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August 13, 2013

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

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

Dear Ms. Dortch:

With this letter, AT&T Inc. (“AT&T”) submits the attached paper entitled “Comments on T-Mobile’s ‘Dynamic Market Rule’ Proposal” by Yeon-Koo Che (Professor of Economic Theory at Columbia University) and Philip A. Haile (Professor of Economics at Yale University). This paper demonstrates that T-Mobile’s proposed “Dynamic Market Rule” modification to its earlier proposals to limit participation in the upcoming 600 MHz auction “would not prevent the imposition of spectrum caps from causing substantial reductions in auction revenue,” “would introduce significant new problems to the auction,” “fails even its more modest goal of ensuring that caps do not lead to failure to satisfy closing conditions for any given spectrum target,” and thus “could reduce the total quantity of spectrum reallocated in the incentive auctions, or even lead to failure of the auctions.”

Sincerely,

/s/ David L. Lawson
Counsel for AT&T

Marlene H. Dortch
August 13, 2013
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Comments on T-Mobile's "Dynamic Market Rule" Proposal

Yeon-Koo Che and Philip A. Haile*

August 13, 2013

* Che is the Kelvin J. Lancaster Professor of Economic Theory at Columbia University. Haile is the Ford Foundation Professor of Economics at Yale University. These comments are provided on behalf of AT&T.

1 Introduction and Summary

We have been asked by counsel for AT&T to review and comment on the “Dynamic Market Rule” proposal of T-Mobile USA (“T-Mobile”), sketched in its recent filing with the Federal Communications Commission (FCC).¹ The proposal involves a particular scheme for imposing caps on spectrum holdings in the FCC’s upcoming 600 MHz auction. A close examination of this proposal reveals several areas of serious concern. We begin with some background, and then summarize our concerns. A more detailed discussion of problems we see with the T-Mobile proposal then follows.

T-Mobile previously proposed a specific cap in the form of a one-third limit on low-band spectrum.² If strictly enforced, we understand that such a cap would prevent AT&T and Verizon Wireless (“Verizon”) from participating in the auction in many Economic Areas (“EA”s), and would restrict participation substantially in many others.³ We and others have pointed out previously that, by severely limiting participation of bidders likely to place high value on spectrum licenses, spectrum caps would likely result in less efficient allocation of spectrum, reduced auction revenue, a lower quantity of spectrum reallocated from broadcast television to mobile wireless use, and potentially the complete failure of the incentive auctions.⁴ In response

¹ Gregory Rosston and Andrzej Skrzypacs, *A Dynamic Market Rule for the Broadcast Incentive Auction: Ensuring Spectrum Limits Do Not Reduce Spectrum*, attachment to *Ex Parte Notice* from Trey Hanbury, Counsel for T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 12-268, July 26, 2013 (hereinafter, *T-Mobile Proposal*).

² See, e.g., *Ex Parte Letter* from Trey Hanbury, Counsel for T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 12-269, May 30, 2013.

³ For example, with a spectrum clearing target of 84 MHz (which, after accounting for guard bands and the duplex gap between paired spectrum blocks, we understand would allow 70 MHz of spectrum to be auctioned for mobile wireless use), we understand that a strict one-third cap on spectrum holdings below 1 GHz would preclude AT&T from bidding at all in one or more EAs in 8 of the top 10 markets and would preclude AT&T from bidding to acquire two licenses (as necessary to deploy 600 MHz spectrum in what we understand to be a more spectrally efficient 10 × 10 MHz block) in *all* of the top 10 markets (and in 49 of the top 50 markets). See also *Ex Parte Letter* from Tamara Preiss, Vice President, Federal Regulatory Affairs, Verizon, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 12-269, GN Docket No. 12-268, July 17, 2013 (“If 1/3 limit includes 70 MHz available at auction . . . Verizon Wireless is barred from acquiring licenses in 7 of the top 10 markets and 13 of the top 20 markets”).

⁴ For a discussion of these issues see, e.g., Mark A. Israel and Michael L. Katz, *Economic Analysis of Public Policy Regarding Mobile Spectrum Holdings*, Attachment A to *Comments of AT&T Inc.*, WT Docket No. 12-269, November 28, 2012; Mark A. Israel and Michael L. Katz, *Economic Analysis of*

to such concerns, T-Mobile subsequently proposed an exception to allow every bidder to bid for at least one 5×5 MHz paired license in each EA even if its acquisition of a single license in that EA would cause it to exceed the low-band spectrum cap that T-Mobile proposes.⁵ However, given the costs associated with deploying a new spectrum band and the spectral efficiency gains associated with deploying larger spectrum blocks, we understand that bidders are likely to place high value on more than one license per EA. Therefore, this exception to the cap would not resolve the efficiency, revenue, and auction failure concerns associated with the cap.

The Dynamic Market Rule proposal is T-Mobile's response to continuing concerns about the potential impacts of spectrum caps on auction revenues and efficiency. T-Mobile contends that the proposal would ensure that spectrum caps do not affect whether the minimum revenue threshold necessary to satisfy auction closing conditions for a given spectrum clearing target is met. Under this new proposal, the forward auction for a given spectrum clearing target would begin with the most stringent caps (*e.g.*, those implied by the one-third rule with a single 5×5 license exception) determining the maximum number of licenses each bidder could demand in each EA. The auction would proceed following the clock auction design of Milgrom, Ausubel, Levin and Segal ("MALS"),⁶ leading to prices at which there is no excess demand. If the revenue at these prices would fall short of those required for this clearing target, the caps would be partially relaxed for further bidding in a sequence of "supplementary rounds." Initially, for example, a bidder previously permitted to bid for only one license in an EA might be authorized to bid for two. With this boost to demand in place, the auction would resume. If necessary, the caps would be further relaxed until either the revenue requirement for this target were met, or there were no further relaxations possible under the T-Mobile rules. In the latter case the

Public Policy Regarding Mobile Spectrum Holdings, January 7, 2013 Attachment B to *Reply Comments of AT&T Inc.*, WT Docket No. 12-269; Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, *Spectrum Aggregation Policy, Spectrum-Holdings-Based Bidding, and Unlicensed Spectrum*, Exhibit B to *Reply Comments of AT&T Inc.*, GN Docket No. 12-268, March 12, 2013; and Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, *Comments on Appropriate Spectrum Aggregation Policy with Application to the Upcoming 600 MHz Auction*, WT Docket No. 12-269, June 13, 2013.

⁵ See *Ex Parte Letter* from Trey Hanbury, Counsel for T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 12-269, May 30, 2013.

⁶ Paul Milgrom, Lawrence Ausubel, Jonathan Levin and Ilya Segal, *Incentive Auction Rules Options and Discussion*, Appendix C to the FCC's *Notice of Proposed Rulemaking*, GN Docket No 12-268, October 2, 2012.

spectrum clearing target would be reduced, with a corresponding reduction in the forward auction revenue requirement. The most stringent caps would be reinstated and the entire process would begin again.⁷

Several finer details are important. First, relaxation of caps is not done simultaneously in all EAs. Caps are first relaxed in any EAs with excess supply;⁸ then, if the revenue target is still not met, the relaxation continues in all EAs. Second, there are limits on which caps are relaxed, and on what bids can be made once the caps are relaxed. Third, when the caps are relaxed, the auction design itself is modified.

The second and third points involve several components and are most easily described with an example focusing on a single EA. Suppose that the initial clearing target involves seven licenses in this EA. Suppose that two bidders—bidders one and two—are capped at one license apiece in this EA while other bidders have no caps (or, equivalently, are capped at seven licenses). Further suppose that the auction (held simultaneously for all EAs) with the most stringent caps in place fails to produce sufficient revenue for the initial clearing target, and that caps are now to be relaxed in this EA. T-Mobile proposes that the FCC now re-classify one license in this EA as a “no-limit” license. The remaining six licenses would remain classified as “regular” licenses. (Similar reclassifications would take place in other EAs.) Bidders one and two, as long as they were each demanding a “regular” license in this EA when the clock prices previously stopped, would now be given authorizations to bid for one “no limit” license each in addition to their initial (and continued) authorization to bid for one “regular” license each. Separate price clocks would be used for “regular” and “no limit” licenses. These clocks would be initialized at the same starting price—that already displayed on the clock for the “regular” licenses. Subsequently, however, the clocks would move independently based on excess demand for each class of license following the MALS rules with one important adjustment: the “no limit” price in an EA is to continue rising (even when demand equals supply) whenever there is excess demand for the “regular” licenses in that EA. This feature guarantees that the “no limit” price is never

⁷ Rather than restarting the bidding at reserve prices, the bidding would begin at the prices on the clocks just prior to the start of the supplementary rounds.

⁸ Under the MALS auction design, excess supply can result from inadequate demand at the reserve prices, nonexistence of market clearing prices, or overshooting. The last of these would be minimized through intra-round bidding.

lower than the corresponding “regular” price.⁹ When further relaxations are triggered, this is done through further reclassifications of licenses from “regular” to “no limit” status, matched with relaxation of caps following the rules described above. Finally, an important restriction in force throughout the supplementary rounds is that a bidder may not move its demand for “no limit” licenses between EAs. Rather, as prices rise in the supplemental rounds, a bidder may only maintain or reduce its previous demand for each “no limit” license.

We have several concerns with the proposal:

1. *The proposal would not prevent caps from causing revenue losses.* Given any quantity of spectrum ultimately sold, restricting bidder participation—especially that of bidders likely to place high value on spectrum—is likely to cause substantial revenue losses.
2. *The proposal fails to ensure that caps have no effect on achievement of minimum revenue thresholds necessary to satisfy the closing conditions at any given spectrum clearing target.* In fact, due to problems inherent to the mechanism T-Mobile proposes, there remains a strong possibility that the dynamic spectrum caps would cause failure of a clearing target that would have succeeded if the auction had been conducted without caps from the start.
 - a. *The proposed mechanism would not ensure that all restrictions on bidder participation are lifted, even when this would be necessary to meet the revenue requirements of a given clearing target.* The proposed rules impose limits on which restrictions are relaxed, provide no mechanism to ensure relaxation of all restrictions when necessary, and are likely to leave many restrictions in place regardless of the implications for revenue or spectrum clearance.
 - b. *The proposal would introduce new exposure risks.* Two details of the T-Mobile proposal—relaxation only of caps that appear to bind based on current standing bids, and the use of separate clocks for “regular” and “no limit” licenses—introduce substantial exposure problems for bidders with binding caps.

⁹ Thus, although an uncapped bidder is not permitted by the T-Mobile rules to bid for a “no limit” license instead of a “regular” license, there would be no gain from doing so except through effects on prices paid by competitors.

- c. *The proposal would harm price discovery.* In addition to encouraging bidding schemes designed to avoid or exploit the new exposure risks, the sequential relaxation of caps would create disruptions of the convergence to market clearing prices that bidders rely on to adjust their spectrum aggregation strategies in response to others' demand.
 - d. *The proposal would exacerbate existing exposure problems.* By inhibiting price discovery, the proposal would worsen substantial exposure problems already present for *all* bidders under the MALS auction design.
 - e. *The proposal would inhibit efficient substitution between licenses.* A bidder's preferred spectrum aggregation strategy will depend on the relaxation of caps—its own and, most likely, others'. Under the proposed rules, maintaining the option to pursue the preferred strategy under one set of caps will often involve substantial risk or commitment that will be costly if a different set of caps prevails at the end of the auction.
 - f. *The proposal would introduce new incentives for manipulative bidding.* In addition to bidding schemes designed to avoid or exploit the new and exacerbated exposure risks, bidders may have incentives to manipulate the proposed iterative relaxation and reinstatement of caps in order to limit the spectrum obtained by their mobile wireless competitors.
 - g. As the preceding points illustrate, *the proposal would introduce significant uncertainty and complexity for all bidders*
3. *The problems with the proposal are not easily fixed.* Most of the problems we identify appear to be inherent to the key features of the proposal: (a) restrictions on bidder participation and (b) reliance on repeated relaxation and reinstatement of these restrictions in an effort to limit the adverse effects of the caps on auction revenue.

2 The T-Mobile Proposal Would Not Prevent Revenue Losses from Spectrum Caps

The stated goal of the T-Mobile proposal is to ensure that “spectrum limits do not reduce spectrum clearance,” *i.e.*, that a restricted auction with spectrum caps does not result in less spectrum being reallocated to mobile wireless services than an unrestricted auction. As we explain below, the dynamic caps proposed by T-Mobile would not achieve this goal. But even

before getting to this point, a separate problem is that avoiding failure of a clearing target is not the same as avoiding revenue losses. For any given quantity of spectrum that might be sold in the forward auction, revenues generally will be higher when all interested bidders are permitted to compete than when participation—especially that of high-valuation bidders—is restricted.¹⁰ Thus, even if it were true that the proposed dynamic caps would have no effect on the quantity of spectrum reallocated to mobile wireless uses in the incentive auctions, it is not true that forward auction revenues would be unharmed. It is a simple matter of logic that *avoiding unnecessary failure of closing conditions, even if this goal could be achieved, does not prevent revenue losses from imposition of spectrum caps.*

Although the T-Mobile proposal itself makes no claim to the contrary, press coverage has been misleading about this fundamental point.¹¹ As we will see below, the dynamic caps proposed by T-Mobile can in fact lead to large revenue losses.

To see the most basic problem, consider a single EA. Suppose the current clearing target is seven licenses (each pairing 5-MHz of uplink spectrum with 5-MHz of downlink spectrum) and that the revenue requirement for this target is \$12 million. Let there be eight bidders whose valuations (in \$millions) for a first and second license are as in the following table.

¹⁰ A nearly universal message from the theory of auctions is that revenues are enhanced by *encouraging* participation. As T-Mobile mentions, there is a widely understood *theoretical possibility* suggested in the economics literature that participation restrictions might enhance revenue in some types of auctions under special conditions. However, these special conditions are unlikely to hold in the FCC 600 MHz auction; *see, e.g.*, Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, *Spectrum Aggregation Policy, Spectrum-Holdings-Based Bidding, and Unlicensed Spectrum*, Exhibit B to *Reply Comments of AT&T Inc.*, GN Docket No. 12-268, March 12, 2013, and Michael L. Katz, Philip A. Haile, Mark A. Israel, and Andres V. Lerner, *Comments on Appropriate Spectrum Aggregation Policy with Application to the Upcoming 600 MHz Auction*, WT Docket No. 12-269, June 13, 2013.

¹¹ *See, e.g.*, “T-Mobile: FCC can prevent spectrum hoarding without sacrificing revenue,” at <http://www.pcworld.com/article/2042843/tmobile-fcc-can-prevent-spectrum-hoarding-without-sacrificing-revenue.html>; “T-Mobile Says it Has a Fix to FCC Auction Rule Debate,” at http://news.cnet.com/8301-1035_3-57590788-94/t-mobile-says-it-has-a-fix-to-fcc-auction-rule-debate/; or “T-Mobile Proposes a Cover-All-Bases Spectrum Auction Rule,” at <http://www.eweek.com/networking/t-mobile-proposes-a-cover-all-bases-spectrum-auction-rule/>.

Bidder	Valuation for One License	Valuation for Second License
1	7	7
2	7	6
3	6	6
4	5	0
5	4	0
6	3	0
7	2	0
8	1	0

With no spectrum caps, we would expect the forward auction to end at a price of approximately \$4 million per license,¹² yielding total revenue of $7 \times \$4 \text{ million} = \28 million in this EA. Now suppose bidders one and two are initially subject to caps limiting them to one license each. Under the T-Mobile rules we would now expect the forward auction to close at a price of approximately \$2 million per license.¹³ Although the total revenue of \$14 million is more than adequate to meet the closing conditions, imposition of T-Mobile’s proposed dynamic caps has cut revenue by half.

As this simple example illustrates, *even when caps do not affect satisfaction of closing conditions, they can have substantial adverse effect on auction revenue.*

3 The T-Mobile Proposal Would Not Ensure that All Restrictions on Participation Are Eliminated When Necessary to Meet a Revenue Threshold

Although the T-Mobile proposal makes reference to “complete relaxation of the limits” and spectrum caps that are “fully removed,” the rules proposed by T-Mobile make it unlikely that all restrictions on participation will be dropped, even if this would be essential for meeting a revenue threshold. This is due to the proposal that a bidder’s cap in an EA be relaxed only if that

¹² \$4 million is the eighth highest marginal valuation for the seven available licenses and, thus, the lowest market clearing price. \$4 million is also the final auction price when bidders use “straightforward” bidding strategies—*i.e.*, when each bidder demands the number of units equal to the number of his marginal valuations that exceed the clock price. If the clock is continuous, valuations are common knowledge, and bidders observe only the clock price, then straightforward bidding is a Nash equilibrium. Further, any pure strategy Nash equilibrium in weakly undominated strategies yields a price of \$4 million.

¹³ This prediction is based on the same properties discussed in the previous footnote, but now for the auction with caps.

bidder is already bidding its cap for “regular” licenses in that EA when the relaxation is triggered.

In a given round of a spectrum auction, bidders often bid in only a subset of the markets in which they might ultimately want to acquire licenses. This can be because bidders face budget constraints,¹⁴ because bidders view licenses in different markets as substitutes and have not yet determined where their best opportunities will ultimately be, or because there are complementarities between licenses within or across markets. Under the T-Mobile rule, however, a bidder who isn’t already bidding its cap in an EA when the supplemental rounds begin will not be able to pursue a “no limit” license unless both (a) a further relaxation is implemented and (b) this bidder is demanding its cap for “regular” licenses in this EA when that relaxation is triggered. Nothing in the T-Mobile rules would ensure that both conditions are met when a spectrum clearing target is in jeopardy. Indeed, as we will see below, several features of the proposed rules make full relaxation unlikely, regardless of the implications for revenues or spectrum clearing.

4 The T-Mobile Proposal Would Introduce Substantial New Exposure Risks Complementarities Within an EA.

Consider a bidder that would like to bid for two licenses in a particular EA but places little or no value on a single license.¹⁵ Suppose this bidder is subject to an initial cap of one license. If it turns out that closing conditions cannot be met with the initial caps in place, this bidder’s cap may be relaxed, allowing it to bid for the two licenses it desires. However, under the proposed rules, this relaxation is granted only if this bidder was demanding a license in this EA at the end of the bidding phase in which its cap was in place.¹⁶ This requires the bidder to demand a

¹⁴ See Jeremy Bulow, Jonathan Levin, and Paul Milgrom, *Winning Play in Spectrum Auctions*, available at <http://www.stanford.edu/~jdlevin/Papers/AWS.pdf>.

¹⁵ For example, given the bidder’s need to support numerous existing and future spectrum bands in its handsets (both for its own diverse spectrum portfolio and for domestic and international roaming), the bidder might determine that adding the 600 MHz spectrum band could not be justified for only a 5×5 MHz position in that band.

¹⁶ Dropping this rule would eliminate this particular exposure risk but would introduce incentives for manipulative bidding. For example, by demanding nothing when caps are in force, bidders could virtually guarantee relaxation of constraints. Allowing such a possibility would clearly undermine the

license that has little or no standalone value. Because this involves exposure risk, the bidder may choose not to bid at all in this EA while its cap is in place. In that case, however, this bidder would never be able to bid for the pair of desired licenses. Its cap would never be relaxed under the T-Mobile rules, regardless of the implications for revenue or spectrum clearing. *Thus, it is not true that the repeated relaxation of caps proposed by T-Mobile would eventually yield the same outcome that would have been obtained if there had been no caps in the first place.* Below we will see several other ways in which this discrepancy can arise.

A second new source of exposure risk arises from the proposed use of separate price clocks for the “regular” and “no limit” licenses in each EA.¹⁷ Suppose that the bidder above ignores the exposure risk in early rounds of the auction and that its cap is eventually removed. It is now free to bid for both licenses, but to do so the bidder must demand one unit of the “regular” license and one unit of the “no limit” license. This involves a standard exposure risk: if the total price of the pair becomes too high, the bidder would like to drop its demand in this EA altogether; but this will not be permitted unless both classes of license are in excess demand.¹⁸ This exposure risk would be absent in the MALS auction design (without caps) because there all licenses in this EA would be treated as generic. By breaking the principle of generic licenses, the T-Mobile proposal introduces not only inefficiency, but also a new source of exposure risk. An implication is that *even when T-Mobile’s proposed rules would actually lead to all caps’ being fully relaxed, the final outcome (in terms of revenue and spectrum cleared) still need not be the same as in the MALS auction with no caps.*

goals behind T-Mobile’s proposal, but would likely enhance auction revenue relative to that under the rules T-Mobile proposes.

¹⁷ The motivation for the distinct classes of license and separate clocks is not explained in the proposal. However, a primary effect is transparent: this limits the extent to which uncapped bidders are forced to pay higher prices as a result of competition from bidders whose caps are relaxed. This is likely to create further reductions in both revenue and the efficiency of the final allocation.

¹⁸ Consider, for example, the situation described by point 5.d.ii. of the “Dynamic Market Rule Details” in the T-Mobile proposal: when the price of the “regular” license stops rising, it is unknown how much higher the “no limit” price will go. If the “no limit” price reaches a level making the pair unprofitable, the bidder will want to drop its demand for both licenses, but dropping demand for the regular license will not be permitted.

Complementarities Across EAs. The situation is similar when there are complementarities between licenses in different EAs. Consider a bidder that would like to obtain 20 MHz (two 5×5 MHz licenses) in a regional market comprised of EAs A, B, and C. Suppose that a license in one of these EAs provides value only when matched with licenses in the other two. However, the bidder is initially capped at one license in EA C. This bidder faces a much more severe exposure problem under the T-Mobile proposal. The bidder's cap might eventually be relaxed, allowing it to bid for two licenses in each EA. However, maintaining the option to do so under T-Mobile's proposed rules requires bidding for multiple licenses in EAs A and B while the cap is still in place. Unless the bidder is certain that its cap will eventually be relaxed, bidding for these licenses carries substantial exposure risk.

Very similar situations can arise for reasons other than asymmetry in caps across EAs. For example, suppose the bidder initially faced a cap of 1 license in all three EAs. If EAs A and B turn out to be in excess supply at the beginning of the supplemental rounds, the bidder's situation is similar. Alternatively, even if the bidder's caps are relaxed in all three markets, bidding for all six licenses involves exposure risk due to the separate clocks for "regular" and "no limit" licenses. For example, the price for "regular" licenses in all three markets could stop rising, committing the bidder to buying the three "regular" licenses even though the prices for the three "no limit" licenses continue to rise, perhaps beyond the point at which the bidder finds the six licenses profitable.

In any of these situations, the bidder is likely to reduce (or avoid) risk by bidding for just one license in EAs A and B (or none if the bidder determines that adding the 600 MHz spectrum band to its portfolio could not be justified for only a 5×5 MHz position in that band). Thus, once again, regardless of the implications for revenue or spectrum clearing, the repeated relaxation of caps permitted by the T-Mobile rules need not lead to elimination of all caps, nor to a final outcome equivalent to that in the MALS auction with no caps. The final outcome is likely to involve reduced revenue and efficiency relative to an unconstrained auction.

5 The T-Mobile Proposal Would Harm Price Discovery

Under the T-Mobile proposal, bidders will face substantial uncertainty about which market constraints will be in place when the forward auction closes. As prices rise and excess demand

begins to vanish, bidders will not know whether the auction is converging to a final allocation or is about to adjust sharply due to relaxation of caps and shifting of licenses from “regular” to “no limit” status. This undermines one of the main objectives underlying the MALS auction design: price discovery. Price discovery may be further harmed by the strategic behavior of bidders attempting to minimize their exposure risk. Finally, gradual relaxation of caps is similar to a relaxation of the usual activity rules, which are designed to prevent bidders from expressing substantial new demand late in the auction. Here, permission for such “late” expressions of demand would explicitly be given to bidders as the caps were relaxed. This may facilitate efforts by capped bidders to hide their intentions until others have revealed their own plans and/or committed to certain licenses.

6 The T-Mobile Proposal Would Exacerbate Existing Exposure Risks for All Bidders

The adverse effects of the T-Mobile rules on exposure risk would not be limited to bidders with binding caps. As we have discussed elsewhere, all bidders are likely to face significant exposure risks in the auction design proposed by MALS.¹⁹ Exposure risk arises from complementarities between licenses. Such complementarities will exist for most (likely, all) bidders. For example, it is highly unlikely that many bidders would find it worthwhile to obtain spectrum in only a single EA. Rather, a license obtains much of its value through combination with other licenses. The MALS auction design makes no provision for bidders to express demand for one set of licenses that is dependent on acquisition of other licenses. Instead, by forcing bidders to make noncontingent bids in each EA, the design imposes substantial exposure risks on bidders. By harming price discovery, the T-Mobile proposal makes these exposure risks even more difficult for bidders to manage. Bidders seeking to avoid losses due to the exposure problem typically seek to extract as much information as possible about final prices before committing to risky bids. Obtaining such information becomes more difficult when price discovery is suppressed and when relaxation of caps can lead to sharp nationwide changes both in total demand and in the supply of regular licenses.

7 The T-Mobile Proposal Would Inhibit Efficient Substitution Between Licenses

¹⁹ Yeon-Koo Che, Phil Haile, and Michael Kearns, *Design of the FCC Incentive Auctions*, Exhibit B to *Comments of AT&T*, GN Docket No. 12-268, January 25, 2013.

Spectrum caps, by design, interfere with the allocation of spectrum to the bidders who value it most highly. T-Mobile suggests that their proposal provides a market test of their hypothesis that such interference will not endanger auction success, while also providing a backup plan ensuring that the caps do no harm. We have already seen that this is not correct: revenues can be substantially harmed and the proposed relaxation of caps would not generally replicate the outcome of an unconstrained auction. But the problems discussed above are not the only ways in which the “backup plan” fails. The rules proposed by T-Mobile would also introduce barriers to efficient reallocation of demand between substitute licenses when caps are relaxed.

A first culprit is the proposed prohibition on moving demand between EAs during the supplemental rounds.²⁰ Consider a bidder who would like to obtain two 5×5 MHz licenses in either New York or Los Angeles (but not both) and is initially capped at one license in each EA. Which pair of licenses the bidder prefers depends only on the prices of the licenses. We have already pointed out that such a bidder faces exposure risk when its cap is in place: maintaining the option to pursue the preferred pair requires demanding one license in each EA when the cap is in place, and this involves risk of winning only one license in one or both EAs. If this risk is too great, this bidder may not bid at all in these markets, so the effect of the caps would be equivalent to outright exclusion from these markets. But suppose the bidder ignores the exposure risk, bidding for both regular licenses, and that its cap in both EAs is subsequently removed. Now the bidder faces a new problem. It cannot know at this point whether the NY pair or LA pair will ultimately offer the most attractive opportunity. But it must commit immediately because the proposed T-Mobile rules forbid shifting of demand for “no-limit” licenses between EAs. Requiring bidders to commit to markets before the process of price discovery will lead to inefficient allocations and to risks for bidders. Both will tend to discourage participation and aggressive bidding. Indeed, eliminating the ability of bidders to adjust their demand in response to that of competitors is contrary to the most basic objectives in allocating spectrum by auction.

²⁰ Here we discuss only the restriction on moving demand from a “no limit” license in one EA to a “no limit” license in another. It is unclear from the T-Mobile proposal whether they also intend to rule out other types of cross-EA substitution during the supplemental rounds—*e.g.*, moving demand for “regular” licenses from one EA to another or moving demand for a “no limit” license in one EA to a “regular” license in another. Such restrictions would create additional risk for bidders (*e.g.*, once a bidder moves some of its demand to a “no-limit” license, it cannot go back) and barriers to efficient allocations.

Even if the “no moving demand” restriction were dropped (T-Mobile describes a precise way of doing this in its Appendix²¹), significant barriers to efficient substitution between licenses would remain. A slight variation on the previous example illustrates the point. Consider a budget-constrained bidder that would prefer two 5×5 MHz licenses in New York but is initially capped at one license. Believing that its New York cap is unlikely to be relaxed, the bidder instead pursues its alternative, second-best strategy, demanding one license each in Los Angeles and San Francisco. If closing conditions eventually fail and the New York cap is relaxed, the firm would like to withdraw its demand for the Los Angeles and San Francisco licenses. But this will not be permitted unless the “regular” licenses in both California EAs are in excess demand. Thus, the bidder must either pursue the California licenses and risk foreclosure of the chance to bid for its most preferred licenses, or commit to New York (where it may end up winning only a single license) and hope the cap is relaxed. Either strategy leads to substantial likelihood of inefficient allocation. Further, the risk this bidder faces is typical of what will arise under the T-Mobile scheme: depending on how the auction proceeds, the set of licenses a bidder desires may change; but maintaining the option to acquire a preferred set of licenses involves commitment and risk. This is likely to result in the same types of bid suppression, reduced revenues, and inefficiency that arise from standard exposure risks.

8 The T-Mobile Proposal Would Introduce Substantial Uncertainty and Complexity for All Bidders

T-Mobile may be correct in suggesting that their proposal would add little complexity to the auction from the perspective of the FCC. However, the discussion in the preceding sections makes clear that their proposed rules would introduce several significant sources of uncertainty and complexity for bidders. Bidders facing caps may be especially affected, due to the introduction of new exposure problems and barriers to efficient reallocation of demand. But all bidders would face substantial uncertainty about the degree of competition that will be present when final allocations are determined. And all bidders will face greater uncertainty due to the

²¹ The Appendix discusses variations on other of T-Mobile’s proposed rules as well. The Clearing Rule variation would further harm revenue by stopping the auction sooner, and would also introduce additional uncertainty and risk for bidders. The proposed Bidding Eligibility variation would harm efficiency and revenue by further restricting the relaxation of caps.

harm to price discovery and greater complexity, both in determining their optimal spectrum aggregation strategies and in managing their exposure risks.

9 The T-Mobile Proposal Would Introduce New Incentives for Manipulative Bidding

When exposure risk is present, bidders will eschew straightforward bidding in favor of strategies aimed at minimizing their own exposure and exploiting the exposure of competitors. We would expect the T-Mobile proposal to lead to greater use of such manipulative strategies, since the proposal introduces new sources of exposure risks and exacerbates existing exposure risks.

A second potential source of new manipulative bidding incentives is the iterative relaxation and reinstatement of spectrum caps proposed by T-Mobile. A bidder without binding caps will have incentives to exploit the rules to minimize the competition for spectrum it wants and, perhaps more important, limit its mobile wireless competitors' access to spectrum. Anticipating all possible manipulative strategies is difficult, in part because a theory of equilibrium bidding for an auction with the complexity of even the MALS design (without the added complexity of the T-Mobile variation) has not yet been developed. However, one possibility is that bidders without binding caps will seek to ensure that closing conditions fail when clearing targets are high. Bidders may understand that meeting the closing conditions for high clearing targets would require substantial relaxation of caps. If the early clearing targets fail, however, uncapped bidders may be able to obtain the spectrum they desire while minimizing the quantity of spectrum obtained by capped bidders. Indeed, a target failure may not merely reinstate the caps on competitors, but may tighten them.²²

Of course, withholding demand to trigger target failure may involve risk, and would have to be done in a way ensuring that the activity rule did not prevent the manipulators from later demanding their desired spectrum. Although T-Mobile asserts that “activity rules would diminish or eliminate” manipulative bidding opportunities,²³ they offer no supporting analysis.

²² As T-Mobile points out in the Appendix to their proposal, this can arise when the caps are tied to the total quantity of spectrum available: tighter supply then leads to tighter caps. Because the T-Mobile rules will not generally lead to full relaxation of caps when necessary to avoid a clearing target failure, T-Mobile's proposed solution to this problem will not be fully effective, even ignoring the possible implications for bid manipulation.

²³ *T-Mobile Proposal* at 1.

We do not believe that standard activity rules would rule out such manipulations. Indeed, it is widely understood that demand reduction is already likely to arise as equilibrium behavior under the MALS auction design, harming efficiency and auction revenue. With the additional rules proposed by T-Mobile, the possibility of limiting competitors' access to spectrum through demand reduction strengthens the incentives for such behavior.

10 The T-Mobile Proposal Would Not Prevent Spectrum Caps from Causing Failures to Meet Minimum Revenue Requirements

As we have explained above, the T-Mobile proposal would introduce a number of problems to the auction. All of these problems point in the direction of reduced revenues relative to an unconstrained auction. Moreover, we have shown that there is no round of the auction design proposed by T-Mobile in which the outcome would generally be the same as that which would have arisen if the MALS auction were held with no bidding caps: at any spectrum-clearing target, forward auction revenue is likely to be reduced by caps, even under the T-Mobile design. Among other harms, this leaves the strong possibility that their proposed rules would lead to failure of a clearing target that would have succeeded if the auction had been conducted without caps from the start.

11 The Problems with the T-Mobile Proposal Are Not Easily Corrected

Whether one could mitigate the new problems introduced with the T-Mobile proposal through fine details of the auction rules is unclear. However, we are doubtful. The problems appear to be inherent to the essential features of the T-Mobile proposal: (i) the imposition of caps that restrict competition in the auction, and (ii) the reliance on iterative relaxation and reinstatement of these caps in an effort to limit the adverse effects of caps on auction revenue.

12 Conclusion

We have described a number of significant concerns with the recent T-Mobile “dynamic market rule” proposal. We have shown that this rule would not prevent the imposition of spectrum caps from causing substantial reductions in auction revenue. In fact, the dynamic adjustment of spectrum caps would introduce significant new problems to the auction. As a result, the proposed design would likely result in substantially less efficient allocations and substantially

lower revenue than if the auction had been conducted without spectrum caps. Finally, the proposal fails even its more modest goal of ensuring that caps do not lead to failure to satisfy closing conditions for any given spectrum clearing target. Thus, the proposal could reduce the total quantity of spectrum reallocated in the incentive auctions, or even lead to failure of the auctions.