would allow AT&T to achieve lasting efficiency gains more rapidly and less disruptively than the proposed acquisition.

10. On the contrary, AT&T's proposed acquisition of T-Mobile will perpetuate AT&T's inefficient spectrum use. Rather than encouraging investment in new, innovative, and more efficient technologies, the proposed T-Mobile acquisition would permit AT&T to keep subscribers tied to older and less efficient technologies, delay innovative new facilities-based investment, and continue to maintain a large inventory of unused spectrum.

***PART A***

**AT&T's stated capacity problems are not unique; some of AT&T's competitors are managing a similar volume of voice and data traffic per subscriber on their networks, with superior customer satisfaction and network performance.[1]**

## III. AT&T'S CLAIMED CAPACITY PROBLEMS ARE SPECIFIC TO ITS DATA NETWORK AND ARE NOT UNIQUE TO AT&T

11. AT&T has claimed that it has been experiencing high growth in data traffic over the last four years. While AT&T's purported 8000% increase in data traffic from 2007-2010[2] appears significant at face value, no baseline for comparison or amount of data transmitted per mobile user has been provided to substantiate this claim or enable analysis of the relative efficiency of AT&T's network in supporting it. As is typical throughout its Application, AT&T offers no explanation for how it arrived at this statistic. AT&T appears to have simply summed all data traffic on its network, at any location, at an annualized level, and on a national scale. In

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[1] *See ACSI: Customer Satisfaction Turns Positive Despite Drop for Information Services*, Press Release, American Customer Satisfaction Index (May 17, 2011), *available at*: <http://www.theacsi.org/images/stories/images/news/11may_press.pdf> ("ACSI Press Release").

[2] Public Interest Statement, attached to Applications of AT&T Inc. and Deutsche Telekom AG for Consent to Assign or Transfer Control of Licenses and Authorizations, WT Docket No. 11-65, at 2 (April 21, 2011) ("Application").

doing so, AT&T did not account for variations in data consumption by user handset types, user profiles, or user consumption patterns. Nor did AT&T account for geographic variations between urban, rural, and suburban areas. And, of course, AT&T's claim does not capture critical monthly, daily, weekly, or even hourly fluctuations in data traffic.

12. *As a result, AT&T's statistic does not indicate to the Commission whether AT&T's network is taxed at any given point in time or at any particular location.* AT&T assigns a highly specific value to a unit of measure that is vague and without reference or context, which causes it to be devoid of meaning. Nothing in AT&T's statistic explains whether capacity constraints exist anywhere on AT&T's network and, if constraints do exist, whether those constraints are national in scope or highly localized, whether they are chronic and persistent or intermittent and temporal, or whether they are large and meaningful or small and relatively inconsequential. In addition, AT&T does not provide information in the Application to indicate whether the claimed congestion in its network is in its radio access network, transmission and backhaul network, core network, or in all parts of its network.

13. Mobile networks are designed to handle traffic during the busiest hour of the day. Traffic engineering is based on probabilistic models that predict a network's ability to handle a particular level of peak traffic with a level of certainty. Therefore, the monthly or annual traffic usage provided by AT&T in its Application is an ambiguous reference from a traffic engineering point of view. Just as mobile network operators have done for many years with voice traffic, using 'nights and weekends' plans to shape usage, data demand can also be shaped to bring down peak demand without changing the total traffic carried on the network. Using better demand shaping supported by smarter business decisions, AT&T would be able to handle more data traffic per month without changing the total capacity of its mobile network. For example,

the graph below shows representative traffic profiles of three different cell sites in a representative, hypothetical network. While all three sites have to be designed to handle different peak traffic levels, total data traffic during the 24-hour period is the same on each site.

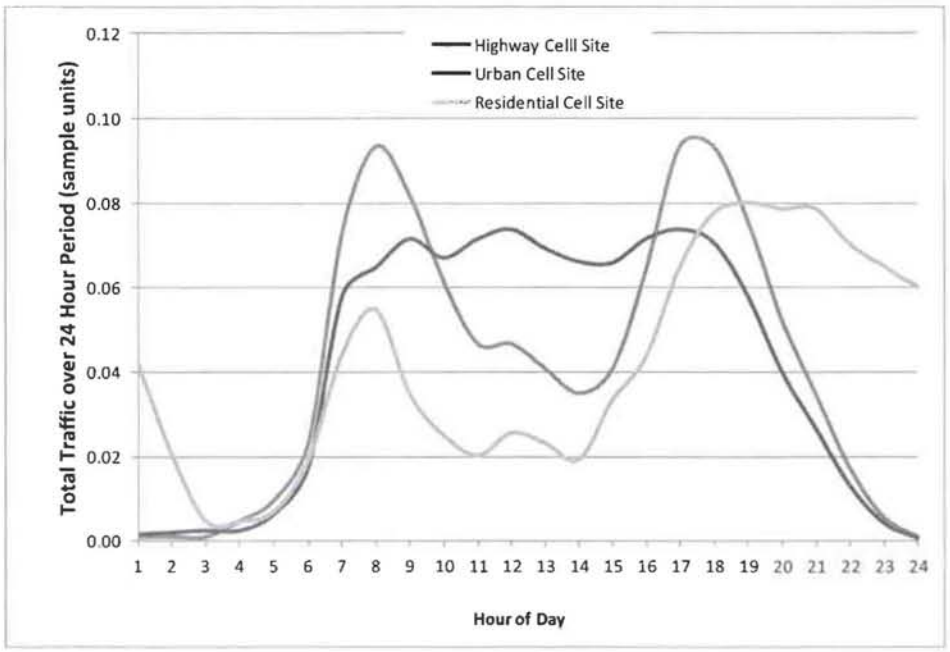


Figure 1: Representative traffic pattern of three cell sites by hour. All three cell sites are handling the same amount of total traffic during a 24-hour period, but have different traffic peaks, and hence are designed differently.

14. AT&T's experience as a wireless data service provider appears to be wholly unremarkable. The wireless marketplace has seen widespread, substantial growth in data traffic; however, AT&T's assertion that their network is "uniquely strained by the exponential growth in data usage" is incorrect. The demands on AT&T's mobile data network are similar to those of its competitors. Relative to its competitors, AT&T's data network is performing better in some markets and worse in others, based on a review of 151,766 empirical field tests conducted across the hundred most populous U.S. markets during approximately the last six months by an industry-leading independent, third-party competitive test provider. Based on over one million field test results collected during more than 900 market drive tests conducted since 2007, AT&T

– along with the overall wireless industry – has continued to improve in mobile data network speed, connection success, and connection reliability, with the last six months offering some of the most dramatic improvements. In short, the data from an industry-leading independent third-party competitive test provider does not support AT&T's assertion that it is experiencing unique capacity demands or network-capacity problems as compared to other mobile network operators.

15. While AT&T's competitors face similar growth in demand for and usage of their data services, they have proven able to manage that growth by investing in many innovative techniques to meet the growing demand for services. Part C elaborates on some of the methods, tools, and techniques available to a mobile network operator in order to address challenges caused by growth in mobile data usage. For example, as illustrated in the table below, Verizon Wireless has similar broadband-capable spectrum holdings to those of AT&T while Verizon Wireless supports a similarly sized subscriber base to AT&T. Verizon is also widely regarded as having superior network performance to AT&T.[3] AT&T has not provided any information in its Application to support its claims that it faces data usage demands that are different from what its competitors face or that it cannot deploy network improvements and investments to meet customer data demand.

[3] *See* ACSI Press Release (indicating that in the latest ACSI report, Verizon and Sprint tie for the highest level of customer satisfaction among the national wireless carriers, while AT&T "show[s] a large deterioration in customer satisfaction" and places last among these carriers).

| | Total Spectrum (nationwide population weighted) | Total Subscribers[4] | Spectrum per Subscriber (megahertz per million subscribers) |
|---|---|---|---|
| **Verizon** | 88 MHz | 94.1 million | 0.94 |
| **AT&T** | 99 MHz[5] | 86.2 million | 1.15 |

Figure 2: Comparison spectrum holdings of Verizon Wireless and AT&T Mobility on a per subscriber basis

16. While mobile *data* usage has continued to grow dramatically, all major mobile network operators, including AT&T, are experiencing stagnating or slightly declining *voice* usage on their networks on a per subscriber basis. During the period from 2007 to 2010, average monthly voice usage on a per subscriber basis for national mobile network operators has declined from 723 minutes to 635 minutes.[6] This decrease in voice usage strongly suggests that older technologies such as GSM, which predominantly support voice customers, are not under capacity constraints. The continued shift in usage away from voice to data should allow AT&T to repurpose its GSM spectrum more aggressively so that AT&T can use some of the spectrum

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4 The number of "total subscribers" *excludes* connected devices. In addition, while making comparisons at a local market level, population density will be taken into account; however, on the national level, given similarities in coverage of Verizon's and AT&T's wireless networks, comparing subscribers on a per MHz basis is a fair comparison.

5 The 99MHz of spectrum attributed to AT&T on a nationwide, population-weighted basis excludes Qualcomm's 700 MHz spectrum that AT&T proposes to acquire as well as AT&T's proposal to acquire nearly two dozen additional 700 MHz spectrum licenses. For information on AT&T's latest spectrum acquisitions, *see, e.g.,* Mike Dano, *AT&T looking to buy even more 700 MHz spectrum for LTE*, FIERCE WIRELESS (May 24, 2011), *available at*: <http://www.fierce wireless.com/story/att-looking-buy-even-more-700-mhz-spectrum-lte/2011-05-24>.

6 Semi-Annual Wireless Industry Survey, CTIA- The Wireless Association (2011), *available at*: http://files.ctia.org/pdf/CTIA_Survey_Year_End_2010_Graphics.pdf ("CTIA Survey")

currently dedicated to GSM for more spectrally efficient technologies such as UMTS/HSPA+ and LTE.

## IV. AT&T HAS DEVICE PORTFOLIOS THAT LIMIT ITS ABILTY TO USE THE NETWORK EFFICIENTLY

17. AT&T continues to make strategic device introduction decisions that limit the use of new technologies, thus limiting AT&T's ability to build a ready user base for its new network and slowing the transition of spectrum it currently uses for older technologies to more efficient technologies. For instance, AT&T continues to subsidize and sell on its website GSM phones such as the Samsung SGH-A107 and ZTE R225, which use 2G data technologies such as EDGE and GPRS,[7] thus limiting the ability to take advantage of more spectrally efficient technologies like UMTS/HSPA+ and LTE.

18. AT&T does not sufficiently promote the migration of users from legacy network technologies to higher capacity, more spectrally efficient networks. For example, AT&T has yet to develop its flagship smartphone – the Apple iPhone 4 – to take advantage of the HSPA+ technology. Instead, AT&T's most popular smartphone device – the best-selling device on AT&T's network "by far" – can only take advantage of slower, and less spectrally efficient, HSPA 7.2 technology.[8] As a result, even the newest iPhone on AT&T's network uses 15% more radio resources than a HSPA+ device would use. For every one million subscribers AT&T moves from HSPA 7.2 to HSPA+, AT&T would have capacity to add another 150,000 customers

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[7] *See* Shop, Wireless, Packages & Deals, *Cell Phone Deals and Packages*, AT&T Wireless, *available at*: <http://www.wireless.att.com/cell-phone-service/packages/packages-list.jsp?wtSlotClick=1-004YXE-0-1&WT.svl=title> (last visited May 24, 2011).

[8] *See* Technology News, *iPhone 4 is the best-selling device ("by far") for both Verizon and AT&T* (May 9, 2011), TECHNOLOGY NEWS, *available at*: <http://www.technologynewss.com/2011/05/09/iphone-4-is-the-best-selling-device-%E2%80%9Cby-far%E2%80%9D-for-both-verizon-and-att/>.

with similar usage profiles. As illustrated in the figure below, AT&T could provide significant capacity relief in a number of major metropolitan markets if its most popular smartphone utilized HSPA+ technology.

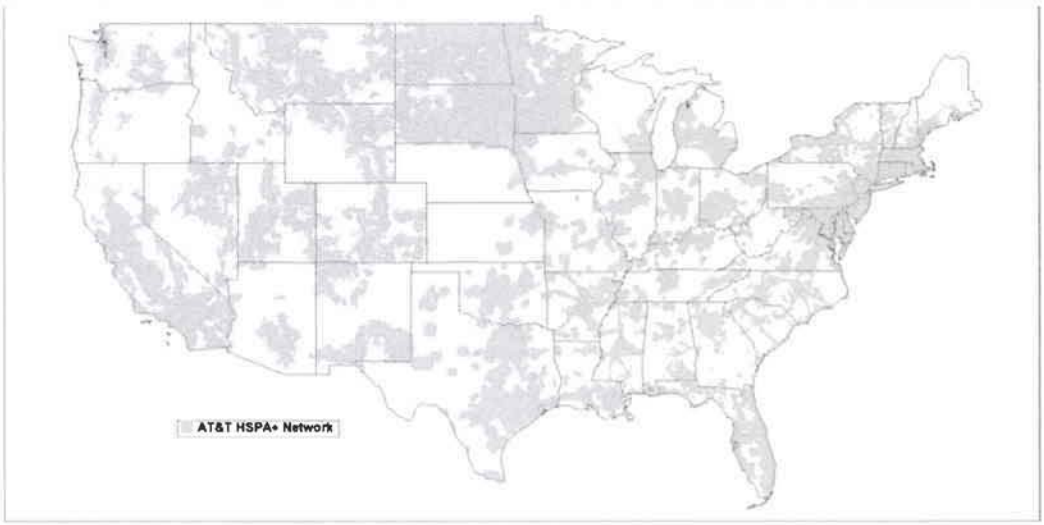


**Figure 3: AT&T's HSPA+ Network Coverage. While service is available in most major metropolitan markets, AT&T's iPhone users cannot take advantage of the superior throughput of this network today.** ***American Roamer, LLC is the creator and copyright holder of the coverage mapping data used in this analysis.***

Stated differently, the full potential of HSPA+ speed is unavailable to help relieve capacity constraints for AT&T's most important, data-hungry customers. Moving even a fraction of AT&T's customers from HSPA 7.2 to HSPA+ would produce material efficiency gains. And moving AT&T's customers from these older technologies to current-generation LTE would produce even more meaningful gains. Unfortunately, however, not only has AT&T not taken advantage of moving more customers from HSPA 7.2 to current-generation HSPA+ technology, AT&T is currently not preparing to move customers from outdated technologies to current-generation LTE technologies that are more efficient. As AT&T moves towards its LTE launch later this year, it has yet to adequately "pre-seed" the market with LTE-ready devices that could

deliver an immediate network capacity offload when AT&T eventually deploys and activates its LTE network. Pre-seeding, a common industry practice, is a process by which mobile network operators introduce devices capable of running on a more advanced, yet-to-be-launched, network, that are still compatible with existing networks. In doing so, mobile network operators establish an installed user base that is ready to take advantage of the newest network when it is launched. As of May 27, 2011, AT&T does not offer any LTE-enabled data-connection device out of its expansive device offerings.[9] In contrast, T-Mobile, in anticipation of its HSPA+ network launch on May 24, 2010, launched a HSPA+ capable dongle on March 14, 2010.

19. If it were behaving as a prudent steward of its spectrum resources, AT&T would already be pre-seeding the market with LTE/HSPA+ devices as a means of ensuring the timely transition of data traffic from its older-generation networks to its far more efficient next generation systems. The opportunity to pre-seed the market exists today. Qualcomm released its MDM9200 multimode 3G/4G device chipset in the fourth quarter of 2009[10], and this chipset has been available in Android phones since the first quarter of 2011. Unlike the majority of devices that AT&T currently deploys, devices with Qualcomm's MDM9200 chipset will be able to take advantage of the most advanced capabilities in AT&T's network through support of UMTS, HSPA+, and LTE, thus allowing for a more efficient use of AT&T's spectrum. AT&T's practice of not providing end users with equipment capable of taking advantage of advanced technology does not support efficient spectrum management. While delaying investment in deploying

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9 *See* Shop, Wireless, Cell Phones and Devices, *Cell Phones & Mobile Devices*, AT&T Wireless, *available at*: < http://www.wireless.att.com/cell-phone-service/cell-phones/index.jsp> (last visited May 27, 2011).

10 *See* Press Release, Qualcomm (Nov. 12, 2009), *available at*: <http://www.qualcomm.com/news/releases/2009/11/12/qualcomm-now-sampling-industry-s-first-dual-carrier-hspa-and-multi-mode-3gl>.

capacity-enhancing technologies for end-users may help AT&T maintain a low Cost per Gross Addition ("CPGA"), the decision is at odds with its purported interest in increasing network capacity as rapidly as possible.

## V. AT&T'S CLAIM TO NEED MORE SPECTRUM TO SUPPORT THREE WIRELESS TECHNOLOGIES, WHILE BEING A COMMON INDUSTRY CHALLENGE FACED BY ALL MOBILE NETWORK OPERATORS, IGNORES AT&T'S DECISION NOT TO PROACTIVELY MIGRATE USERS TO NEWER TECHNOLOGIES

20. All of AT&T's national competitors are supporting multiple generations of technologies on their networks, and many of them have launched next generation networks based on advanced, OFDM-based technologies such as WiMAX and LTE. Verizon has deployed CDMA, EV-DO, and LTE networks, and Sprint supports CDMA, iDEN, EV-DO and WiMAX subscribers on its network. AT&T, by comparison, is currently only supporting GSM, UMTS, and HSPA+ subscribers on its network, with plans to launch LTE. Unlike Verizon and Sprint, moreover, AT&T has had the added advantage of evolving its network through related technologies, which has already provided it with inherent advantages in terms of the ability to readily overlay new technology on existing sites and utilize existing core network elements and network management systems. Sprint and Verizon are managing technologies that have no backward compatibility (*e.g.*, CDMA and iDEN in the case of Sprint) and that have totally separate core network elements and network management platforms. To summarize, AT&T is managing a single Third Generation Partnership Project ("3GPP") family of technologies that include LTE, HSPA+, UMTS/HSPA and GSM whereas many of AT&T's competitors face far more complex network management and evolution challenges. If other operators with a more differentiated system set have managed diversity on their networks, AT&T's can reasonably be expected to do the same in support of their 3GPP GSM, UMTS, and HSPA+ technologies.

21. As an operator with a UMTS/HSPA+ network, AT&T should have an easier path of migration to LTE compared to Verizon Wireless, an operator with a network based on CDMA technology, due to the similarities in bandwidth size and network architectures between UMTS and LTE. Both UMTS/HSPA+ and 5 MHz x 5 MHz LTE operate on a 5 MHz channel per uplink/downlink direction. Thus, it is easier to re-tune AT&T's UMTS/HSPA network to LTE, with greater spectrum utilization and relatively lower risk of incurring interference between legacy and new networks.[11] In addition, auxiliary equipment, such as external filters, can be reused with LTE 5x5. 3GPP standards specify the use of a Serving Gateway to allow seamless interconnections between legacy 3GPP technologies such as UMTS and HSPA. Finally, many of the Evolved Packet Core ("EPC") components are software upgradable from UMTS/HSPA+ to LTE.

22. Support for legacy generations of network technologies is a commercial decision that every operator makes based on usage patterns, network reliability, operating costs, spectral efficiency, and the customer experience. All carriers provide deadlines for the transition of subscribers from legacy networks and offer incentives to move to new, more efficient devices, supported by the latest network technology. These incentives come in the form of subsidized or free mobile device upgrades, discounted services, and flexible contract terms. The Application does not indicate why AT&T has been unsuccessful in migrating GSM users to newer, more efficient generations of network technology. AT&T's business decision not to migrate subscribers from GSM to UMTS devices more actively has created an unnecessary need to

[11] For the PCS bands, consecutive CDMA/EVDO frequency assignments are spaced by 50 kHz and 1.2 MHz guard bands are maintained between frequency blocks, resulting in eleven 1.25 MHz carriers in a 15 MHz x 15 MHz PCS block and three 1.25 MHz carriers in a 5 MHz x 5MHz PCS block. Implementing a 5 MHz or 10 MHz LTE carrier will have implications on the number of CDMA/EVDO carriers that will need to be vacated.

reserve substantial spectrum for less efficient uses. AT&T acknowledges that its UMTS technology covers approximately 260 million people.[12] Yet, AT&T still sells and supports handsets configured to support only less efficient 2G data capability. AT&T could improve the efficiency of network use by aggressively marketing and subsidizing more UMTS/HSPA+ handsets and by discouraging sales of additional devices that use 2G data. This material improvement in efficiency could be accomplished at a far smaller cost than the proposed transaction with T-Mobile. Even, for example, if AT&T was to upgrade the handsets of just 1% of its subscriber base, the cost would be less than $300M – or less than seven-tenths of one percent of the cost of the proposed T-Mobile acquisition.[13] Migrating one million HSPA 7.2 handsets to HSPA+ handsets would allow AT&T to accommodate another 150,000 subscribers with similar usage profile.[14] AT&T has previously conducted such migrations, including the evolution from its former TDMA and AMPS analog networks to its GSM network in February, 2008. Similarly, AT&T no longer offers service on its PocketNet cellular digital packet data ("CDPD"), which was shut down in 2005 after more than a decade of successful operation.

23. AT&T has been very slow in deploying the latest network equipment and software to increase capacity and enable more efficient use of substantial spectrum resources. AT&T's current, more efficient HSPA+ footprint has not yet been rolled out nationwide, and is also not uniformly supported by more efficient backhaul infrastructure, thus leaving customers

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[12] AT&T's less efficient GSM network covers more than 300 million people. *See* Declaration of William Hogg, attached to Applications of AT&T Inc. and Deutsche Telekom AG for Consent to Assign or Transfer Control of Licenses and Authorizations, WT Docket No. 11-65, ¶¶ 18-22 (April 21, 2011) ("Hogg Decl.").

[13] This calculation assumes that the average cost of a smartphone handset is $300. Data from Asymco, *available at:* <http://www.asymco.com/>.

[14] There is a 15% spectral efficiency gain between HSPA7.2 and HSPA+. *See* ¶ 62 below for a detailed chart on spectral efficiency.

with slower data speeds even in areas covered by HSPA+ cell sites. Section XVII in Part C of this Declaration provides more details on the use of high speed backhaul network to support growing customer data traffic.

## *PART B*

**AT&T's claimed benefits from the proposed T-Mobile acquisition are speculative, not readily verifiable, nor specific to the acquisition.**

## VI. AT&T'S CLAIM OF A "WELL-MATCHED CELL-GRID" WITH T-MOBILE NETWORK IS NOT SUPPORTED BY THE DATA IN THE APPLICATION

24. The Application argues that efficiencies will be gained through the integration of T-Mobile's existing cell sites to effectively create cell splits for AT&T's network. However, the claim that the "two network grids are remarkably complementary – T-Mobile has many sites where AT&T needs them and AT&T has many sites where T-Mobile needs them"[15] is not substantiated by data. It seems highly implausible for T-Mobile to have erected sites in precisely those areas where AT&T could not physically reach despite "years of aggressive cell-splitting activities to improve capacity" by AT&T.

25. AT&T claims that it will undertake an aggressive network integration program for T-Mobile's facilities. According to AT&T, a network integration of that portion of the T-Mobile network that AT&T retains would require nine to twenty-four months following consummation, which, including merger review, would likely equal eighteen to forty-five months. Even taking AT&T's estimates of the pace of network integration at face value, integration of the T-Mobile network requires just as much time as AT&T's estimate of the time required to simply install

[15] Hogg Decl. at ¶ 43.

new cell sites on the same towers currently occupied by T-Mobile or on towers owned by tower companies and other parties with available capacity. AT&T has not provided significant evidence to demonstrate that it has pursued alternatives to this acquisition to establish co-location with the T-Mobile cell sites it claims it needs for cell splitting.

26. AT&T concludes that developing its own cell sites cannot possibly provide a satisfactory solution because constructing new cell sites can "literally take years" to complete.[16] The process as described by AT&T – "locate a suitable and available location, arrange to acquire the site through purchase or lease, comply with regulatory requirements that necessitate extensive studies and consultation, apply for and obtain building permits and zoning approvals, contract with third-party vendors to purchase the needed equipment, construct the site and associated backhaul, and then integrate the site into the network"[17] – assumes "worst case" conditions and fails to account for AT&T's own current economies of scale. Like its competitors, AT&T relies on Master Lease Agreements with tower site and rooftop management companies that can provide ready access to portfolios of available sites locally, regionally and nationally. Studies to enable regulatory approval, which may include a NEPA Phase 1, National Historic Presentation Act screen, or radiation safety study, can often be completed in a matter of days. Furthermore, jurisdictions across the country have implemented guidelines for the zoning and permitting of wireless facilities to encourage collocation, and many now process conforming applications "over the counter" without a full zoning hearing.[18] Surely AT&T also has existing

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16 Application at 46.

17 *Id.*

18 AT&T further benefits from the November 2009 Declaratory Ruling in WT Docket No. 08-165 in which the Commission established a shot clock for tower-siting application review by jurisdictions. The Commission acted to accelerate "the deployment of next generation wireless

supply contracts and material logistics processes, and does not need to renegotiate these agreements on a site-by-site basis. More realistic industry averages for new site construction are from six to twelve months for tower collocations and from nine to eighteen months for rooftop installations or new tower sites. Certain site location scenarios pose challenges to operators and no doubt require more time, but, again, these scenarios are the exception, not the rule, and in any case are hardly unique to AT&T. Using more typical transmitter construction estimates means that AT&T could readily invest in new transmitter locations substantially far more quickly than it could realistically hope to acquire all of the assets and operations of T-Mobile and integrate them into its network operations.

27. If T-Mobile's cell sites do just happen to be located in precisely those areas where AT&T requires additional capacity, the Application does not provide evidence that the usage patterns and available capacity of these sites will address AT&T's capacity shortfalls. A mere visual examination of the network grids of AT&T and T-Mobile, which AT&T has not presented in its Application, does not provide sufficient data to demonstrate that the assets of the T-Mobile network are complementary and that they would serve as a natural cell split for the AT&T network. The site location and other characteristics of the site –height, orientation, gain, radiation pattern, and downtilt of the sector antennas – are the key determinants of a site's utility. AT&T has not provided evidence that it has conducted the engineering analysis necessary to draw the conclusions it has drawn in its Application. AT&T has provided no data to substantiate the claim of a good match between its networks. In any case, because the usage patterns for

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networks." *Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt Under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance*, Declaratory Ruling, 24 FCC Rcd 13994 (2009).

T-Mobile sites located near AT&T sites are unlikely to be materially different, combining the two locations eliminates much of the opportunity for net availability gains in congested areas. It is, of course, plausible that a new engineering design would not select the same exact site as the prospective T-Mobile site. But unless a site location aligns with AT&T's design requirements, major modification costs for changes such as antenna height and downtilting may still be incurred. Even more so, the combination of two major macro networks does not represent the optimal solution or the most advanced forward thinking and engineering design. As discussed in greater detail below, heterogeneous networks offer a blend of macro and micro cell sites that maximize coverage and minimize interference in urban environments.

28. And yet even if T-Mobile sites were to be located in a perfectly matched grid with AT&T's cellular network, had complementary traffic patterns to provide a good match with AT&T's cell sites, and were suitable in their characteristics (height, orientation, etc.), those T-Mobile sites must have unused space for equipment and antennas and an ability to instantly increase their use of backhaul, electrical power, and HVAC. AT&T recognizes that the process of integrating T-Mobile sites into the AT&T network will require it to deploy "a multi-band (700 MHz, 850 MHz, 1900 MHz, and AWS bands) antenna to the site and place AT&T's equipment on it."[19] These new multiband antennas are physically larger and weigh more. Additional feedlines and/or remote RF radio heads will be required to support the newly added frequencies at the site. As a result, many of the supposedly perfectly matched T-Mobile sites that AT&T has speculated exist may not actually be able to support AT&T's proposed antennas.

29. Although it provides no support for the proposition, AT&T nonetheless argues that the proposed use of already operational cell sites will accelerate its ability to provide cell

[19] Hogg Decl. at ¶ 46.

split capacity to its network. AT&T's hoped-for acceleration is unlikely to be realized in practice. The very type of measures that AT&T hopes to avoid – including the use of sites that would otherwise be excluded from separate collocation of AT&T equipment, the complex site development tasks it intends to avoid, and expansion of leasing, zoning, and backhaul activities – would likely still be needed to integrate T-Mobile's facilities into AT&T's network. Before making claims of its ability to rapidly integrate T-Mobile cell sites into its network, AT&T should provide evidence of an audit of T-Mobile's site inventory and the detailed analysis to verify the utility of these sites. AT&T also claims that "T-Mobile USA sites that AT&T could integrate represent more than *eight years* of new sites based on AT&T's 2010 rate."[20] This information is not pertinent to this discussion, however. AT&T's 2010 build rate reflects only AT&T's decision to invest a limited portion of its CAPEX on cell site construction. This rate does not reflect AT&T's *ability* to build a certain number of cell sites, but simply AT&T's *willingness* to build to those sites.

30. In summary, AT&T's claims that "common use of those technologies, together with their complementary spectrum holdings and well-matched cell-site grids, will produce immense synergies" is not supported by data. AT&T's claim is essentially impossible to evaluate much less validate without having access to T-Mobile's detailed network map *and* AT&T's existing base station locations. Moreover, without the call and data traffic information for the cell sites in areas where AT&T claims to be experiencing network congestion, neither the Commission nor other parties in this proceeding can evaluate – much less validate – whether integrating T-Mobile's cell sites into AT&T's network would provide a real capacity increase during the hours when AT&T asserts that demand exceeds its network capacity. In addition, it is

[20] Application at 46.

not clear whether there are any significant coverage gains associated with AT&T's proposed acquisition of T-Mobile's network. As shown in the graph below, AT&T's proposed transaction gives AT&T *less than one percent of* additional U.S. population coverage.

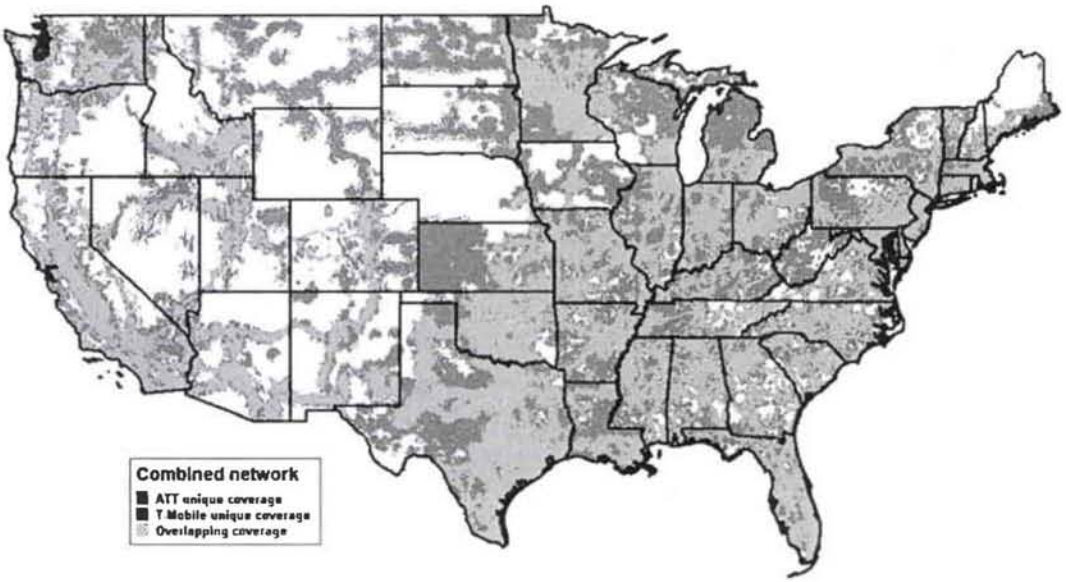


Figure 4: Combined coverage of AT&T and T-Mobile networks. *American Roamer, LLC is the creator and copyright holder of the coverage mapping data used in this analysis.*

## VII. AT&T FAILS TO RECOGNIZE THE INEFFICIENCIES ASSOCIATED WITH INTEGRATING T-MOBILE CELLS SITES AND USERS

31. AT&T's claim to "reuse radios and other equipment from decommissioned sites to enhance network coverage and performance"[21] is not substantiated in terms of cost savings or equipment reuse. Today, T-Mobile operates 2G and 3G networks ("GSM/Edge")[22] on PCS frequencies and UMTS/HSPA on AWS frequencies. Given AT&T's stated goals of more

[21] Declaration of Rick L. Moore, attached to Applications of AT&T Inc. and Deutsche Telekom AG for Consent to Assign or Transfer Control of Licenses and Authorizations, WT Docket No. 11-65, ¶ 34 (April 21, 2011).

[22] Edge is considered an evolutionary 3G technology by the ITU. Most in the industry phase it as a 2.75 G technology.

extensive deployment of 3G and 4G technology, reusing outdated 2G GSM equipment will likely provide little additional value to AT&T or its shareholders and none at all to consumers who remain hungry for faster devices and applications. Further, only portions of the 3G HSPA+ equipment will be reusable because AT&T intends for all future deployments in the AWS band to utilize LTE technology. AT&T makes a broad generalization regarding the ability to redeploy existing equipment, but does not provide evidence of how much T-Mobile equipment is a current release that is easily upgradeable to the latest 3G or 4G technology. In many cases, reusing existing equipment in other locations may not prove to be the most cost effective solution because an upgrade would cost more than a replacement. Furthermore, the value derived from the reuse of existing equipment is overstated. Even if brand new HSPA+ equipment is to be deployed, it typically comprises only 30-40% of the total cost to build a new site. The cost associated with the design, development, and construction of the site, along with ancillary materials, comprises a far larger portion of the site cost. As the reuse is such a small portion of cost of cell site deployment, AT&T needs to provide more information on how it has calculated efficiencies arising from reuse of older equipment.

32. AT&T also proposes to move T-Mobile's GSM and UMTS/HSPA+ customers from the existing T-Mobile networks to the AT&T GSM and UMTS/HSPA+ networks. AT&T has provided no explanation, however, how its network will be able to handle these additional customers or the compromises that will be necessary to accommodate these millions of users. T-Mobile's existing network relies on an average 26 MHz of available PCS spectrum to support T-Mobile's GSM users and 10 to 20 MHz[23] of available AWS spectrum to support T-Mobile's

[23] SMC estimate, with assumption of one to two carriers implemented in T-Mobile's network.

UMTS/HSPA+ users. Under AT&T's proposed plan, T-Mobile's 33 million users will be moved to AT&T's existing network. AT&T would also use T-Mobile's PCS spectrum on its existing network while, T-Mobile's AWS spectrum would be held for future use in deploying AT&T's LTE network. AT&T would also eliminate most of the T-Mobile cell sites. While details are not available in AT&T's application, AT&T's plan of record will likely result in even more congestion and heavier use of the spectrally inefficient GSM and UMTS/HSPA+ technologies. AT&T's plan will also result in most customers being served by fewer cell sites. The negative consequences of these changes, including increased congestion at specific cell sites, slower data speeds, and more dropped calls, will offset many of the efficiencies that AT&T claims will result from its acquisition of T-Mobile.

## VIII. AT&T'S CLAIMED UTILIZATION EFFICIENCIES ARE DIFFICULT TO EVALUATE, ARE AT BEST BASED ON ONE-TIME AND SHORT-LIVED BENEFITS, AND ARE NOT APPLICABLE TO ITS DATA NETWORK

33. It is unclear whether AT&T's claimed network utilization efficiencies of 10-15% extend to the data network that represents the future of its network operations.[24] It appears that these purported efficiencies are only applicable to its voice network,[25] and, even if these gains were documented with sufficient specificity to verify that AT&T could achieve them, they do not

[24] Hogg Decl. at ¶ 50.

[25] The relationship of offered traffic load and carried traffic load on a voice network can be engineered through an Erlang B statistical measurement. The offered traffic load is the product of the call arrival rate and the mean holding time, as each voice call occupies the channel for the duration of the conversation. In keeping with the Erlang B relationship, traffic capacity of the system increases non-linearly with the number of channels available to handle voice calls. Data traffic models, however, differ substantially from voice traffic models. Data traffic is transmitted over a "shared pipe" and the scheduler performs statistical multiplexing to ensure high utilization. Further, network protocols such as TCP/IP permit the retransmission of packets that are blocked or lost due to congestion. Given the dramatic differences between voice and data traffic engineering, AT&T has not provided the data and analysis need to substantiate how channel pooling gains would apply to data networks.

represent a substantial capacity increase when viewed as a percentage of overall traffic generated from its GSM/UMTS/HSPA+ network. By establishing a baseline of voice capacity on its archaic 2G network, AT&T has set its own bar exceptionally low. AT&T further fails to quantify these measures in the context of the spectrum harvested for its UMTS networks. In the end, these gains represent a one-time measure that is applicable to a legacy 2G network from which AT&T envisions it will migrate its users to its UMTS or LTE network as opposed to a merger-specific efficiency. AT&T is claiming to get efficiency gains from the older 2G network; it should have focused on upgrading its technology and device portfolio sooner.

34. Through the use of the airport ticket counter example, AT&T would lead us to believe that massive traffic handling efficiencies will be achieved through channel pooling; however, AT&T itself admits that the gains are modest, with only 10-15% improvements in many areas and presumably less or none at all elsewhere.[26] AT&T's airport ticket counter example is misleading because it illustrates the channel pooling gains that can be achieved for a low number of channels. AT&T itself has acknowledged that control channel efficiencies will only be applicable for voice traffic and not for data traffic. Since AT&T claims that its data network is congested and is experiencing high traffic, it will not gain much efficiency by acquiring T-Mobile. As already noted earlier in this declaration in paragraph 16, voice usage per subscriber has been declining for the last three years.[27]

35. While it may be feasible for AT&T to reclaim spectrum through control channel aggregation, these benefits will neither be immediate nor lasting. While the amount of spectrum

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26 Hogg Decl. at ¶ 52 & fn. 20.

27 CTIA Survey; SMC analysis.

that may be reclaimed sounds exciting in aggregate – 4.8 to 10 MHz[28]– AT&T provides no data to substantiate this claim. Nor does AT&T offer an estimate of how soon or how often this degree of reclamation would prove feasible. As a practical matter, it would appear that achieving the proposed levels of reclaimed spectrum will be a time consuming process. Much of what will initially be reclaimed will be small amounts, potentially single GSM channels, scattered over the various bands in use. Considerable frequency planning will likely be needed to reorganize the freed-up spectrum into blocks usable for 3G. Therefore, AT&T will likely put the reclaimed spectrum into immediate use for GSM voice or SMS capacity relief because the more efficient alternative of reclaiming the spectrum for data usage would require more time and money, which will perpetuate the cycle of investment in inefficient 2G GSM technology.

## IX. AT&T'S CLAIM THAT IT NEEDS TO ACQUIRE T-MOBILE TO DEPLOY A NATIONWIDE LTE NETWORK IS BASED ON ERRONEOUS ASSUMPTIONS

36. In its Application, AT&T announces that it needs access to an unencumbered "contiguous 20 MHz" everywhere in the United States regardless of population density and asserts that its proposed acquisition of T-Mobile will satisfy this ostensible need. As explained below, AT&T probably does not need a "contiguous 20 MHz" anywhere, but it almost certainly does not need a "contiguous 20 MHz" everywhere. Even if AT&T needed a "contiguous 20 MHz" of spectrum everywhere regardless of population density or demand, AT&T already holds at least a "contiguous 20 MHz" of unencumbered spectrum for approximately 70% of the United States population prior to its proposed acquisition of T-Mobile. *See* Figure 6. Finally, while AT&T does not plainly define the term "contiguous 20 MHz" in its Application, I have assumed AT&T to mean one ten megahertz uplink paired with one ten megahertz downlink for a total of

[28] Hogg Decl. at ¶ 48.

20 MHz of "contiguous" spectrum; however, even if an unencumbered "contiguous 20 MHz" of spectrum actually means a total of 40 MHz of spectrum (*i.e.*, a 20 MHz uplink paired with a 20 MHz downlink), then AT&T's acquisition of T-Mobile's spectrum would not achieve that goal. As shown in Figure 5, the acquisition of T-Mobile would reach that level in only a handful of mostly rural counties. *See* Figure 5.

37. As a threshold matter, AT&T's argument that it can only deploy the more efficient, fourth generation ("4G") LTE technology with a minimum of 20 MHz of contiguous spectrum[29] is false. What remains unclear is AT&T's usage of the term "contiguous 20MHz of spectrum."[30] Industry nomenclature would define this as a 20 MHz x 20 MHz channel (*i.e.*, twenty megahertz for the base-to-mobile or downlink transmission and twenty megahertz for the mobile-to-base or uplink transmission). By industry definition, the additional amount of 20 MHz x 20 MHz contiguous spectrum gained by acquiring T-Mobile would be very limited (see below Figure 5).

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29 Contiguous spectrum means the ability to aggregate adjacent channels without gaps.

30 Application at 5.

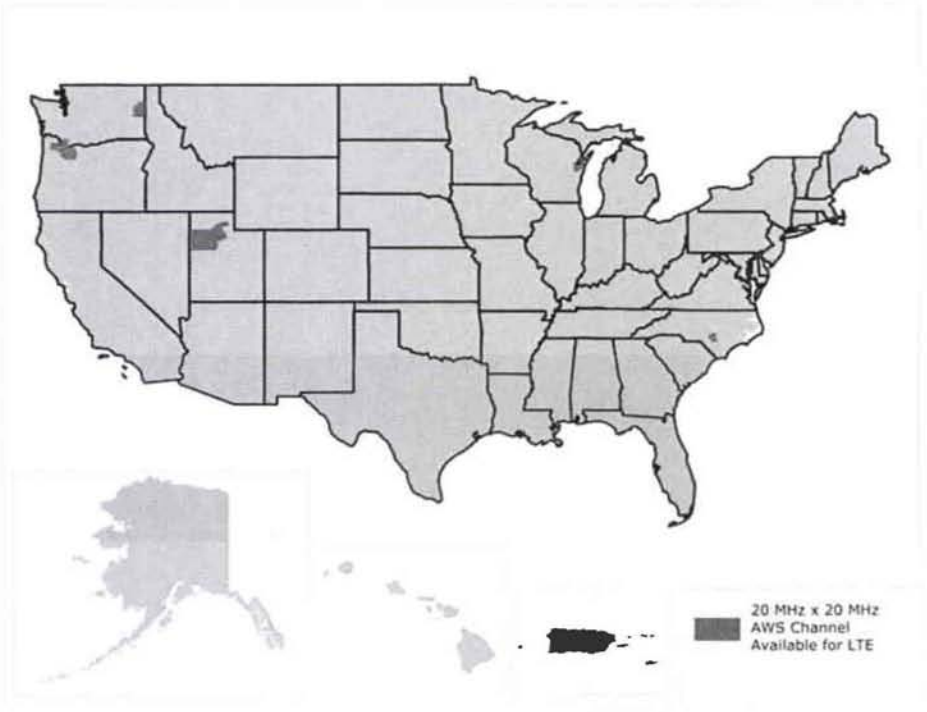


**Figure 5: Additional 20 MHz x 20 MHz AWS Spectrum Obtained with T-Mobile Acquisition.** ***American Roamer, LLC is the creator and copyright holder of the coverage mapping data used in this analysis.***

38. AT&T's use of term "contiguous 20MHz of spectrum"[31] obfuscates the amount of spectrum it already holds, largely unused spectrum that provides a readily-deployable 10 MHz x 10 MHz channel. As seen in *Figure 6* below, AT&T already has capacity to cover more than 70% of the U.S. population with twenty megahertz (10 MHz + 10 MHz) of spectrum. Furthermore, LTE can be deployed on configurations smaller than 10 MHz x 10 MHz, for example on a 5 MHz x 5 MHz configuration. LTE supports scalable carrier bandwidths of 1.4, 3, 5, 10, 15, and 20 MHz.[32]

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31 *Id.*

32 LTE Release 8 Standards.

Figure 6: Current AT&T 10 MHz x 10 MHz Channel Coverage Reserved for LTE. *American Roamer, LLC is the creator and copyright holder of the coverage mapping data used in this analysis.*

39. Through the proposed acquisition, AT&T apparently seeks to gain access to additional spectrum needed to launch LTE in a 10 MHz x 10 MHz configuration for improved speed and spectral efficiency.[33] While a 10 MHz x 10 MHz configuration would certainly provide additional network capacity over alternative configurations using less spectrum, it is nonetheless possible for AT&T to initially launch service to greater than 95% of the population using its 700 MHz and AWS spectrum and through careful engineering, programmatic network expansion, and capacity management to provide a consistent user experience across the markets

[33] Application at 5.

it serves.[34] While a 10 MHz x 10 MHz configuration is desirable for highly-dense urban areas, other configurations can provide similar peak data speeds per user due to lower population densities in those areas. When operators deploy infrastructure, they develop deployment plans, including spectrum configurations, based on real-world conditions. To support its purported need for additional spectrum everywhere across the United States, however, AT&T essentially assumes that every area in the United States has a common level of population density and a common level of user demand. Similarly, AT&T relies upon theoretical peak user speed achievable in a test environment. Sound network engineering dictates that AT&T focus not on theoretical levels achievable in a test environment, but instead focus on designing network infrastructure for the best user experience in any particular location. In a real-world scenario, an LTE subscriber in New York City could very well experience lower average throughput while served by a 10 MHz x 10 MHz LTE network than a subscriber in rural Iowa served by 5 MHz x 5 MHz LTE network because of the lower user density in rural Iowa.

40. With significant nationwide spectrum holdings already lying fallow, AT&T can deploy LTE today in various configurations to achieve nearly nationwide coverage without acquiring T-Mobile. Although AT&T argues that it can only deploy LTE on 700 MHz and AWS spectrum, LTE standards approved by the 3GPP indicate that LTE can also be deployed on PCS ("LTE Band 2") and cellular band spectrum ("LTE Band 5"). In fact, AT&T can deploy a 10 MHz x 10 MHz configuration to almost 70% of the most densely populated areas in the U.S. with its current 700 MHz or AWS spectrum holdings. Finally, AT&T's claim that the acquisition of T-Mobile is necessary for AT&T to cover 97 percent of the U.S. population with

[34] Analysis of AT&T's AWS and 700 MHz spectrum holdings indicates that it has sufficient spectrum to deploy one or more 5 MHz x 5 MHz carrier covering more than 295 million people.