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January 29, 2014

EX PARTE VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Room TW-A325
Washington, D.C. 20554

Re: *Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269
Expanding the Economic and Innovation Opportunities of Spectrum through Incentive Auctions, Docket No. 12-268

Dear Ms. Dortch:

T-Mobile USA, Inc. ("T-Mobile")[1] commissioned CostQuest Associates ("CostQuest"), an economic modeling firm, to estimate the cost of providing wireless service to unserved areas of fifteen states using mid-band 1.9 GHz PCS spectrum and low-band 700 MHz spectrum. CostQuest's census-block level, forward-looking cost analysis found ***the costs of wireless broadband deployment would be up to 2108% higher using mid-band PCS spectrum compared to low-band 700 MHz spectrum***. CostQuest's model examined unserved areas in fifteen states representing many different topographies, network coverage requirements, and population densities.[2] While the precise cost differentials vary by state, CostQuest's forward-looking cost model supports the substantial record evidence demonstrating how the current high-concentration of low-band spectrum holdings by the two dominant wireless providers can frustrate robust competition on price, service, quality, and innovation, especially in historically underserved markets.

[1] T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.
[2] The states studied included Arizona, Colorado, Florida, Georgia, Hawaii, Idaho, Kentucky, Louisiana, Minnesota, Mississippi, North Carolina, New Mexico, Oregon, Texas and Washington. T-Mobile commissioned the CostQuest study for the purpose of making a recommendation regarding the appropriate level of funding for a wireless High-Cost Universal Service Fund, but ultimately did not submit the study in the universal service fund docket after having chosen not to pursue Phase II Mobility Funds.

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CostQuest Prepared a Forward-Looking Cost Model of Investment for Mid- and Low-Band Spectrum Using Cell-Site Level Analysis as Well as Detailed Investment and Operational Profiles from the Industry

A cost model, such as the study produced by CostQuest, uses geographic and non-geographic data to produce an estimate of the cost of providing a service. The CostQuest study does not attempt to determine the actual final cost of building and operating a 4G network, but rather seeks to provide a reliable, data-driven cost projection for network build out in each of the states studied. In other words, a cost model is designed to provide a normalized measure of investment and operational costs so that policy choices, technologies, carriers and geographic areas can be compared on a fair and impartial basis. CostQuest models are highly respected, and have been relied on by government agencies, by corporate entities in their valuation of networks in acquisitions, and in property tax valuations.

To initiate the attached cost model study, CostQuest compiled publicly-available industry service data on wireless network deployments.[3] Based on this data, CostQuest made an informed assessment of the extent of 4G wireless coverage for each state included in the model, and was able to extrapolate those areas within each state that lacked such coverage. For the cost model, CostQuest divided each of the fifteen states studied into regions that approximated the anticipated commercial coverage area of a single wireless base station using either 700 MHz or 1900 MHz spectrum. The resulting cell coverage areas, which ranged from less than one square mile to as much as 310 square miles, were superimposed over each state, with modeling that assumed that all areas within a given state that fell outside the range of the known coverage regions would require infrastructure development by a hypothetical carrier, using either mid- or low-band spectrum.[4]

Based on these coverage maps, CostQuest developed an estimate of the infrastructure needed to build out a network in uncovered areas at a commercially acceptable level of service. Assuming the installation of forward-looking, commercially available telecommunications technologies and using generally accepted engineering practices and procedures, CostQuest took into account specific network deployment practices that would be used in varying terrain. Based on a single service provider network with 100% market share and an assumed mix of owned and leased tower sites, CostQuest then developed a capital investment profile that was applied to all cell coverage areas where 4G service was not available.[5] The final investment profile generated by the model included all infrastructure components that would be needed to prepare each projected mobile network for commercial use. In addition, CostQuest analyzed representative U.S. domestic wireless average operational expenses for network, customer, general, and administrative functions to serve as cost inputs that were driven either by cell coverage area or the projected number of subscribers. Investment cost annualization, which captures the costs of

[3] Determinations of 4G coverage were based on data from American Roamer. Where areas had no existing 4G service, the model either assumed the cost of augmenting existing 2G or 3G infrastructure or, if no existing wireless network was available, build out as a greenfield.

[4] Coverage cells without any reported population were not included in the final cost analysis.

[5] The model also developed the backhaul and core network investments necessary to support the network operation.

depreciation, financing and taxes, was included in operational expenses to produce a total monthly expense. This monthly expense rate was equally apportioned to each assumed monthly subscriber in the target service area, and then compiled by census block to derive a monthly cost per user per census block.

CostQuest's Forward-Looking Cost Model Consistently Demonstrated Higher Costs of Deployment for Mid-Band Spectrum Compared to Low-Band Spectrum

The CostQuest model allocated demand for 4G services by census block, based on population and the number of households, housing units, and business locations. The presumptive network design in each census block was determined by applying take rates, provided as a user input, to the demand locations. Drawing from the underlying cost model, CostQuest generated a financial support model for each census block based on a single network deploying mobile broadband with demand levelized over a six year period of 60% for consumers and 32% for businesses.

One of the advantages of the CostQuest cost model is its granularity, and the final results included in the report are presented at a census block level. The model identifies the costs of providing service to areas with residents that need 4G wireless broadband service but do not have that service today.[6] On average, across the fifteen states studied, the model shows that the build out of a wireless network using 1900 MHz spectrum requires 279% more total investment than the build out of a wireless network by an identical provider deploying 700 MHz spectrum.

CostQuest's Forward-Looking Cost Model Found that the Increased Costs Associated with Mid-Band Spectrum Deployment Can Be* Thousands of Times Higher *than Low-Band Spectrum Deployment

CostQuest's finding that providing wireless broadband to residents of unserved areas using mid-band spectrum required substantially more capital investment than would be the case if low-band spectrum were used held true across states representing a variety of topographies and population densities. The investment differentials between low- and mid-band spectrum offerings in some states proved especially striking. In Kentucky, for example, the difference between deploying a new 4G network using low- or mid-band spectrum was 2108%. Similarly, in Louisiana the differential was 1895%. The table below summarizes the results of the CostQuest study by state:

[6] CostQuest's model only addressed areas where consumers reside; the model did not address areas such as national parks or highways, even though consumers travel in those areas frequently. Incorporating areas without permanent residents into the scope of the study would presumably result in further increases to the relative cost of deploying wireless broadband services using mid-band as opposed to low-band spectrum.

Total Est. Annual Funding Needed			
	700MHz	1900MHz	% Difference
Arizona	$19,241,557	$57,752,708	200%
Colorado	$16,659,640	$58,559,001	252%
Florida	$1,721,422	$9,458,345	449%
Georgia	$5,147,021	$39,242,541	662%
Hawaii	$521,517	$1,610,316	209%
Idaho	$15,195,767	$38,089,762	151%
Kentucky	$591,039	$13,048,924	2108%
Louisiana	$442,023	$8,819,237	1895%
Minnesota	$2,994,023	$32,475,339	985%
Mississippi	$1,497,479	$12,153,013	712%
North Carolina	$2,491,848	$25,037,044	905%
New Mexico	$20,123,991	$32,475,339	61%
Oregon	$17,675,756	$53,855,778	205%
Texas	$18,563,022	$79,178,026	327%
Washington	$9,348,960	$38,924,421	316%
All States	*$132,215,066*	*$500,679,793*	279%

As indicated above, four other states (Georgia, Mississippi, North Carolina, and Minnesota) had deployment cost differentials for networks using 700 MHz as opposed to 1900 MHz spectrum of between 662% and 985%, and eight states (Idaho, Arizona, Oregon, Hawaii, Colorado, Washington, Texas, and Florida) had deployment cost differential ratios for low- and mid-band spectrum deployments of between 151% and 449%. Even in the state with the lowest investment differential between low- and mid-band spectrum deployments, New Mexico, the difference was more than 60%.

Diverse Low-Band Spectrum Holdings Encourage Broadband Deployment and Promote Vigorous, Sustainable Wireless Broadband Competition

The CostQuest study has its limitations. CostQuest offers a model, not a perfected network design or morphology, and this model rests on inputs drawn from publicly available data and best engineering practices, including how these practices are applied within specific terrain. Moreover, CostQuest's forward-looking cost model may understate the cost of deployment by relying on the most efficient network architecture and studying only the areas with permanent residents. While no model is perfect, the CostQuest study demonstrates that, by an average of nearly 300% in areas currently unserved by a 4G network, deploying broadband services using below 1 GHz spectrum is substantially less costly than deploying broadband services using spectrum above 1 GHz. These results hold true regardless of topography, morphology, and population density.

CostQuest's analysis also suggests precisely why a reduction in concentration in the control of low-band spectrum is so critical to consumers: vigorous competition requires carriers to have a reasonable opportunity to overcome the dominant carriers' incentive to prevent their competitors from access to the input resources necessary for effective facilities-based competition. With low-band spectrum, competitors can provide improved performance and coverage throughout the entire country and offer service in suburban and rural areas at a far more cost effective basis than

if they had to rely on mid- or high-band spectrum alone. Indeed, the cost differences between low- and mid-band spectrum are substantial enough to mean the difference between competing vigorously in a given market and not entering it at all.

Protecting competitors' access to low-band spectrum, as the Department of Justice has noted, is essential to "serv[ing] the dual goals of putting spectrum to use quickly and promoting competition in wireless markets."[7] Encouraging broadband deployment and creating sustainable wireless broadband competition will, in turn, result in more innovation and enhanced economic growth as well as increases in hiring and investment. The Commission should design its auction rules in a manner that gives bidders of all sizes a meaningful opportunity to acquire spectrum where needed, rather than simply allowing AT&T and Verizon to continue their unfettered dominance of low-band spectrum resources.

Consistent with section 1.1206(b)(2) of the Commission's rules, please associate this letter with the above-referenced dockets.

Respectfully submitted,

/s/ Trey Hanbury

Trey Hanbury
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[7] *Ex Parte* Submission of the United States Department of Justice, *Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269 at 23 (filed Apr. 11, 2013).