



White Paper

LTE Deployment Strategies: Network Overlay vs. Single RAN



Prepared by

Berge Ayvazian
Senior Consultant, *Heavy Reading*
www.heavyreading.com
ayvazian@heavyreading.com
(508) 416-1142 direct
(617) 803-6643 mobile



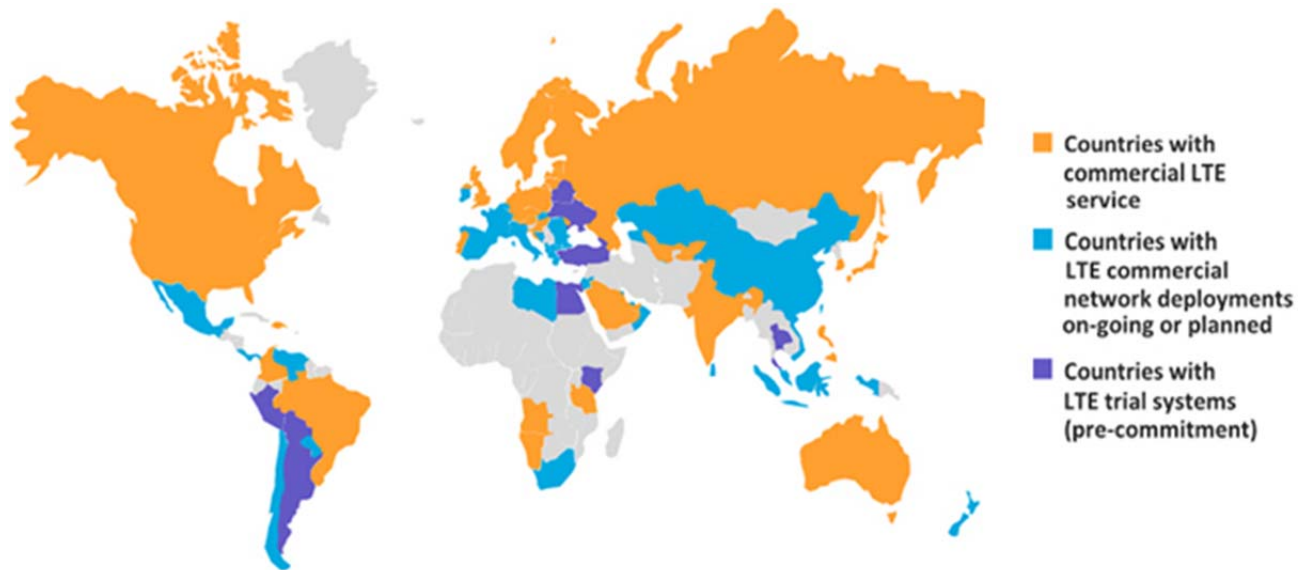
tech.ubm.com

February 2013

Executive Summary

The pace of LTE network deployment is accelerating, as mobile operators are investing to keep pace with competition and with dramatic growth in mobile data traffic. A recent GSA report indicates that 97 LTE networks were commercially launched during 2012, and 234 new LTE networks will be launched in 83 countries by the end of 2013 (see **Figure 1**).

Figure 1: LTE Deployment Plans & Strategies (2012-2015)



Source: Global mobile Suppliers Association (GSA) 2012

This *Heavy Reading* white paper examines the tradeoffs mobile operators are considering in choosing between two primary LTE deployment strategies. The assessment of LTE network deployment strategies is based on an objective analysis of actual scenarios being faced by operators.

A few major operators have opted for a **single RAN** deployment strategy, which involves the deployment of new multi-standard base stations, some with multi-mode radios, as a common platform to add LTE while converging multiple generations of wireless networks. Single RAN offers advantages such as lower power consumption and smaller cell-site footprint, but a complete modernization while introducing a new technology can be slow, costly and potentially disruptive to subscribers.

That is why many operators have adopted an alternative **LTE network overlay** strategy, deploying LTE base stations without a simultaneous 2G/3G upgrade. Among these are the most successful operators in terms of LTE subscribers, such as Verizon Wireless in the U.S., NTT Docomo in Japan or SK Telecom in South Korea. In their cases, LTE overlay has offered shorter time to market and lower capital investment, while minimizing the disruption in their stable and well-loaded 2G and 3G networks. Such an LTE overlay strategy does not exclude modernizing and integrating later 2G and 3G into the LTE system, because most LTE networks deployed are based on multi-standard platforms.

Drivers of LTE Network Deployment

Mobile broadband (MBB) demand is at an all-time high, with some operators reporting a doubling of data traffic in each of the last five years. As indicated in **Figure 2**, with falling prices and increasing adoption of sophisticated smartphones and tablet devices, more and more people are relying on MBB as their primary means for Internet access, content, applications, communications and messaging. In particular, video streaming, content downloading, gaming and other high-bandwidth, data-intensive multimedia applications are accelerating mobile data traffic growth. We are reaching a point of network saturation as more smart devices are penetrating the market, enabling users to satiate their hunger for advanced services and applications. As such, we expect mobile data traffic to grow 30-fold over the next few years and 100-fold over the next 10 years.

Figure 2: Drivers of LTE Network Deployment Strategy

USER BEHAVIOR	DEVICE ADOPTION	CONTENT AND APPS
MBB as primary means of Internet access anywhere	Sophisticated devices; smartphones & tablets	Multimedia applications, messaging & communications
Always connected to social networks	Mobile device cost dropping aggressively	Video streaming, content downloading and gaming
Speed to market: attract & retain subscribers with best user experience	Internet of Things, M2M applications and connected automobiles	Efficient and rapid network rollout needed in high-traffic areas and lower data cost
Increased use of mobile commerce & transactions	MBB-enabled consumer electronics	Mobile operators need to increase ARPU

Source: Heavy Reading, 2013

Based on these drivers, leading operators are testing various means to stimulate MBB adoption, extend MBB to more devices and family members and increase customer ARPU and revenue from new services. Even so, operators in mature markets are still seeing revenue grow less than half as fast as mobile data traffic, even as they invest heavily in advanced infrastructure. This creates enormous pressure to deploy more efficient network technologies that can deliver increased mobile data capacity at a lower cost per bit so operators can remain profitable.

Currently there is a rapid increase in LTE network trials and commercial launches worldwide. But some operators have taken a cautious approach to LTE deployment and marketing. This may be due to their negative experiences with initial UMTS deployments, which were characterized by low consumer demand and an immature ecosystem (expensive, power-hungry devices and complex, unstable networks). Despite the current ramping demand for mobile data services and LTE being significantly more mature than UMTS at that stage, in these cautious markets higher LTE smartphone and service prices and limited coverage have resulted in slower LTE subscription uptake to date. Many operators are selectively phasing in LTE networks to address rapid data traffic growth in urban "hot zones." In Nordic countries such as Finland, Sweden and Denmark, where operators were among the first to deploy LTE, we have seen minimal LTE service adoption to date. Other operators in countries such as Germany are initially focusing LTE deployments to meet license obligations and deliver essential MBB services in rural/remote areas.

In other countries, competitive and market forces have combined to accelerate deployment, aggressive marketing and adoption of 4G LTE. **Figure 3** shows the leading operators and competitors in the top three countries based on LTE subscriptions at year end 2012. In mature markets such as Japan, South Korea and the U.S., LTE has emerged as the basis for handling the explosion of MBB traffic, achieving competitive differentiation to gain market share and adopting new services to increase ARPU. In these countries, leading operators have been pressured by customer demand, competition and rapid data traffic growth to rapidly deploy LTE as an overlay on existing 3G HSPA and CDMA/EVDO networks. Once the first operator in one of these markets begins marketing LTE services and devices, competitors are forced to follow suit primarily to keep pace and avoid losing subscribers. For the leading operators, speed to market and efficient rapid network rollout are the primary drivers of their LTE deployment strategy. This has resulted in a race to nationwide LTE deployment, aggressive 4G service marketing and rapid growth in LTE subscriptions in these countries through year end 2012.

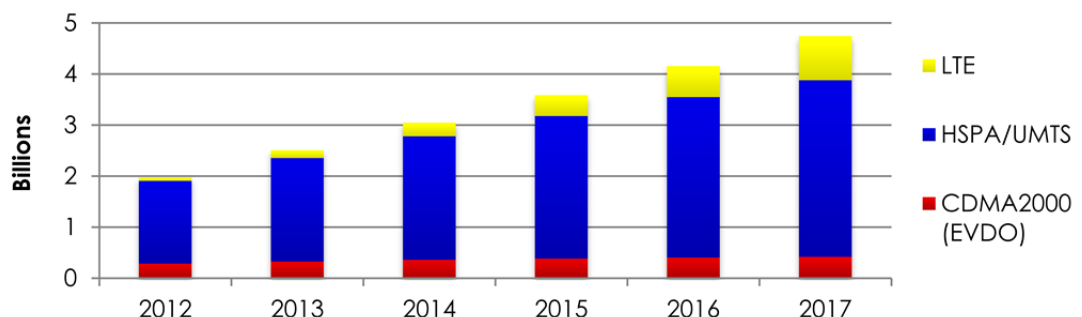
Figure 3: LTE Subscriptions by Leading Operators in Top Three Countries

COUNTRY	LTE SUBSCRIPTIONS YEAR END 2012	LEADING LTE OPERATORS	LTE COMPETITORS
U.S.	33.3 million	Verizon Wireless	AT&T, Sprint and MetroPCS
Korea	16 million	SK Telecom	LGU+ and KT
Japan	10 million	NTT Docomo	KDDI and Softbank

Source: Heavy Reading and Pyramid Research

Figure 4 presents the most recent Pyramid Research forecast of subscriber growth for 3G HSPA, EVDO and 4G LTE networks worldwide. Pyramid estimates that 4G LTE subscriptions worldwide will grow from 70 million at year end 2012 to 864 million in 2017. This is presented in the context of Pyramid's forecast for 3G HSPA/UMTS subscriptions, which are projected to grow at a 16 percent CAGR, from 1.6 billion in 2012 to 3.5 billion in 2017. With LTE growing four times faster than HSPA/UMTS, Pyramid projects combined 3G/4G MBB subscriptions worldwide to exceed 4 billion by year end 2017, with LTE comprising 20 percent of the total.

Figure 4: Pyramid Research Forecast of HSPA, EV-DO & LTE Subscription



Source: Pyramid Research and Heavy Reading, 2012

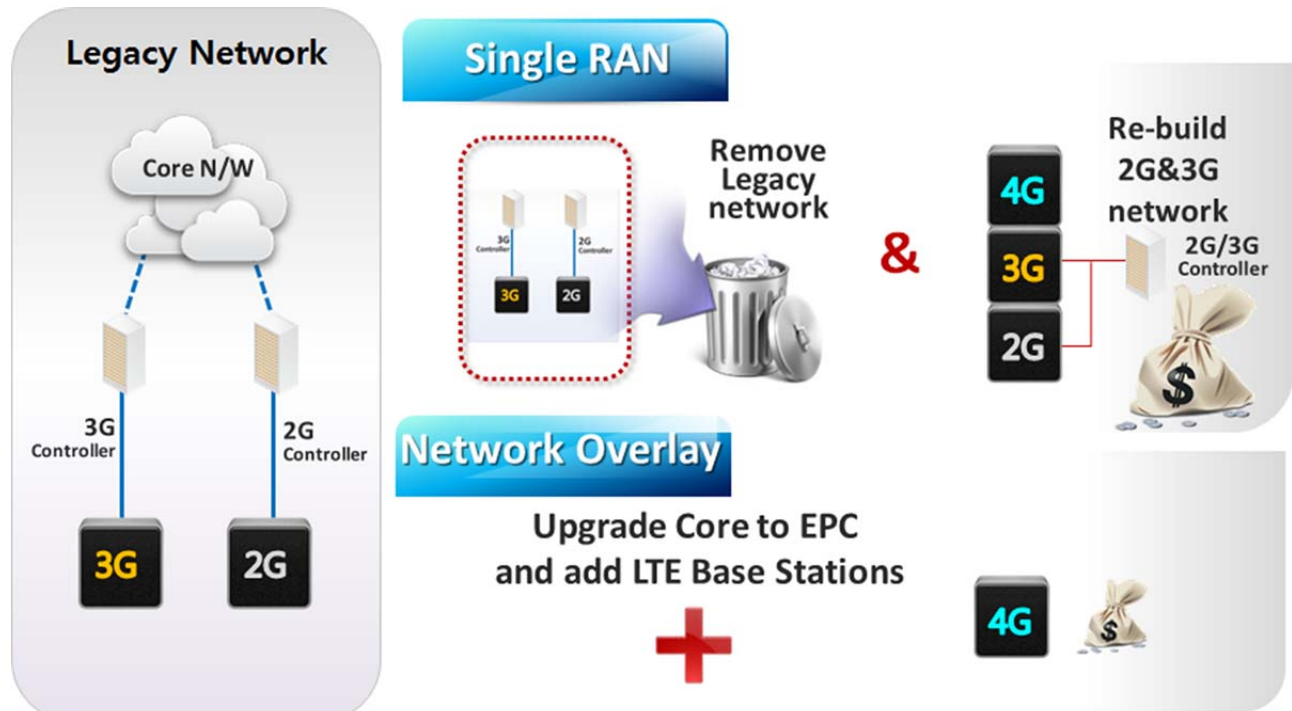
Single RAN vs. LTE Network Overlay Strategies

This *Heavy Reading* white paper examines the tradeoffs that leading operators are considering for the timing and pace of their LTE deployments based on a clear analysis of scenarios that each is facing in their respective markets. A well-thought-out LTE deployment strategy needs to be developed based on:

- Spectrum and regulatory considerations
- Age and status of existing 2G and 3G (HSPA and EVDO) wireless networks
- Pressure to address capacity constraints/customer demand
- Key competitive and business considerations
- Quality of experience (QoE) issues
- Implications for handling new services, including voice/VoIP maturity

Mobile operators are considering the tradeoffs between two primary alternative LTE deployment strategies, as shown in **Figure 5**. This includes a **single RAN** strategy that involves the deployment of new multi-standard base stations as a common platform to add LTE while converging multiple generations of wireless networks. In this approach, operators must carefully plan the removal of the legacy network equipment from each site, replacing it with a new single RAN base station with multimode radios to more efficiently support 2G, 3G and 4G services.

Figure 5: Alternative LTE Deployment Strategies: Network Overlay vs. Single RAN



Source: Heavy Reading

Figure 6 summarizes the primary factors that are influencing leading operators in mature markets such as Japan, South Korea and the U.S. to adopt a **network overlay** strategy to efficiently deploy their LTE networks with minimal investments, without having to disturb their otherwise stable 2G/3G networks. Such an LTE overlay strategy does not exclude a later modernization and integration of legacy and LTE systems because most LTE networks being deployed are based on multi-standard platforms. Speed to market and efficient network rollout have emerged as the primary drivers of their LTE strategy, resulting in a race to nationwide LTE deployment, aggressive 4G service marketing and rapid LTE subscription growth.

Figure 6: Deployment Scenarios for Single RAN and Overlay LTE Networks

ADVANTAGES OF NETWORK OVERLAY	ADVANTAGES OF SINGLE RAN
Faster, easier and less expensive LTE deployment	Converge multiple generations of wireless networks or newly merged operators
Minimize additional investment in legacy 2G/3G networks	Longer time available to phase in a new LTE network over three to five years
Avoid any disturbance to a stable 2G/3G network, while capping its growth	Ability to upgrade 2G/3G network while deploying a 4G LTE network
Achieve efficiency and rapid ROI in LTE deployment	Common 2G/3G/4G network platform with lower opex

Source: Heavy Reading

LTE Network Overlay in the Asia/Pacific Region

The Asia/Pacific region is emerging as the fastest-growing market for LTE deployment, driven by exponential increases in mobile data traffic across the most developed markets. With an extensive list of devoted LTE operators – led by SK Telecom, LG U+ and KT in South Korea, and NTT Docomo, KDDI and SoftBank in Japan – Pyramid Research predicts that Asia/Pacific will become the world's largest LTE region after overtaking North America in 2015. The region will comprise 40 percent of all LTE subscribers worldwide by the end of 2016.

As **Figure 7** shows, most of the leading mobile operators in Asia/Pacific (including Japan, South Korea and Australia) have been using the LTE network overlay deployment strategy. These leading operators have been pressured by customer demand, competition and rapid data traffic growth to quickly upgrade their networks with LTE, and the network overlay strategy has helped them achieve the speed to market with an efficient and economical LTE network deployment.

Figure 7: Most Leading Mobile Operators Adopt Network Overlay vs. Single RAN Strategy

COUNTRY	LTE SUBSCRIPTIONS YEAR END 2012	OPERATOR	SPECTRUM BAND	LAUNCH DATE	DEPLOYMENT STRATEGY
South Korea	7 million	SK Telecom	800 MHz/1.8 GHz	2011	Overlay
	5 million	LG U+	800 MHz	2011	Overlay/SR
	4 million	KT	1.8 GHz	2012	Overlay
Japan	7.5 million	NTT Docomo	2.1 GHz	2010	Overlay
	1.5 million	KDDI	800 MHz	2011	Overlay
	1.0 million	Softbank/WCP	2.5GHz/2.1 GHz	2012	Overlay
Australia	0.5 million	Telstra	1.8 GHz	2011	Overlay
		Optus	1.8 GHz	2012	Overlay
		Vodafone	1.8 GHz	2013	Single RAN

Source: Heavy Reading

LTE Deployment Strategies in South Korea

South Korea is set to become the first major market to migrate the majority of subscribers to LTE, with more than half the country's users forecast to be using LTE within two years. According to the GSMA's Wireless Intelligence unit, the pace of LTE adoption in South Korea surpassed that of neighboring Japan in mid 2012, and we estimate LTE subscriptions now exceed 16 million, second only to the U.S.

SK Telekom adopted CDMA 2000 1X in 2000 and introduced HSPA+ in June 2010, reaching 42 cities in April 2011. SK Telecom launched its initial commercial LTE service in July 2011, using 10 MHz of 800MHz spectrum to handle heavy wireless data traffic in Seoul. In response to *Heavy Reading's* questions, SK Telecom reported that it had adopted a network overlay strategy, adding LTE base stations without a simultaneous 2G/3G upgrade, using many existing cell sites and back-haul infrastructure. SK Telecom reported that the primary reason for deploying LTE was to meet the MBB needs of its most demanding business and consumer customers while capping the growth of its stable 2G/3G network.

SK Telecom has deployed its LTE network to almost 99 percent of South Korea's population, including rural areas. In South Korea's LTE spectrum auction in August 2011, SK Telecom paid \$920 million, more than double the asking price, for 20 MHz of 1.8GHz spectrum, the so-called "golden spectrum." SK Telecom achieved the world's first commercialization of multi-carrier LTE, utilizing a total of 20 MHz, including its existing 800MHz spectrum and the 1.8GHz band. SK Telecom recently announced plans to begin commercializing LTE-Advanced in its network in 2013.

A huge demand surge for LTE service in South Korea has helped SK Telecom add about 60,000 new customers per day and reach its goal of having between 7 and 8 million LTE subscriptions by year end 2012. It took only 18 months to achieve this target – much shorter than the two years and four months it took to achieve 7 million 3G WCDMA subscribers since commercializing the service in 2006. Even as data traffic keeps dramatically increasing, the deployment of the extensive SK Telecom LTE network has prevented any further increases in 3G data traffic.

KT paid \$243 million to secure the remaining 800 MHz spectrum band, but this spectrum was not available until July 2012. KT's LTE plans were boosted by a recent court ruling that allowed the company to drop its 2G services so it could utilize its 1.8GHz band for 4G LTE services.

KT is using a simple and fast network overlay installation system as a "plug in" to its abundant fiber optic infrastructure, and after a month-long delay it finally launched its first 4G LTE service in January 2012. Despite its late offering of 4G services, KT estimates that its LTE service initially covered 84 cities, and that by April 2012, 92 percent of South Koreans were covered with LTE services, bringing it level with rival operator SK Telecom. KT has achieved its goal to secure 4 million customers for its "WARP" branded "cloud RAN" LTE service by the end of 2012.

LG U+, unlike its competitors, did not operate a 3G HSPA network and decided to make a leap forward to launch commercial LTE service by using multimode single RAN base stations. The smaller South Korean mobile operator was able to install LTE circuit boards in existing CDMA cabinets thus saving considerably on time and deployment costs. LG U+ launched its LTE services in July 2011 using 2.1GHz band spectrum with 500 base stations in Seoul and two other cities. LG U+ extended its LTE network coverage to 86 cities across South Korea nationwide to mid 2012, claiming to cover 99.9 percent of the country's population.

As LTE is becoming a mainstream mobile service, South Korean operators are now focusing on the development and marketing of differentiated services to deliver greater value and convenience for its subscribers. Both SK Telecom and LG U+ launched Voice over LTE (VoLTE) services in August 2011.

LTE Deployment Strategies in Japan

Japan is one of the leading markets for LTE network activity.

NTT Docomo has 60.6 million subscribers, 44.7 percent of the total base, and hopes to maintain that lead as its domestic rivals KDDI, SoftBank Mobile and EMOBILE (eAccess) have been launching LTE. Docomo became the Japanese LTE market leader by launching its "Xi"-branded LTE service initially in Tokyo, Nagoya and Osaka in December 2010. Docomo has benefited from a first-mover advantage with its network overlay strategy, which allowed the Xi extra-high-speed LTE service to reach 5 million subscribers less than a month after surpassing the 4 million mark in July 2012. This pace accelerated after Docomo introduced a lineup of Xi-

compatible smartphones, and its LTE service surpassed 7.4 million subscribers in November 2012. Docomo plans to expand LTE coverage to 70 percent of Japan's population by March 2015, when it expects to have 15 million LTE customers.

KDDI is employing a network overlay strategy, adding LTE to its 3G CDMA/EVDO network using 800MHz spectrum. KDDI launched its LTE data services at speeds of up to 75 Mbit/s, and began selling LTE-enabled smartphones including the Apple iPhone 5 in December 2012. By March 2015, KDDI plans to extend LTE coverage to 96.5 percent of the population, equivalent to its EVDO Rev. A area, by deploying LTE at 800 MHz for nationwide coverage and 1.5 GHz for urban/suburban areas.

SoftBank Mobile commercially launched its initial LTE service in November 2011, and 10 months later it had attracted more than 260,000 subscribers. The LTE TDD AXGP (Advanced eXtended Global Platform) network is being deployed by SoftBank's Wireless City Planning unit in 2.5GHz band as an overlay on its large base of 160,000 microcell sites. SoftBank expects this TDD network to cover 100 percent of the population of Japan's 12 major cities by year end 2013. It has also begun deploying an LTE FDD network using its 2.1GHz spectrum and is expanding its HSPA+ coverage using 900MHz spectrum. SoftBank has increased its capital budget for the next two years to support the rollout of 41,000 multi-standard LTE/HSPA+ base stations and achieve 99.9 percent population coverage by 2016.

LTE Deployment Strategies in Australia

Telstra is the leading mobile operator in Australia, with more than 13 million subscribers. It was the first Australian operator to commercially launch LTE, in September 2011. Telstra opened up its LTE network to existing 3G subscribers who signed up for dual-mode LTE/HSPA+ MBB dongles. Telstra is rolling out LTE using 1.8GHz spectrum, and will selectively use 900MHz through re-farming.

In response to *Heavy Reading* questions, Telstra reported that its primary reason for adopting an LTE network was to reduce the cost for expanding the capacity and coverage of its 3G HSPA+ network. Telstra has adopted a network overlay strategy to avoid any disturbance to its existing stable 2G/3G network that was recently upgraded and does not need to be refreshed. The Telstra LTE network is currently available in 100 metropolitan and regional locations, covering 40 percent of Australia's population. Telstra has announced that it ended 2012 with 500,000 LTE subscribers of which 160,000 have dual-mode smartphones. Telstra said it will extend LTE coverage to two thirds of the population by mid 2013, after it doubles coverage in the major cities. The number of 4G LTE users in Australia is accelerating on a track to surpass 2 million connections and market-leader Telstra is planning to capture three quarters of the Australian 4G market by year end 2013.

Optus, Australia's number-two mobile operator, switched on its first LTE networks for consumers in mid 2012, providing the first 4G competition for Telstra. Like Telstra, Optus is using a network overlay strategy to rapidly deploy LTE FDD technology using re-farmed 1800MHz 2G spectrum while it waits for digital dividend (700MHz) spectrum to become available. With LTE available in Sydney and other major cities, SingTel-owned Optus reportedly plans to spend \$2 billion over two years on a nationwide rollout of 4G LTE services in an effort to take on Telstra. Optus has also recently completed the \$230 million acquisition of local WiMax operator Vividwireless with the intention of using its 98 MHz of 2.3GHz spectrum in March or April 2013 for a supplementary TD-LTE network that will have higher throughput. Optus will likely need to adopt a single RAN strategy to deploy its 2.3GHz TD-LTE or 700MHz LTE FDD networks beginning in 2013.

LTE Network Overlay in the U.S.

Each of the major U.S. mobile operators is being driven by competition to be a first mover by rapidly deploying new 4G infrastructure, offering customers a 4G MBB user experience while investing to maintain its legacy network. **Figure 8** summarizes the LTE deployment strategies adopted by the leading mobile operators in the U.S.

Figure 8: LTE Deployment Strategies in the U.S.

OPERATOR	SPECTRUM BAND	LTE DEPLOYMENT STRATEGY	LAUNCH DATE	LTE SUBSCRIBERS YEAR END 2012
Verizon Wireless	700 MHz/2.1 GHz	Network Overlay	2010	21.6 million
AT&T Mobility	700 MHz/2.1 GHz	Network Overlay	2011	6.7 million
Sprint Nextel Clearwire	1900 MHz	Single RAN	2012 2013	4 million
MetroPCS T-Mobile	AWS 1.9/2.1GHz	Network Overlay	2010 2013	1 million

Source: Pyramid Research and Heavy Reading

Verizon Wireless launched its LTE network in December of 2010, with initial coverage in 38 major U.S. markets serving approximately 110 million people. Verizon Wireless adopted the quicker and less expensive network overlay strategy, adding LTE base stations to its current network without a simultaneous 2G/3G upgrade, using many existing cell sites and backhaul infrastructure. Rather than a "switch-over," this approach allowed Verizon Wireless to light up its LTE nationwide network in one fell swoop, rather than in a traditional market-by-market rollout. Two years later, Verizon Wireless still benefits from greater financial resources and contiguous 10 MHz of 700MHz spectrum to offer 4G LTE in 470 markets, covering 280 million people. It now plans to complete its LTE deployment, matching its full nationwide 3G CDMA coverage, by the middle of 2013 – about six months earlier than previously stated. Verizon Wireless is leveraging its vast retail distribution network to offer more than two dozen LTE smartphones and a broad array of LTE-equipped tablets, portable hotspots and USB modems. This momentum of this LTE initiative became apparent in the third quarter of 2012, when the carrier announced that it had upgraded 16.1 million (16.5 percent) of its subscribers to LTE, and that about 35 percent of its overall data traffic is being transported over its LTE network. Verizon revealed in its 4Q12 results that it has 21.6 million LTE subscribers at year end 2012.

MetroPCS was the first U.S. mobile operator to launch a commercial LTE network in September 2010. MetroPCS has also been implementing a network overlay strategy using AWS spectrum to overlay 4G LTE on its existing 2G CDMA network to in three select markets. The coverage of this 4G LTE data service was recently extended into three additional metro areas. MetroPCS was unique in the U.S. wireless industry with this bold leapfrog strategy to invest nearly \$1 billion to implement the move directly from 2G to 4G LTE as its primary data network. But the prepaid wireless operator wanted to expand data services across its customer base, much of which can't afford the high-cost of an LTE smartphone. So MetroPCS started overlaying EVDO Rev. A over 20 percent of its CDMA network. As it reached 1 million LTE subscribers, MetroPCS was also the first U.S. operator to launch commercial VoLTE services, initially with one smartphone in Dallas-Fort Worth in August 2012 as a way to re-farm its 2G spectrum for 4G LTE.

While Verizon Wireless was commercially launching LTE, **T-Mobile USA** was investing to upgrade its HSPA+ RAN equipment and IP-capable backhaul networks, offering 21 Mbit/s as an interim step to LTE. The company has acquired AWS spectrum to deploy LTE with its own network overlay strategy beginning in 2013. But T-Mobile USA has now agreed to acquire MetroPCS, positioning the prepaid carrier as the leading edge of LTE network deployment plans and VoLTE service innovation.

AT&T responded quickly to Verizon Wireless's commercial LTE services launch by claiming that "the nation's fastest mobile broadband network is getting faster," with 4G HSPA+ available now and faster LTE service "coming soon." With significant congestion in selected major markets, AT&T began investing to upgrade its HSPA+ MBB network and enhance backhaul to deliver faster speeds. AT&T also began promoting the use of Wi-Fi to complement its 3G+ network, since it operates the largest nationwide network of more than 23,000 Wi-Fi hotspots.

With Verizon Wireless racing away with its LTE network expansion plans, AT&T renewed its focus on LTE and began planning its move toward an all-IP MBB network. AT&T leveraged the network overlay method to rapidly expand coverage of its LTE service, using 5 MHz to 10 MHz of 700MHz and AWS paired spectrum. This allowed AT&T to reach its target LTE coverage of 150 million Americans more than a month ahead of schedule in 2012. This came only a month after Verizon Wireless announced that it exceeded its year-end target of covering 400 markets and 250 million Americans with LTE. AT&T has also announced plans to spend as much as \$14 billion to bolster its spectrum position and network upgrades over the next few years, to extend its 4G LTE network to new markets while improving network quality, capacity and spectral efficiency. With rapidly growing demand for high-speed MBB, AT&T plans to extend its LTE network coverage to 250 million people by year end 2013 and to 300 million people by the end of 2014. AT&T plans to continue its network overlay strategy to rapidly increase its LTE coverage and capacity, and to be on par with Verizon Wireless's LTE coverage by year end 2013.

Sprint is the only U.S. operator that adopted a single RAN strategy for deploying new multi-standard base stations as a common platform to add LTE while replacing legacy networks. With its older and less-efficient legacy 2G/3G network, Sprint is now making a strategic, long-term investment in new multimode base stations to dramatically improve coverage, capacity, signal strength, data speeds and in-building penetration. Having committed to the investment in Network Vision to replace its 3G CDMA/EVDO network, Sprint is also phasing in a new nationwide LTE network over three to five years, to optimize the use of its spectrum assets, initially using 5 MHz of paired FDD spectrum in existing PCS Band 25 (1900 MHz). Sprint commercially launched LTE service in July 2012 with coverage in 15 cities, expanding to 49 markets at year end 2012. Sprint will add another 115 cities in the coming months, and plans to have LTE coverage of 250 million people by year end 2013 and continue fill in smaller markets from early 2014. The Network Vision plan will also allow Sprint to decommission 22,000 legacy iDEN network base stations, while significantly reducing Sprint's network operating expenses and roaming costs.

Sprint has had some difficulty financing and executing its complex Network Vision program. In October, it announced it had fallen one quarter behind the schedule to upgrade 12,000 cell sites by year end 2012. With Sprint's balance sheet highly leveraged, Japan's SoftBank recently agreed to make a \$20.1 strategic investment to purchase 70 percent of Sprint Nextel shares, in a deal expected to close by mid 2013. Within weeks of this investment, Sprint made a \$2.2 billion proposal to take full control of Clearwire, including its 4G network and 160 MHz of 2.5GHz spectrum in the top 100 markets. Sprint's Network Vision architecture should allow it to deploy a TD-LTE network more efficiently than Clearwire was able to on its own.

Conclusions: When Is Network Overlay the Best LTE Deployment Strategy?

Figure 9 summarizes the circumstances when network overlay is the best LTE deployment strategy. Most of the market leaders have adopted a network overlay strategy to rapidly deploy their LTE networks efficiently and with minimal investments, without having to disturb their otherwise stable 3G networks.

Figure 9: When Is Network Overlay the Best LTE Deployment Strategy?

ADVANTAGES OF NETWORK OVERLAY	WHEN IS NETWORK OVERLAY THE BEST LTE DEPLOYMENT STRATEGY?
Faster, easier and less expensive LTE network deployment	Overlay can be deployed faster because it doesn't involve decommissioning and replacing the existing network
Minimize additional investment in legacy 2G/3G technologies while preserving the opportunity to upgrade and integrate into a multi-standard platform later	Avoid any disturbance to a stable 2G/3G network, while capping 3G network growth. As 2G and 3G subscribers migrate to LTE, if there is a need for modernization the investment in legacy technologies will be lower
With overlay there is only one new network to operate	Overlay results in lower technology installation, integration, commissioning and training
Single RAN commitment to a single vendor represents a business risk in terms of cost and network evolution	Need efficient deployment, low equipment cost and rapid ROI in LTE network overlay deployment

Source: Heavy Reading