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## T-Mobile embarks on LTE expansion using the breakup fee cash and spectrum acquired from AT&T

T-Mobile has announced plans to invest \$4-billion to modernize its network and begin to migrate its HSPA+ network to 4G LTE. These plans come as no surprise given that AT&T was forced to pay T-Mobile a breakup fee of \$3-billion in cash plus critical spectrum at the end of 2011. T-Mobile will need to “shuffle” its spectrum – moving 3G services onto older wavelengths to free up the newer and “better” AWS spectrum for 4G, and can only complete this reallocation with the spectrum that AT&T had to give up. These plans will be contingent on obtaining FCC approval to transfer the AT&T spectrum to T-Mobile.

According to T-Mobile, this upgrade will be a three-phase process involving several *15-puzzle* type shifts:

1. Free up older non-3G spectrum
2. Temporarily move HSPA+ services to the formerly 2G spectrum
3. Deploy LTE services on the current HSPA+ spectrum.

The AT&T spectrum provides T-Mobile with the wiggle room necessary to shift its services across spectrum bands and reallocate the best AWS spectrum to LTE services.

In the first phase, T-Mobile will phase out non-3G GSM usage and eliminate such older 2G spectrum allocations in order to make room for HSPA+. Over the last few years, 2G usage has decreased substantially as customers cycle out of older handsets in favor of new 3G and 3G+ handsets. Outdated GSM-only antenna and tower equipment will be replaced with new multi-mode equipment that supports GSM, HSPA+, and LTE. In recently upgraded markets, where similar gear has been deployed, new equipment will not be needed, but GSM/HSPA+ services will still need to be shifted to non-AWS spectrum to make room for LTE. Advanced backhaul, capable of transmitting both higher bandwidth capacity and faster speeds, will be required at virtually all of the sites.

Phase 2 requires that base stations and towers be reconfigured to transmit and receive HSPA+ on both AWS (3G) and PCS (currently used for 2G) spectrum. T-Mobile will likely free up about 10-20 MHz of AWS spectrum for redeployment to LTE services. In markets where T-Mobile already has sufficient AWS spectrum and where usage is relatively low, this spectrum shuffle may not be necessary.

One of the benefits of LTE 4G is that it is an incremental upgrade to most advanced 3G services. That means that modern

equipment can switch between 3G and 4G services with only a software change. (For more information on LTE, HSPA+ and network upgrades, see VIEWS AND NEWS, August 2011.) T-Mobile has already rolled out such equipment for its HSPA+ services. This newer gear will support LTE deployment via remote software upgrades and reconfigurations. After the Phase 2 shuffle is complete in a given market, a software update can be sent to the new equipment, instructing cells to activate LTE services on the now vacant AWS spectrum.

The end result will be a much faster network that moves T-Mobile beyond the 3G+ era, and that will permit the carrier to upgrade to LTE-Advanced and other future 4G technologies. As we discussed last month (VIEWS AND NEWS, February 2012), it seems very likely that T-Mobile will need to gain the rights to sell the *iPhone* to help stanch subscriber losses. It is also very likely that the next *iPhone* release will be an LTE-capable device. A combination of new 4G services, a T-Mobile version of the *iPhone*, and the availability of T-Mobile’s postpaid non-contract options, may be the competitive boost that T-Mobile needs to compete against AT&T and Verizon.

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## AT&T mulls third-party billing for data

Just as – or perhaps *because* – the proliferation of mobile apps has expanded to the point where wireless carrier networks are experiencing demand levels that stretch their available capacity, the carriers are withdrawing their unlimited data plans and replacing them with relatively low “usage caps” above which often substantial “overage charges” will be imposed (see VIEWS AND NEWS, February 2012). Most consumer-oriented wireline Internet access services in the US offer unlimited usage for a flat monthly charge or, if a usage cap is imposed, it is set at a level sufficiently high that only a minuscule fraction of consumers would ever exceed it. Consumers have thus come to view their use of the Internet as “free” in that their total monthly payment is unaffected by the volume of usage they make of the Internet access service.

The potential of some sort of pay-as-you-go Internet access pricing confronts consumers with the prospect of having to pay their wireless carrier for their use of specific websites or apps, a condition that could well chill consumer demand for such services. From the

standpoint of e-commerce providers or other websites that generate revenue from user access to their services, the practice of metering and charging based upon bits sent and received could undermine their business models and cost them revenues and profits.

In the circuit-switched telephone service world, consumers were often subject to substantial usage-based charges, particularly for “toll” or “long distance” calls, and providers of goods and services that transacted business over the telephone would have had great difficulty convincing their prospective customers to pay toll charges in order to reach them. Early on, some companies would advertise their willingness to accept “collect calls” from customers; because some customers might have been reluctant even to attempt to place such collect calls (which required that the customer provide his or her name to the long distance operator), AT&T created a reverse charge service known as “Enterprise Calling” in which the call recipient would be assigned an “Enterprise” number (e.g., “Enterprise 2345”) which would be translated into the recipient’s phone number with the call completed by the AT&T operator on a reverse-charge basis. The eventual solution was a *mechanized* reverse-charge calling service. Calls were placed using a special “toll-free” phone number (initially using the ‘800’ service access code), which was translated by the public switched telephone network into a routing to the call recipient. The charge for the call was billed to the call recipient under one of several “800 Service” pricing plans.

Now, AT&T has surfaced the idea of an 800-type charging scheme for wireless data usage. John Donovan, AT&T’s Senior Executive Vice President for Technology and Network Operations, announced a possible new approach to billing for data services: charge the website owner or app maker for the data used when AT&T subscribers visit specific sites or use specific apps. Such use would not count against consumers’ monthly data allotment. Consumers would effectively gain more “free” data use, while AT&T gains a new way to monetize its data product and boost revenues.

Providers of mobile services are currently beneficiaries of mobile data plans. Industry profits on apps and web offerings have soared recently along with use of cellular data services; and growth in usage is not expected to subside any time soon. However, as usage skyrockets, and as carriers have eliminated unlimited data plan offerings in favor of capped usage with high overage charges, these third parties may find it profitable – perhaps even *essential* – that they agree to cover the cost of the data used by consumers of their services in order to encourage and grow such usage.

The details of how AT&T would structure such deals are far from clear. AT&T hopes to roll out the new plan sometime next year, and the concept is only being discussed presently at a very high level.

### ***A boon for consumers, or a blow to net neutrality?***

But is creating an 800-type charging scheme for wireless data access all that AT&T is up to? Not very likely. We discussed the need for carriers to find innovative ways to boost data revenues to cover the costs of subsidizing expensive smartphones last month (VIEWS AND NEWS, February 2012). Getting app makers to subsidize the underlying data service would certainly represent a new revenue stream for wireless carriers. But is it innovative? Billing third parties for access to its customers has been in the back of AT&T’s mind for some time now. Former AT&T CEO Ed

Whitacre famously quipped of internet companies:

How do you think they're going to get to customers? Through a broadband pipe. Cable companies have them. We have them. Now what they would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using. Why should they be allowed to use my pipes?"

AT&T’s Donovan innocuously likens the scheme to 800 telephone service, where the recipient, rather than the person placing the call, picks up the tab. But when AT&T introduced toll-free long distance calling back in the late 1960s, its rates were regulated by the FCC and in many cases 800 Service – which was offered under a bulk usage pricing arrangement – was actually *cheaper* than by-the-call outbound long distance rates. But if it is still AT&T’s position that it “ain’t gonna let *them* [i.e., commercial websites and app developers] use AT&T’s pipes free,” then this seemingly innovative pricing *option* may in the end drive the entirety of wireless data pricing. Upon closer examination, AT&T’s plan actually represents yet another blow to net neutrality in that, among other things, it would permit AT&T to establish content- or application-based pricing, charging the service provider different prices based upon the nature of the use being made of its wireless data services.

AT&T could, for example, impose a higher price per kb transmitted for applications requiring packet prioritization or low latency, such as VoIP, video conferencing (e.g., Skype, Apple’s Facetime, Google’s video chat), and Netflix-type streaming videos. While it might be argued that the requirement for priority treatment imposes greater demand on AT&T’s IP network than for the less-immediate transmission requirements of applications such as e-mail, online banking and shopping, and text or still image downloads, there is neither a market-based nor a regulatory mechanism for ensuring that any pricing differentials accurately reflect and capture such cost differences as may actually exist.

In the heated discussions that led up to the FCC’s December 2010 Net Neutrality rulings, proponents of net neutrality insisted that an Internet access provider’s ability to offer “paid prioritization,” where carriers would apply surcharges or other pricing differentiation for prioritizing network traffic, would undermine the goal of an open and neutral Internet. And in its 2010 Net Neutrality Order, the FCC generally prohibits such pricing discrimination – *but only for fixed wireline Internet service providers*. Such restrictions generally do not apply for wireless carriers, and so the reverse-charge idea being floated now by AT&T appears to be a back-door way of accomplishing the paid prioritization that the carrier has been seeking for some time.

### ***How is this different from free or subsidized Wi-Fi?***

Many brick-and-mortar businesses offer their customers free Internet access via Wi-Fi, and some paid Wi-Fi services occasionally offer promotions where the cost of the Wi-Fi is borne by a subsidizing advertiser, rather than by the end user. For example, users of San Francisco International Airport (SFO) access free Wi-Fi sponsored by American Express. Google subsidized in-flight Wi-Fi on several airlines as part of a promotion for its Chrome web browser and Chromebook computers. Amtrak provides free Wi-Fi

at some of its stations and trains. These sponsorships differ from AT&T's proposed reverse-charge plan in that these Wi-Fi services provide access to the full Internet, not just to a selection of websites and apps selected by the sponsor. Users of the Google promotion could use an Apple laptop, search the web with Microsoft Bing, and check their Yahoo email account. AT&T sells unfettered Internet access to its consumers, but its proposed targeted promotions would limit the uses of the subsidized service. While consumers could spend more money to visit other sites, non-subsidized traffic would face a serious artificial competitive hurdle, one that could ultimately force the sponsors of those sites and apps to fork over whatever tribute AT&T may demand.

The inherent limitations on wireless spectrum, cell-splitting and other realities of wireless data networks make it highly unlikely that we will see a return to unlimited use pricing anytime soon. And in the pay-as-you-go pricing world, some type of toll-free or reverse-charge billing may be an important business tool to foster continued growth. So long as network neutrality considerations are met, the idea should not be dismissed out of hand merely because of the dangers it also portends.

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## LightSquared faces exponential problems

Sprint has just announced that it has terminated an agreement with wireless upstart LightSquared, and returned \$65-million in pre-payments associated with the agreement. Last year, Sprint and LightSquared reached a "spectrum hosting" deal wherein Sprint would provide the physical network facilities—towers, antennas, switches—necessary to operate a 4G wireless network on LightSquared's spectrum. The deal, covering 15 years and worth billions, allowed Sprint an out if LightSquared could not obtain the necessary regulatory approvals to launch its network, which hopes to combine traditional cellular service with satellites to provide more complete coverage. The FCC has repeatedly held up LightSquared's progress over concerns that LightSquared's spectrum use interferes with GPS services.

### *What is LightSquared?*

Originally a satellite service company, LightSquared announces on its website that "[it] is building the only national 4G-LTE open wireless broadband network that incorporates nationwide satellite coverage and offers people the speed, value and reliability of universal connectivity, wherever they are in the United States. Through its wholesale-only business model, those without their own wireless network or who have limited geographic coverage or spectrum can market and sell their own devices, applications and services using the LightSquared network—at a competitive price and without retail competition from LightSquared."

The LightSquared concept, from a technical perspective, is intriguing. Especially in rural areas, traditional terrestrial wireless networks have patchy coverage, and truly ubiquitous coverage would be prohibitively expensive to deploy, if it was even possible to do so in difficult terrain and remote locations. Instead, the company seeks to augment traditional coverage with satellite-based service. LightSpeed claims that its Boeing-built geostationary satellite is among the most powerful commercial

satellites ever launched. If consumers move out of range of traditional cell service, nationwide satellite coverage would kick in.

Unlike rivals AT&T and Verizon, which are primarily *retail* wireless carriers (providing service directly to consumers), LightSquared's business model is focused on being a wholesale provider, allowing third parties (e.g., device manufacturers, non-wireless telcos, and others) a platform to offer wireless service. LightSquared claims that it will not compete with its wholesale customers at the retail level—whereas the big four nationwide carriers often engage in wholesale transactions that come with a conflict of interest from the companies' own retail operations.

### *Market implications of the LightSquared business model*

One of the worst fears of broadband providers, wireless and wireline alike, is that they might become sellers of a commodity product, with prices being driven down towards costs, and the profits associated with the services that run over those connections being left to device makers, application developers, and other innovators. As noted above, AT&T is working frantically to develop service offerings that capture more than commodity returns. LightSquared seems to be embracing such fears, turning its network into more of a wireless "utility," from which other companies could purchase capacity for re-use in whatever sort of service offering these third parties might imagine.

This would certainly be a radical departure from the current landscape of the wireless marketplace, where value add services like SMS sell for tens or hundreds of times the underlying cost of providing the actual service. If LightSquared were to realize its network deployment goals, it would also mark a milestone as the first new nationwide entrant in nearly a decade. Certainly disruptive, the LightSquared network would permit any number of service providers without their own network, or without a national footprint, to enter the market and compete against the big four. AT&T and other carriers would have greater difficulty charging for value-add services if consumers had a choice of how to purchase the underlying wireless connection, and at commodity-level prices.

At an economic and competition policy level, the LightSquared business model is clearly a positive development. Consumers would be the beneficiaries of lower prices for wireless services and new innovative offerings from companies able to leverage the wholesale network access.

### *Complications with the LightSquared business model*

LightSquared faces a number of substantial challenges with its proposed business model. First and foremost, as a wholesale provider, LightSquared will necessarily face lower margins for its service offerings than its retail, vertically integrated competitors. While this would hopefully translate into lower prices for end users (and likely increased demand), it sounds like a dangerous parallel to the adage that a business can lose money on every sale but makes it up on volume. LightSquared will face a difficult balancing act as a network middle man to cover the massive costs of network deployment and operation (and earn a profit thereon), but still offer wide enough margins that wholesale customers can offer services at prices that are equal to or less than the big four

competitors.

Because LightSquared is targeting—and touting—a nationwide rollout, their network construction efforts will be enormous, if not impossible. AT&T and Verizon have built up their networks over decades, through acquisitions and capital deployments. LightSquared cannot simply snap its fingers and duplicate that level of buildout. In its failed attempt to takeover T-Mobile, AT&T noted that one of its reasons for the acquisition was to acquire T-Mobile's tower and antenna locations, obviating the need to complete a similar overbuild.

This expense and effort was the motivation for LightSquared's "spectrum hosting" agreement with Sprint. Rather than build its own nationwide network, LightSquared was going to, in effect, lease components of the Sprint network, in exchange for cash and service credits. This sort of unbundled network access served as the basis for a substantial growth in competition in the wireline market following the Telecommunications Act of 1996—but only while the rates for unbundled network access were set at forward-looking long run cost (in that case, total element long run incremental cost or TELRIC). Such competition vanished nearly overnight as soon as prices were allowed to increase to purported "market" driven levels in the wake of the *USTA II* decision. While the details of the deal with Sprint are unknown, it seems unlikely that LightSquared would have had the negotiating power to obtain cost-based rates from Sprint. That means that LightSquared's potential margins are even thinner, since it would be paying a vig to Sprint while passing the potential retail profits on to its own customers.

All of this is, of course, very speculative at present, because LightSquared's nationwide 4G network doesn't actually exist yet, and its immediate spectrum hosting deal with Sprint has been canceled, leaving LightSquared with...its old satellite network and an idea.

### ***Interference: spectrum and the FCC***

A critical portion of the spectrum to be used in the LightSquared network deployment is in the 1500 MHz band of so-called Mobile-Satellite Services. Although LightSquared claims that it has obtained all of the necessary authorizations to use this spectrum as part of a 4G LTE network, the FCC has repeatedly held up the network deployment because of complaints that LightSquared's network interferes with GPS services operating in adjacent bands of spectrum. While LightSquared counters that the perceived interference is the result of poorly manufactured GPS devices that are programmed to "listen" for GPS both on the standard frequencies and LightSquared's authorized frequencies, GPS industry groups vigorously disagree, and the FCC has once again prohibited LightSquared from moving forward with the deal, until such interference issues are resolved.

In the wake of the FCC decision, the company's CEO, Sanjiv Ahuja resigned.

It is unclear if LightSquared will ever be able to resolve these issues on a technical level, and prospects at the FCC are so dim that Sprint canceled its deal. "Sprint has elected to exercise its right to terminate the agreement announced last summer. We remain open to considering future spectrum hosting agreements with LightSquared, should they resolve these interference issues,

as well as other interested spectrum holders," Sprint said in a statement.

LightSquared now appears poised to take legal action to gain the necessary go ahead to use its spectrum for terrestrial uses.

## **Bankruptcy concerns raised for Sprint**

Shares of Sprint Nextel stock fell more than 4% after analyst Group Bernstein Research raised the specter of a future bankruptcy filing from Sprint. While not making an official prediction of bankruptcy, the downgrade noted that such an outcome was a "very legitimate risk."

Sprint's financial situation has deteriorated over several years as the company failed to capitalize on potential synergies from its merger with rival Nextel and massive customer defections arising largely from the botched transition. The company hasn't earned a profit in more than four years, although cash on hand has increased in the last two years.

The renewed concerns over Sprint's fiscal health arise largely from the enormous take or pay contract with Apple that allowed Sprint to begin carrying the iPhone. While current sales of iPhones have helped Sprint stave off some of its subscriber losses, it seems more and more likely that the summer/fall release of the next iPhone will be an LTE capable device. While Verizon and AT&T have already rolled out LTE, and T-Mobile has obtained the necessary cash and spectrum to do so, Sprint's path to LTE from its WiMax 4G debacle seems much less clear or certain. Sprint lacks both the cash and spectrum to make such a transition.

While this is not an immediate problem, Sprint will be in a difficult competitive position once consumers come to expect LTE speeds and service. If Sprint has inadequate (or zero) LTE coverage, the launch of an LTE version of the nations most popular smartphone handset could be devastating. Sprint's contract with Apple is take or pay: if Sprint does not have enough demand for iPhones, it has to pay Apple anyway. If Sprint customers defect to rival networks to gain access to LTE speeds on the iPhone, Sprint would suffer a trifecta of woes: paying Apple to satisfy the contract, losing revenue producing customers, and having to tighten its belt at a critical moment where cash will be necessary for network upgrades. Sprint's current condition is fragile enough. The company currently holds some \$7-billion in current liabilities and \$20-billion in long term debt, while maintaining only \$11-billion in equity. After the drop in share price, the company's market capitalization fell to \$8.3-billion (less than Apple is spending on its newly announced share repurchase program).

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