use the technology and the ecosystem of LTE. MulteFire is not a proprietary solution. That's an advantage.

**Nanda:** The interoperability between different vendors in LTE is quite important. Enterprise Wi-Fi doesn't have the same degree of interoperability.

**Monica:** What about using enterprise Wi-Fi?

**Nanda:** Immediately after we did the project for ENEL on the substations, we covered the Vittorio II power plant, which is one of the largest power plants in Europe. It's a 2000 MW coal-fired power plant spread over 2 km<sup>2</sup>. The plant had a complex radio environment, with a lot of steel around the boiler and the functional areas. There are large domes of stored coal spread across the area, and cargo trains that bring coal to the plant. There is also a lot of movement of metal domes of coal. These cause blockage and disruption of the radio signal. It is a complex area to cover.

They tried Wi-Fi and found that it didn't meet the requirements. You can imagine the number of Wi-Fi access points and amount of cabling needed. It turned out to be quite an expensive project.

We covered the whole plant with one macro base station. It gave us true mobility, and it was able to deal with the changes in radio environments, such as coal domes and trains coming in and out. We also got good coverage inside the boiler room, even though it was one floor beneath the main plant. The superiority of LTE was apparent to everybody.

Of course, when you work in MulteFire, you can't transmit at the same power as on licensed spectrum. The power is lower than in licensed LTE, the same you get with Wi-Fi. But you tend to have three to four times better usable coverage, better throughput, and better reliability than with Wi-Fi. And you have the ability to deal with large numbers of simultaneous users with high bandwidth, particularly when you're using applications that

use video, such as surveillance or thermal imaging.

In mines, there are workers with head cameras, and there are autonomous vehicles and mining machinery. Wi-Fi really wasn't designed to handle all this.

**Monica:** In a MulteFire deployment in an enterprise, you get better coverage and capacity for all sorts of applications, and that includes IoT applications.

**Nanda:** Exactly. Enterprises are also increasingly focusing on security. The security levels in LTE are much higher and very different from Wi-Fi. We very commonly hear of Wi-Fi systems getting hacked, but it's unheard of for LTE networks to be hacked.

As technologists, we can get excited about throughput and all the wonderful things that we can do with LTE. High levels of security may seem to be a basic thing, but they can be a powerful motivator for enterprises to adopt LTE.

**Monica:** What differences do you see in the ability to deploy MulteFire and Wi-Fi across countries?

**Nanda:** The regulatory framework for MulteFire is very similar to that of Wi-Fi. The availability and the ease of deployment of MulteFire in different jurisdictions will be the same as it is for Wi-Fi. To the extent that Wi-Fi is universally available, we don't expect MulteFire to be any different.

**Monica:** MulteFire is easily deployable across geographies. But an enterprise can put a Wi-Fi access point wherever it wants, and it works. LTE is a more complex technology. Is there anything different that the enterprise has to do to deploy MulteFire?

**Nanda:** For MulteFire to succeed, we need to replicate what has been done in Wi-Fi. Enterprises need to be able to put up access points and be done. Over the years, we have focused on making the deployment of LTE in the enterprise simple, with access points that can be simply plugged into an Ethernet connection and connect back to the core network.

That's all the enterprise needs to do. It's exactly like plugging in a Wi-Fi network. From a deployment perspective, enterprises don't need to care whether it's LTE or Wi-Fi. All they need to know is that they have an access point that they need to put up and plug into the Ethernet port. When they've done that, they have a private network.

**Monica:** In a licensed LTE network, you have a core. It's a complex infrastructure that you need behind the access point. How can the enterprise deal with the additional complexity that a MulteFire core brings in?

**Nanda:** It all comes down to the enterprise-focused core network. It is as simple as deploying Wi-Fi. You put your access point up, plug it into your intranet, and it connects back to the core network. The core network is transparent to enterprises. All they see is a little GUI which shows them the users. They click on a button to enable users, and they can

set the priorities and requirements they want for them, for instance in terms of throughput and services.

Enterprises can connect it also to whichever IoT platform they want, whether it's Azure, AWS, a third party, or their own IoT platform – it's all designed to be click-and-deploy and click-to-action. That is a difference between the complexity of a telecom core network and the ease of use we're trying to bring to the enterprise with MulteFire.

**Monica:** What work are you doing with other clients? Are they mostly in developed markets, emerging markets, or both? What differences do you see among them?

**Nanda:** In our early days, many of our deployments, whether in public safety or enterprise, were in developed markets. Subsequently, we saw growing deployments in emerging markets.

The mining sector is one of the verticals in which we have become very active recently, with a number of deployments in mines. We're seeing quite a lot of interest from mines in emerging markets, as well.

Besides the mine itself, there's an opportunity for the mine to serve the surrounding areas, as part of its corporate social responsibility. In many emerging and developing markets, broadband is not available. All of a sudden, you can look at how MulteFire can bring coverage to the unconnected and bridge the digital divide. It opens up the prospect of community-based LTE.

Even in the most deprived environments in the least developed countries, it becomes simple to put up a couple of radios, as you would do in the enterprise, and connect back to a local core or a remote core, using a satellite or any kind of backhaul – or even a stand-alone network, if there is no backhaul.

Many countries, especially developing countries, have spent a lot of money to roll out Wi-Fi to bring in connectivity in remote areas that have no coverage. They found out that Wi-Fi is difficult to roll out in that manner, because it wasn't designed to do that.

LTE, however, was designed to solve exactly this problem. When you take away the cost of spectrum, you make the technology self-deployable. That's really what we are focused on: self-deployable networks. All of a sudden, a small community can, for a couple of thousand dollars, put up a network that can serve an entire community.

You can have a network where Wi-Fi and LTE coexist. LTE can give macro coverage or arterial coverage. Then you can use Wi-Fi and MiFi as capillary networks inside a building, a small town or an impermanent dwelling.

MulteFire can actually accelerate the growth of Wi-Fi. We see these as two complementary technologies in developing markets. One of the great things that Wi-Fi has is that there are lots of Wi-Fi devices and terminals out there.

Wi-Fi has always been acting as a medium for bringing in all of that capillarity, which LTE can backhaul more effectively. The combination of MulteFire and MiFi in the devices is an almost

perfect solution for covering emerging markets.

**Monica:** Absolutely. And, as you said, you can also couple the coverage expansion with enterprise deployments. Once you have the local ecosystem, these communities may have a chance to leapfrog, because they start fresh, compared to some developed markets that may have less efficient legacy solutions.

You mentioned the mining sector. What makes MulteFire particularly attractive to this sector?

**Nanda:** One of the great advantages in the mining sector is that the underground is a private environment without any interference or risk of leakage. You can have full control over who comes in and goes out, what devices people can take in. It is almost like being in a completely licensed environment. That's the beauty of deploying wireless networks underground.

Today there are many LTE applications that we use underground. The challenge always is jurisdictional. In some jurisdictions, you can deploy LTE underground without having to go back to a mobile operator or a regulator. In other jurisdictions, even if you are underground, you need to work with a mobile operator or a regulator. MulteFire allows mines to deploy these networks underground or above ground without the need to coordinate the deployment with a mobile operator or the regulator. Again, they tend to be in quite remote areas, so they have almost a private environment that is free of interference even in the unlicensed bands.

Typical activities in mining are asset tracking, human tracking, and control of autonomous mining machinery. As someone who grew up enjoying fireworks, my favorite application is what is sometimes called LTE blasting, which uses LTE to explode dynamite remotely. You can track assets and people with LTE to make sure that the explosion is in a safe zone. With pre-programmed algorithms or sequences, you can make sure that an area is clear and check the health and safety parameters, before the explosive act.

**Monica:** That is a cool one. It's also interesting, because you combine different applications – for instance, human tracking and asset tracking – and put all that information together. That's an interesting one. Looking at the future, what do you think the timeline for MulteFire in the enterprise is?

**Nanda:** We had the first MulteFire infrastructure solution in 2018. The first radios came out at Mobile World Congress in Barcelona. Other manufacturers also came out with more radios, later in the year.

In the next stage, we will start seeing devices – handsets and CPEs in particular. I strongly believe that Wi-Fi and MulteFire can coexist. We'd like to see CPEs and MiFi devices that harness the strength of MulteFire and Wi-Fi.

At the same time, we're also looking at what's happening in CBRS. That's going to be one of the first deployments of lightly licensed spectrum, which is similar to what we're trying to do in MulteFire.

CBRS is going to generate interest, show the use cases, and widen the interest from the rest of the world. People will ask, "Hey, if this is happening in the US, we want to have it, as well." And that's going to help the ecosystem for MulteFire, as well, because MulteFire, unlike CBRS, works across the globe.

Japan is the first MulteFire market. MulteFire is already available there in the 1.9 GHz band. The combination of CBRS in the US and MulteFire in the 1.9 GHz band in Japan will raise awareness that there is demand from the enterprise in other countries.

This will especially happen in emerging markets and other places where broadband isn't available. People are going to see MulteFire as a technology that can expand coverage. I'm very excited about what the future holds for MulteFire.

## Glossary

<b>AWS</b>	Advanced wireless services
<b>CBRS</b>	Citizen Broadband Radio Services
<b>CLI</b>	Command-line interface
<b>CPE</b>	Customer-premises equipment
<b>GUI</b>	Graphical user interface
<b>IoT</b>	Internet of things
<b>SCADA</b>	Supervisory control and data acquisition

## About MulteFire Alliance



The MulteFire Alliance is an independent, diverse, and international member-driven consortium defining and promoting MulteFire – a cellular-based technology for operating in unlicensed and shared spectrum. The MulteFire Alliance purpose is to support the common interests of members, developers and users in the application of LTE and next generation mobile cellular technology – such as 5G New Radio – in configurations that use only unlicensed or shared radio spectrum. As an open organization, the MulteFire Alliance will collaborate with stakeholders that have an interest in shared unlicensed spectrum. Its goal is to develop technology that will be widely adopted in global standards.

## About Athonet



Athonet was founded with the vision that as mobile broadband became a reality, the explosion in voice and data traffic would require a completely new network paradigm based on a highly distributed software-based network with intelligence everywhere. Athonet provides a next generation wireless platform designed for the demanding wireless needs of AR/VR, Immersive video, Industry 4.0, robotics, smart buildings & cities, smartgrids and utilities, autonomous and connected vehicles and the infinite possibilities of the digital age. Athonet's fully softwarised, fully in-house developed platform includes a 5G SA New Core, a complete 5G-orientated mobile packet core solution (EPC/PC) with Home Subscriber Server (HSS), Home Location Register (HLR), Voice-over-LTE (IMS for VoLTE), LTE Broadcast (eMBMS) and IoTAppConnect and connects to any commercial eNB.

## About Nanda Menon



Nanda is responsible for developing Athonet's strategic partnerships and cloud solutions. He brings over 25 years of direct investing and investment banking experience in the telecoms, media and technology sector at leading institutions covering the Americas, Europe, Africa and Asia. Nanda began his coverage of the mobile sector in 1994 at Jardine Fleming (now JP Morgan) at the sector's inception in Asia. From 2000, he was responsible for the global telecoms, media and technology investment portfolios at Nomura International plc and Satellite Asset Management based out of London and New York. He subsequently joined Investec Bank plc as a Director in the investment banking team in London before joining Athonet. Nanda qualified as an ACA (England and Wales) at Arthur Andersen in London and holds a M.Eng in Mechanical Engineering from Kings College London.

## About Senza Fili



Senza Fili provides advisory support on wireless technologies and services. At Senza Fili we have in-depth expertise in financial modeling, market forecasts and research, strategy, business plan support, and due diligence. Our client base is international and spans the entire value chain: clients include wireline, fixed wireless, and mobile operators, enterprises and other vertical players, vendors, system integrators, investors, regulators, and industry associations. We provide a bridge between technologies and services, helping our clients assess established and emerging technologies, use these technologies to support new or existing services, and build solid, profitable business models. Independent advice, a strong quantitative orientation, and an international perspective are the hallmarks of our work. For additional information, visit [www.senzafili.com](http://www.senzafili.com).

## About Monica Paolini



Monica Paolini, PhD, founded Senza Fili in 2003. She is an expert in wireless technologies and has helped clients worldwide to understand technology and customer requirements, evaluate business plan opportunities, market their services and products, and estimate the market size and revenue opportunity of new and established wireless technologies. She frequently gives presentations at conferences, and she has written many reports and articles on wireless technologies and services. She has a PhD in cognitive science from the University of California, San Diego (US), an MBA from the University of Oxford (UK), and a BA/MA in philosophy from the University of Bologna (Italy).

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