Jio Is Changing the India Mobile Market

Samsung partners with Jio to change the LTE landscape in India

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ABOUT THE AUTHOR

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Daryl covers the wireless infrastructure space at Ovum, with a primary focus on market activities as they apply to the radio access network (RAN). RAN coverage includes macro-, micro-, and picocell solutions for CDMA EVDO, HSPA/HSPA+, LTE (TDD and FDD), and LTE-Advanced. Daryl's research includes not only what infrastructure vendors are developing, but how mobile operators are deploying and using these wireless networking solutions. Daryl also leads Ovum's Next Generation Infrastructure team. That team covers all access technologies, fixed and mobile, along with operator trends with network transformation around NFV and SDN.

As an industry analyst, Daryl has been involved in such projects as helping technology vendors develop use cases for new products and services, identifying new technology trends, and providing market sizing and market share support. He regularly speaks at industry and vendor events on trends impacting the wireless infrastructure market. He is also sought out by trade publications to comment on mergers and acquisitions, new product announcements, and market developments as they relate to his coverage area.

Summary

In brief

Reliance Jio Infocomm Ltd ("Jio") has built one of the largest mobile networks in the world in India. In the process, it has changed the nature of mobile services in India. With its consumer-centric pricing and services, it has quickly gained the largest share of LTE users in India and has forced its competitors to rethink how they price their own data services. Samsung, as a key provider of network infrastructure for Jio, played a significant role in the successful rollout of the operator's network.

Ovum view

- **Jio has changed the nature of mobile services in India.** With its customer-friendly pricing and services, Jio has shown that India can be a major market for mobile broadband services.
- **Jio's success can be attributed to several factors.** Those factors include its ecosystem approach, spectrum holdings, services and marketing, device availability, and building out a large nationwide network instead of initially rolling out its LTE networks in limited markets as the other operators did.
- **Samsung has been an important partner to Jio.** The vendor was the key provider of Jio's network infrastructure, and the close relationship between the two companies helped Jio to quickly roll out a nationwide network and to ensure availability of devices that will support the operator's services and performance requirements.

Recommendations for service providers

Jio provides a template for operators when it comes to rolling out LTE and even eventually 5G. The operator's aggressiveness with building its network and creating services has led it to a market-leading position in India in terms of LTE.

Selecting a good network partner and sharing a common vision for the development of the network and services is critically important to success, as evidenced in Jio's relationship with Samsung. Mobile operators need to make sure their network supplier partner can deliver the right mix of gear and support services.

State of LTE in India

India lags the region in LTE uptake

LTE has been commercially available in India since 2012, but it has struggled to gain users, especially when compared to the success LTE has had in other countries in the Asia-Pacific region. For Indian mobile operators, voice revenues remain the number one source of revenues, and operators have had a difficult time in transitioning to more data-centric business models. As of 2Q16, Ovum estimated that nonvoice revenues were approximately 30% of total mobile service revenues in India. At the end of 2015, 3G subscribers were still less than 18% of the total market, while LTE was less than 1%.

China offers an interesting study in contrast in terms of LTE adoption. Commercial availability of LTE came a year later in China than in India, but Chinese operators were still able to achieve 800,000 subscribers by the end of 2013. Indian mobile operators did not reach that level until 2015. Table 1 shows LTE subscriptions for India, other Asia-Pacific countries, and the region as a whole for 2012–16 (estimate).

Table 1: LTE subscriptions, 2012–16					
Country	2012	2013	2014	2015	2016 (estimate)
India	15,000	106,911	263,312	1,557,805	73,013,442
China	0	800,000	98,318,730	414,898,000	762,828,988
Indonesia	0	0	903,000	8,990,000	42,302,250
Japan	13,186,000	39,022,400	64,789,201	82,749,785	97,381,099
Malaysia	0	606,000	2,193,800	7,020,000	11,735,623
South Korea	15,811,360	28,449,437	35,994,000	41,691,000	46,543,695
All of Asia-Pacific	32,131,187	80,953,856	229,882,101	608,956,667	1,131,014,242
Source: Ovum					

Figure 1 below shows LTE subscriptions as a percent of population. Other than Japan and South Korea, all the other countries shown in the figure were roughly in the same place as India at the close of 2013. Since then, however, each country has moved well past India in terms of LTE penetration rates.

Figure 1: LTE subscription population penetration, 2012–16
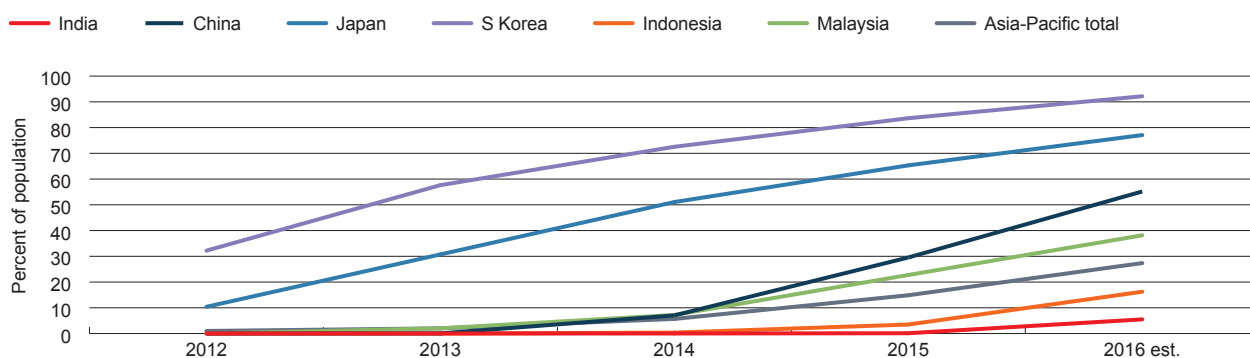
Jio's LTE launch

Jio makes a big investment with LTE

Jio commenced its LTE services in September 2016. As a new market entrant, Jio did not previously operate a 2G or 3G network. Its LTE network is a greenfield deployment. Jio has invested more than INR1,700bn ($25bn) in developing a pan-India communications network and has committed to invest more than INR2,500bn in the Digital India initiative. It has 1108MHz of spectrum across the 2.3GHz (TDD), 1800MHz (FDD), and 800MHz (FDD) bands. The network covers more than 18,000 cities and 200,000 villages. Population coverage is estimated at 75%. In addition to a ubiquitous cellular network, Jio plans to deploy 1,000,000 Wi-Fi hotspots across India in 2017.

Jio only has an LTE network, so one of the defining characteristics of its service is VoLTE. Jio does not charge for voice service. Usage of voice does not count against the data service package. To help seed the market for service subscribers, Jio worked with several smartphone vendors, including Samsung, to bundle Jio's SIM cards with the vendors' devices.

Jio's market strategy

Jio's marketing strategy is based on five pillars:

- **Having the best broadband network** – This includes having a high-speed, all-IP network with broad national coverage and substantial network capacity based on spectrum holdings. To augment the LTE network, Jio has deployed Wi-Fi hotspots.
- **Affordable 4G smartphone and wireless IP devices** – Under the company's LYF brand, Jio has introduced LTE smartphones with prices starting at around $45. The company also sells an LTE router for around $30.
- **Compelling applications and content** – Jio offers its subscribers an application library and content consisting of chat and OTT (over-the-top) voice apps, digital wallet, music, OTT TV, and cloud storage. Content includes a library of 6,000 HD movies, 60,000 music videos, and more than 10 million songs. Jio's OTT TV service offers access to more than 300 live TV channels, of which 40 are high definition (HD).
- **Superior customer service** – For its initial launch, Jio created a sign-up process that reduces customer onboarding time to a few minutes. Jio rolled out an electronic know-your-customer (eKYC) solution, a paperless way to fulfill KYC requirements, in more than 200,000 outlets across India. For customers looking to sign up directly on a phone, there is an app called MyJio, which can also be used to check service balances and to pay for service. Compared to existing industry practice usually taking a few days to activate a new line subscription, this is a significant improvement.

- **Affordable and simple tariffs** – As discussed earlier, Jio charges only for data, while voice services are free. Data services have been made far more affordable with proposed rates at a substantial discount to prevailing industry tariffs. Jio has also simplified tariff plans and made them customer friendly.

Market impact

Jio has had an immediate impact on the Indian LTE market. Within the first month of operations, it was already the number one LTE operator based on number of subscriptions. At the end of September 2016, Ovum estimated there were 27,491,203 LTE subscriptions in India, of which 16,000,000 were attached to Jio. And, while Ovum does not have full market data for the months since September, we do know that Jio has continued to grow. As of mid-February 2017, the operator has reached the 100-million-subscriber mark.

Figure 2: Jio LTE market share at end of September 2016

LTE market share, September 2016

Rest of India mobile operators 42%

Reliance Jio 58%
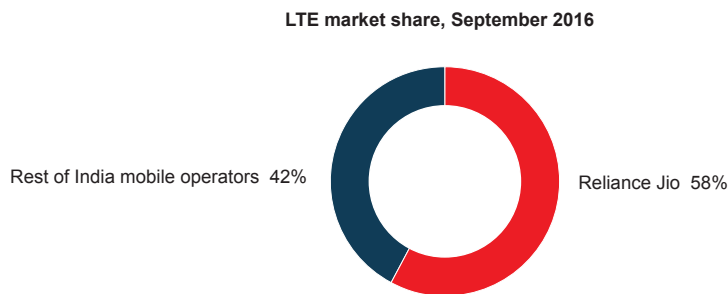
Source: Ovum

Jio's support for VoLTE has changed the Indian device market as well. Samsung estimated the device types supporting VoLTE in India went from 30 at the end of 2015 to approximately 250 at the end of October 2016.

Keys to success

In Ovum's view, Jio's early success is due to several factors. The first of those factors has been the Indian government increasing the amount of available LTE spectrum to enable a broader government strategy called "Digital India."

The key success factors for Jio related directly back to its strategy. Those factors are its network investment, especially having a pan-India footprint. Other India LTE providers rolled out their networks much more slowly, turning up services city by city instead of on a nationwide basis like Jio. Other factors that have helped Jio's success are low-cost devices, simple low-cost service plans, and offering service for free initially. This last factor enabled Jio to educate consumers about the LTE experience and draw them in.

The key factor to Jio's early success has been its close relationship with Samsung Networks. As Jio highlights in the interview below, working with a single "champion" allowed it to move quickly and build one of the largest LTE networks in the world. Jio also felt the two companies had a unified vision for creating an all-data network. Another important contribution from Samsung toward Jio's LTE goals was supplying data-centric solutions such as SON, VoLTE, and traffic optimization.

INTERVIEW WITH MR. JYOTINDRA THACKER, PRESIDENT OF JIO

Thank you for taking the time to answer these questions*, and congratulations on Jio's successful LTE launch.

With large network rollouts like yours, it isn't uncommon for the operator to use multiple vendors, but in your case, you went with a single end-to-end vendor – Samsung. Why did your company take this approach and what were the advantages versus using multiple vendors?
We believed that a solid strategic partner would be one of the key factors for Jio's success. We wanted to become a game-changer in terms of the transition from 2G to 4G in India, and we needed a single championing partner to jointly satisfy Jio's plan and vision. The single-vendor policy led us to successfully carry out the world's largest end-to-end, all-IP LTE greenfield project in a relatively short time.

It was also a means to protect our huge investment to make processes simple and unified and [to build the] network quickly, since it was a "nationwide" service launch from the very beginning, not a fractional, city-by-city [build]. We are a newcomer in this field and yet, had to be well equipped (compared to our competitors).

In many ways, Samsung perfectly fits our strategy and enables us to face the challenges together. Samsung's focus on data-centric solution[s] in dense markets was a key trait in terms of being aligned with Jio's strategy. The most valuable aspect we have seen from Samsung, which differed from other vendors, was that Samsung appeared ready to be a "fully dedicated partner" to Jio.

Also, specifically, what did Samsung supply (base stations, backhaul, EPC, IMS/VoLTE, other network elements)?
Samsung has provided and deployed more than a million cells, indoor/outdoor small cells, core solutions (EPC/MME/SAE), LTE broadcast systems (eMBMS), and SON-based analyzers and optimizers.

However, we felt the most critical support from Samsung was their proven and unique data-centric solutions, such as the SON-based Smart Scheduler, VoMA (VoLTE Management Analyzer), and Cognitive Traffic [Monitoring and] Optimizer (data traffic congestion controller). Our winning strategy [was to provide] the best HD calls (VoLTE) and superior user experience of mobile data from the first day of service.

What type of service support did Samsung supply, such as network planning, network installation, network training, network monitoring, and network maintenance?
As a strategic partner, Samsung set no boundaries in terms of supporting our success, which was something we were looking for from a partner, not just a vendor. They worked with us at each step – whole network planning, spectrum acquisition, site/RF validation, network expansion, interference analytics, optimization, maintenance – and more. I believe that Samsung has successfully proven their capability [in providing] end-to-end professional services and unique tools for data traffic balancing and optimization to assure the best quality for [an] enriched user experience.

Samsung also suggested conducting intensive interoperability tests using Samsung's smartphones and networks before [rolling out the service to a wide user base]. I am sure this rose to the surface only because it was Samsung, which boasts an end-to-end capability. India [has] an open market policy for devices, meaning device validation testing for quality assurance was of utmost importance for us.

Note: This interview has been edited for clarity and brevity.

Why do you think Jio has been so successful in attracting LTE subscribers?

It's simple and clear. We offer "**innovation**," and we introduced several firsts in India. We wanted to offer subscribers unbeatable service quality in areas such as crystal-clear voice and mobile entertainment that was not seen in India prior to Jio's launch.

- Championing [our] vision of a market paradigm shift from 2G voice to 4G data.
- Service innovation
  - Free voice service, HD voice quality (crystal-clear voice through VoLTE), fewer call drops.
  - Compelling mobile applications (multimedia content: 300 live TV channels, 6,000 movies, 60,000 music videos, 10 million songs). There are 10–50 million downloads for the eight media apps [that provide] rich-quality content.
  - Lowest data access rates, affordable devices.
- Process innovation
  - Instant digital activation in just a few minutes as opposed to industry practices.
- Network innovation
  - All-IP network, data-strong, and only 4G LTE, [to offer] the best quality and the highest capacity.
  - Future-ready to embrace all new services (augmented reality, virtual reality, artificial intelligence), easier upgrade to next-generation networks of 5G, 6G, and beyond.

What are the next steps for Jio in terms of new services and network upgrades?

Jio opened a new era of LTE in India and changed the service paradigm. The next step is to continue showing initiative with unconventional new technologies for enhanced user experience, mainly faster speeds and new, IoT-based services. With multiple carrier aggregation, Massive MIMO, and more, we will make gradual steps toward gigabit speed.

Does Jio have plans to expand its service offering to include fixed wireless access? If so, is Jio thinking of doing that with LTE or will you wait for 5G? What is the time frame to offer fixed wireless access?

Backhaul capacity is critical for exponential growth in data consumption. Jio has already created more than 300,000 circuit kilometers of fiber, and we will extend FTTH to the top 100 cities for gigabit fixed service. Simultaneously, we are investigating and studying the ways to use 5G FWA in selected metropolitan areas with Samsung.

How have Jio's competitors responded to Jio's LTE launch?

Jio's [market] entry is acting as an engine that generates positive changes for India. To catch up with Jio's service, incumbent operators are announcing new plans, including lowering tariffs, offering free voice/VoLTE, and accelerating LTE rollouts. It must be noted that Indian citizens, not Jio, will benefit from competition in the market.

What was the motivation or reason that Reliance decided to enter into the mobile telecom business? It is a totally different business from Reliance's usual focus on heavy industry.
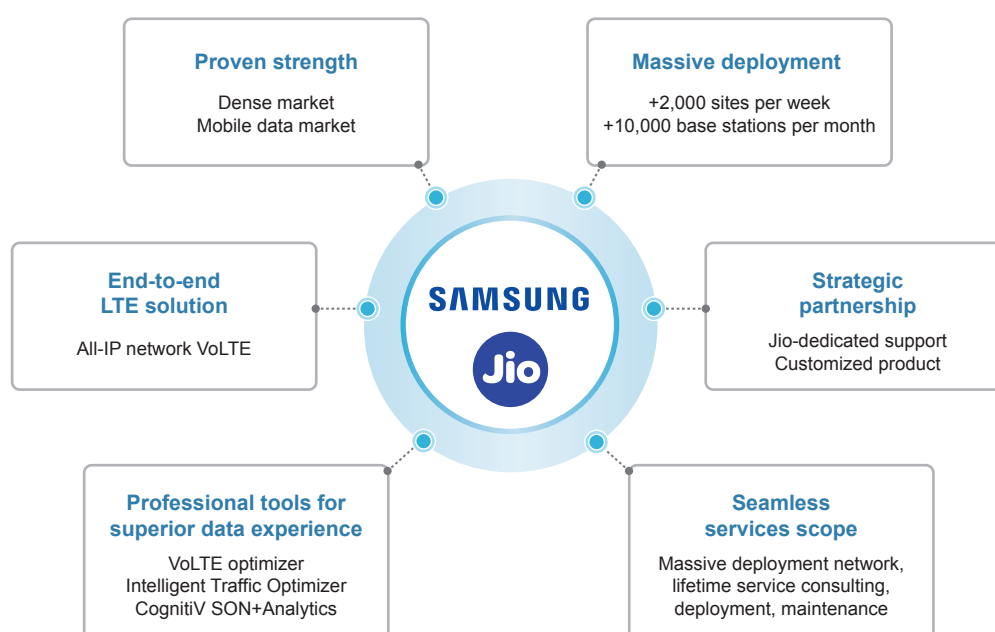
"Jio" means to live and to be alive. We are going through a Digital Revolution, where "data" is the digital oxygen for digital life. Jio will demonstrate the power of data and provide access to each and every Indian so they can fulfill their dreams and collectively enable India to take the initiative in global digital leadership. Currently, India is ranked 155th among 230 countries for mobile broadband internet access. The idea of transforming India into a digitally empowered society has motivated Reliance Group to invest in this new domain of business, and the launch of Jio will transform the lives of the entire Indian population so that they receive every opportunity afforded by the digital life.

SAMSUNG'S CONTRIBUTION TO JIO'S SUCCESSFUL LTE LAUNCH

Note: The following section was written by Samsung.

Samsung's primary focus so far has been on markets with high LTE penetration, with special attention to mobile data-centric projects. Owing to the already verified mobile networks solutions and data service-strong advantages that were applied in LTE commercialized markets such as the US, Korea, Japan, and the UK, Samsung has made a successful entry into one of the largest emerging markets, India. Through collaborating with Reliance Group, which is just starting in the telecommunications business, Samsung has successfully enabled a paradigm shift of the Indian telecommunications service market by transforming it into a 4G LTE data-centric one, away from its 2G voice-centric legacy.

Figure 3: Elements of Samsung's support for Jio's LTE network launch

Proven strength
Dense market
Mobile data market

Massive deployment
+2,000 sites per week
+10,000 base stations per month

**End-to-end
LTE solution**
All-IP network VoLTE

**Strategic
partnership**
Jio-dedicated support
Customized product

**Professional tools for
superior data experience**
VoLTE optimizer
Intelligent Traffic Optimizer
CognitiV SON+Analytics

**Seamless
services scope**
Massive deployment network,
lifetime service consulting,
deployment, maintenance

Source: Samsung

Samsung's end-to-end solution

Samsung's all-IP network solutions include more than just LTE access and network core. They include data services as well as VoLTE and LTE broadcast (eMBMS).

As a strategic partner, Samsung has been actively engaged in Jio's LTE service launch from step one. Areas of service that were covered under the name "Network Life Cycle Service" include the establishment of frequency strategies, network and cell planning, site-acquisition support, nationwide network deployment, and network optimization in more than 22 circles in India, as well as network quality control and maintenance.

Conducting device interoperability testing was a necessity. Testing ensured that devices being distributed in the market were compatible with Jio's LTE network and in alignment with India's open market policy

for devices. Therefore, with Samsung's strength in the device business as a foundation, large-scale interoperability testing was undertaken that involved end-user conformance testing and new application testing, and service quality testing was conducted using hundreds of different devices prior to the LTE service going live. This test played a major part in the smooth and stable operation of new smartphone applications and HD voice and video (VoLTE) service, which was being launched in the Indian market for the first time.

All-IP network solution
Samsung has provided all-IP–based LTE solutions from LTE RAN (macro, small cell) across 800MHz, 1800MHz, and 2300MHz frequencies; LTE core (EPC, gateways); VoLTE solutions; LTE broadcast solutions (eMBMS); SON-based analytics and optimizers; and further.

Massive two-year deployment
Samsung has deployed more than 1 million cells for nationwide coverage, 22 circles in all, in a short time frame. More than 2,000 sites per week were deployed, and more than 10,000 base stations were successfully deployed on a monthly basis.

Massive device interoperability test
Samsung provides end-user conformance testing to ensure interoperability between devices and networks. To find the golden parameter for best performance, service testing is provided to measure and optimize quality and coverage. Further, application testing is also provided to identify the extent to which smartphone applications affect network and device performance.

Professional services for superior user experience in mobile data service
Utilizing a large volume of FDD and TDD spectrum (850/1800/2300MHz) to enable seamless indoor/outdoor coverage, Samsung has come up with a range of professional services for Jio. These professional tools can monitor and optimize mobile data service, and this has contributed to providing Jio subscribers with a stable and improved perceived user experience.
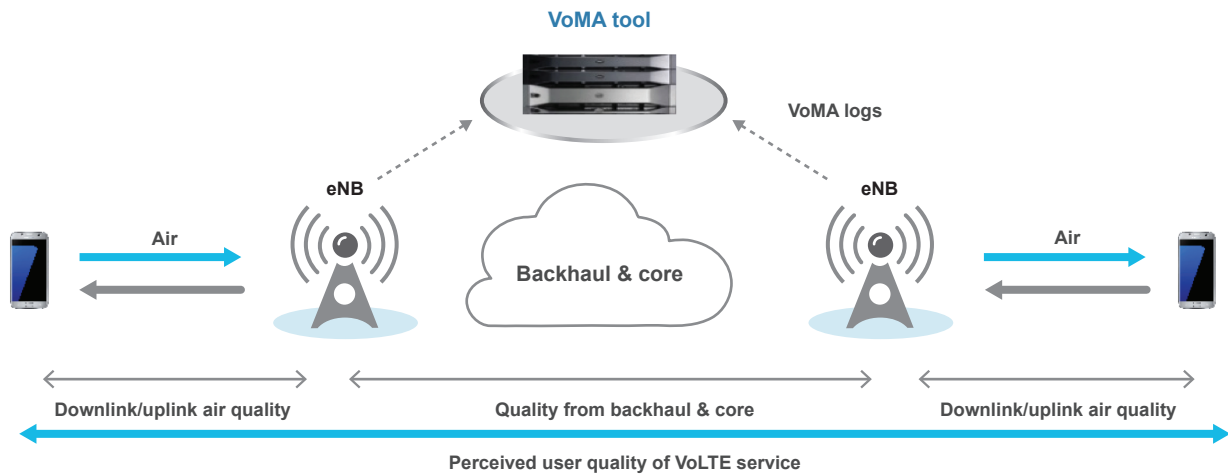
Seamless services through Network Life Cycle as strategic partner
The seamless service provided by Samsung covers network design and build, commercial service, quality control, and maintenance. This service comprises consulting service (network architecture design including backhaul analysis, frequency planning, network and RF planning), deployment service (site acquisition/cell planning, installation, RF optimization), and lastly, professional service for user-experience quality and maintenance (VoLTE quality monitoring; network traffic control; big data analytics, called CognitiV SON; and quality assurance).

Samsung VoLTE Quality Monitoring and Analysis (VOMA)
VoMA is Samsung's commercially proven solution that automatically monitors and analyzes end users' VoLTE service quality (HD calls and videos) over the air and backhaul, 24/7. Among all points of the entire network, ranging from device uplink to backhaul, core, and downlink quality, the solution can identify where problems such as voice-muting occur. This is one of Samsung's biggest strengths, setting the solution apart from previous conventional solutions. Furthermore, VoMA automatically analyzes MOS (mean opinion score), root cause, muting, jitter, and packet loss to periodically process automatic analysis reports. Contrary to what used to happen with circuit-based voice-quality checks, the solution is cost-effective, because it does not require particular tests or expensive hardware.

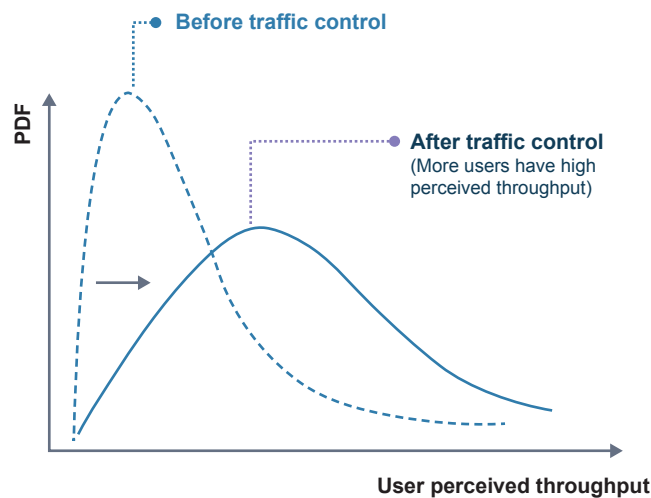Figure 4: Samsung VoMA solution: end-to-end VoLTE quality

VoMA tool

VoMA logs

eNB   Backhaul & core   eNB

Air   Air

Downlink/uplink air quality   Quality from backhaul & core   Downlink/uplink air quality

Perceived user quality of VoLTE service

Source: Samsung

Samsung Cognitive Traffic Monitoring and Optimizer (CTMO)

Along with the increase in the demand for mobile video/TV service, the LTE network's responsibility in handling data traffic is also increasing at a rapid speed. Given high usage, the significance of solutions that are able to provide users with the most satisfying perceived user experience by making the most effective use of the already established LTE network infrastructure is growing. Samsung's CTMO can be seen as the most suitable solution for this because it improves perceived user experience by automatically and speedily detecting traffic congestion at a cell unit and also automatically controlling each user's traffic. For instance, it can distinguish the small group of heavy users and control their traffic by analyzing each user's congestion level to control the speed rate and scheduling priority. Consequently, normal users are able to receive a satisfying perceived user experience.

Figure 5: Impact of Samsung's CTMO on end-user experience

● **Before traffic control**

PDF

After traffic control
(More users have high
perceived throughput)

User perceived throughput

Source: Samsung

Samsung Smart CognitiV SON (Self-Optimizing Networks) and CognitiV Analytics
CognitiV Analytics collects and analyzes the entire LTE network's information, including network performance, coverage and RF quality (user device location based), and service quality (KPI), with big data analysis at its root. Samsung CognitiV SON allows the LTE network to produce performance that is automatically optimized based on big data provided by its connection with CognitiV Analytics. It regularly detects cell outages and any deterioration in coverage and capacity. The solution performs optimization by adjusting antenna tilting and power automatically, based on each user's RF and location information, which is collected from big data analysis. It can regularly detect coverage holes and areas of busier traffic. Furthermore, it can also make new cell-site recommendations for small cells so that operators can easily predict where new sites or capacity will be required. This information is displayed through a graphic user interface. CognitiV SON is a cost-effective solution that allows Samsung to adopt a blade server platform and scalable software architecture.

APPENDIX
Methodology
The information in this report comes from both primary and secondary sources. Primary sources include direct discussion with Samsung and the operator profiled in this report. Secondary sources include previously published Ovum research and industry publications.