



## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Parts 1 and 54

[GN Docket No. 20-32; DA 20-1361; FRS 17443]

### Office of Economics and Analytics and Wireline Competition Bureau Adopt Adjustment Factor Values for the 5G Fund

**AGENCY:** Federal Communications Commission.

**ACTION:** Final action.

**SUMMARY:** In this document, the Office of Economics and Analytics (Office) and the Wireline Competition Bureau (Bureau) adopt adjustment factor values for an adjustment factor that will be used in bidding in the 5G Fund auctions and applied to the methodology for disaggregating legacy high-cost support.

**DATES:** Effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Federal Communications Commission, 45 L Street, N.E., Washington, DC 20554.

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**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's *5G Fund Adjustment Values Public Notice* in GN Docket No. 20-32, DA 20-1361, released on November 16, 2020. The full text of this document is available on the Commission's website at <https://www.fcc.gov/document/oea-and-wcb-adopt-adjustment-factor-values-5g-fund>. To request materials in accessible formats for people with disabilities, send an email to [FCC504@fcc.gov](mailto:FCC504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

### Synopsis

1. The Office of Economics and Analytics (Office) and the Wireline Competition Bureau (Bureau) adopt 5G Fund adjustment factor values to help direct more 5G Fund support to harder to serve areas. Specifically, the values we adopt will increase support levels for bids to serve areas where the

terrain elevation variation raises the expected costs of deploying 5G networks, and/or where the business case for 5G otherwise is likely to be weaker, relative to the support for bids for easier to serve areas. Likewise, the adjustment factor values will also be used in the process of disaggregating legacy high-cost support to account for differences between recipients' subsidized service areas. These adjustment factor values will help ensure that additional 5G Fund support goes to the areas that need it the most.

2. In the *5G Fund NPRM and Order*, 85 FR 31636, May 26, 2020, 85 FR 34525, Jun. 5, 2020, the Federal Communications Commission (Commission) proposed to distribute up to \$9 billion in two phases using multi-round, descending clock auctions to assign support for the deployment of 5G service in rural areas. To account for differences in the cost of providing service and business case considerations across eligible areas, the Commission proposed incorporating an adjustment factor into the 5G Fund auctions that would assign a weight to each geographic area, which would be applied to bidding for support amounts to make the areas most difficult to serve more attractive to bidders and increase the support to such areas. In addition to incorporating an adjustment factor into the 5G Fund auctions, the Commission proposed to apply this adjustment factor to the methodology for disaggregating legacy high-cost support in the transition to 5G Fund support.

3. Legacy high-cost support is currently provided to a competitive eligible telecommunications carrier's entire study area, with no attribution to particular sub-areas within that study area. To illustrate the role of the adjustment factor in the disaggregation of legacy support, consider a hypothetical carrier serving one mountainous census tract and one flat census tract of equal size in its subsidized service area. Such a carrier might require 75% of its support to serve the mountainous tract and 25% to serve the flat tract. Were an unsubsidized carrier to enter the flat tract, which may be more likely given the relatively lower costs in the flat tract, if we did not apply the adjustment factor in calculating disaggregated support, the carrier would lose 50% of its funding and would be unable to continue serving the mountainous tract. However, applying an adjustment factor of three to the mountainous area would result in the carrier retaining 75% of its original support amount and allow it to continue serving the mountainous tract.

4. On June 5, 2020, the Office and Bureau released the *Adjustment Factor Public Notice*, 85 FR 36522, Jun. 17, 2020, which sought comment on the proposed adjustment factor values, the three

analyses that inform the values, and the application of the adjustment factor to the disaggregation of legacy support.

5. In the *5G Fund Report and Order*, 85 FR 75770, Nov. 25, 2020, the Commission adopted its proposal to incorporate an adjustment factor into the 5G Fund auctions that will assign a weight to each geographic area and apply that adjustment factor to bidding for support amounts; this adjustment factor also will be applied to the methodology for disaggregating legacy high-cost support. For a 5G Fund auction, the Commission deferred the final determination of the precise manner in which the adjustment factor will be incorporated into the auction mechanism to the pre-auction process. We provide herein the adjustment factor values, and we discuss the studies underlying our decision to adopt these values for use in a 5G Fund auction and in the methodology for the disaggregation of legacy high-cost support.

6. *Adjustment Factor Values.* In the *5G Fund Adjustment Factor Public Notice*, we proposed values for an adjustment factor that operates along two dimensions: terrain elevation variation and demand, using median household income as a proxy. These two dimensions were included to account for differences in network deployment costs and business case considerations that stem from the geographic and economic variations in the United States. We proposed that areas be sorted into terrain elevation variation and demand factor groups according to their characteristics. The terrain elevation variation dimension is intended to address, in part, network cost differences across areas, while the demand factor is intended to address differences in expected revenues across areas. Under the approach proposed in the *5G Fund Adjustment Factor Public Notice*, an area's terrain classification is determined by its average standard deviation of elevation. Areas are separated into one of three categories: 1) flat (standard deviation of 40 meters or less); 2) hilly (standard deviation between 40 and 115 meters); and 3) mountainous (standard deviation greater than 115 meters). Similarly, areas' demand classification is determined by the areas' median household income. We note that the category thresholds for the medium- and high-income categories represent 2017 median household incomes that are 150% and 200% of the poverty line for a family of three, respectively. Consistent with the adjustment factor values we adopt herein, we will use the latest available data on terrain and median household income appropriate for

such purposes to classify areas into the adjustment factor categories concurrent with the Commission’s release of the map of final areas eligible for 5G Fund Phase I support.

7. We adopt the adjustment factor values in Fig. 1, as proposed in the *5G Fund Adjustment Factor Public Notice*. We find that these adjustment factor values, informed by the three economic analyses laid out in the *5G Fund Adjustment Factor Public Notice*, appropriately reflect the relative cost of serving areas with differing terrain characteristics, as well as the potential business case for each area, with less profitable areas receiving greater weight and therefore more support. Using these values to help distribute 5G Fund support to, and disaggregate legacy support in, a range of areas across the country that are geographically and economically diverse serves the public interest.

Fig. 1: Adjustment Factor Values

		Terrain Elevation Variation		
		Flat	Hilly	Mountainous
Demand Factors	Low	1.2	2.4	3.8
	Medium	1.1	2.3	3.5
	High	1.0	2.0	3.0

8. *Use of An Adjustment Factor in Bidding.* Commenters generally support the use of an adjustment factor to increase support in higher-cost, less-profitable areas, and no commenter suggests alternative adjustment factor values to those proposed in the *5G Fund Adjustment Factor Public Notice*. Although no commenter objects to the use of terrain elevation variation and median household income in the determination of the adjustment factor, several commenters suggest that the adjustment factor should consider other variables, such as differences in the cost of labor and transportation to both deploy and operate 5G service, differences in the cost of utility and other operating costs, and the existing infrastructure in an area.

9. We are not persuaded by these arguments and decline to increase the number of components or categories that make up the adjustment factor. We acknowledge that terrain elevation variation and median household income do not exhaust the list of potentially relevant variables. Likewise, we acknowledge that when we separate areas into categories, the areas near the midpoint of the category will have their relative costs and business cases more accurately represented by the adjustment factor values than areas at the margins. Nevertheless, as noted in the *5G Fund Report and Order*, the adjustment factor adopted by the Commission is not intended to fully offset the differences inherent in

providing service to different types of areas. Rather, it is intended to “make the most difficult areas to serve more attractive at auction in order to encourage more bidding for these areas.” Moreover, we selected terrain elevation variation and median household income as the two dimensions for the adjustment factor characteristics because they are important factors in characterizing deployment costs and business case considerations, respectively, and because there is more readily available and verifiable data with which to apply these two factors. As we discussed in the *5G Fund Adjustment Factor Public Notice*, terrain elevation variation captures differences in network costs because “wireless network engineering principles indicate that greater variability of terrain in a given geographic area reduces the signal strength received by a mobile user, which requires wireless carriers to build more sites to provide the same quality of service.” As a result, areas with higher terrain elevation variation generally have higher capital expenditures, operating expenditures, and leasing costs. Similarly, we also discussed in the *5G Fund Adjustment Factor Public Notice* the importance of demand factors and the role that expected revenues play in carriers deployment decisions. The Entry Model Adjustment Factor study found that, all else equal, areas with higher median household incomes are more likely to be covered, a finding consistent with the basic assumption that higher income areas are more profitable.

10. *Economic Analyses.* To inform the proposed adjustment factor values, the Office and Bureau included three economic analyses. The first analysis (the Entry Model) used coverage data to estimate the effect that an area’s physical and demographic characteristics have on carriers’ network deployment decisions. The second analysis (the Cell Site Density Model) examined how cell site spacing changes as terrain roughness increases. The third analysis (the Auction Bidding Model) used Mobility Fund Phase I (Auction 901) bidding data to estimate how terrain roughness and other factors affected carriers’ bids.

11. Discussion of the economic analyses in the record is limited, and no party submitted an alternative economic analysis. Some commenters argue that the Auction Bidding Model should not be used to determine the adjustment factor values because (1) bidding data from the Mobility Fund Phase I auction is distorted, (2) the Mobility Fund Phase I auction is not an appropriate analogue because it provided one-time funding for capital expenditures versus long-term support for capital expenditures and operational expenses, (3) bidding decisions were based on 2012 pricing that is not comparable to today’s

pricing, and (4) at the time of the Mobility Fund Phase I auction, carriers could still use network equipment from low-cost equipment suppliers that have since been designated by the Commission as national security threats.

12. We acknowledge the contextual differences between the Mobility Fund Phase I auction and the upcoming 5G Fund auctions, but do not find that such differences unduly undermine the analysis. While the timing and one-time funding nature of the Mobility Fund Phase I auction and the presence of Huawei and ZTE as low-cost equipment options for Mobility Fund Phase I support recipients may have influenced the absolute bid amounts, the commenters fail to explain why the relative bid amounts would differ significantly compared with a more recent long-term funding auction where bidders could not use Huawei and ZTE equipment. The absolute level of the bids does not necessarily affect the relative differences across areas. For example, if all bids were 20% lower in absolute level due to factors related to the auction's context, the ratio of bids across areas would be unaffected. We find it more likely that the calculated adjustment factor should be largely invariant to differences in funding type and radio equipment costs. There are two cases to consider. In the case where the costs to build and operate towers are the same across terrain types and more towers are needed to cover rougher terrain, the cost of radio equipment would have no effect on the calculated adjustment factors. In the case where towers cost more to build and operate in rougher terrain, the absolute cost of radio equipment could affect the adjustment factor. However, given that radio equipment costs are a very low percentage of the overall costs to build and operate a network, the change in the calculated adjustment factor would be negligible.

13. Similarly, arguments that the Mobility Fund Phase I auction is not an appropriate point of comparison because it did not provide funding for both capital and operational expenditures likewise do not undermine our analysis here because the adjustment factor values we adopt are meant to capture the relative differences in cost and business case for different areas. That is, reliance upon bid amounts in an auction that did not award operational expenses should not affect the relative differences in costs because bidders in the 5G Fund auctions will be able to consider the entirety of costs (including both capital and operational expenditures). Thus, any additional operational expenses will be reflected in higher bidding values in the auction but the relative differences between areas is likely to remain the same. Moreover, our conclusions about the appropriateness of using Mobility Fund Phase I auction data are also consistent

with all three models producing comparable adjustment factor estimates. We find that the information regarding the relative bidding incentives across areas produced by the Auction Bidding Model outweighs any concerns with the absolute levels of the bidding data.

14. *Use of an Adjustment Factor for Disaggregation of Legacy High-Cost Support.* In the *5G Fund Adjustment Factor Public Notice*, the Office and Bureau sought comment on the appropriate adjustment factor values for the disaggregation of legacy high-cost support to account for differences in costs across areas and the underlying methodologies that could be used to develop the values. In cases where the transition of legacy support occurs across areas of different types, such as eligible areas and ineligible areas, the adjustment factor would be used to scale the actual square kilometers associated with each disaggregated area. In the *5G Fund Report and Order*, the Commission concluded that the adjustment factor values that are adopted by the Office and Bureau for a 5G Fund auction also would be used for the disaggregation of legacy high-cost support. Accordingly, we adopt the adjustment factor values proposed in the *5G Fund Adjustment Factor Public Notice*, as set forth in Fig. 1 herein, for use in the process of disaggregating legacy support.

15. We note that some commenters oppose using the adjustment factor in the disaggregation process. They generally argue that, because the adjustment factor does not capture all of the characteristics of the particular service areas for which legacy support is provided (e.g., foliage) and the terrain categories are too broad, thereby disadvantaging the areas near the margins, it is not appropriate to apply the factor when disaggregating legacy support. They propose instead that the Commission rely on service providers' knowledge of their subsidized areas to estimate the costs of deploying in those areas.

16. In the *5G Fund Report and Order*, the Commission rejected the argument that the adjustment factor should not be applied to the disaggregation of legacy support, finding that “[u]sing an adjustment factor is appropriate because it will alleviate potential concerns over a carrier losing a disproportionate amount of its legacy support resulting from a disaggregation methodology in which more costly areas would be treated the same as less costly areas with respect to subsidies received.” As the Commission indicated, this approach will help ensure that legacy high-cost support is available for harder-to-serve areas.

17. We also note that there are other reasons to apply the adjustment factor to the disaggregation of legacy high-cost support. Using an adjustment factor to disaggregate legacy support is preferable to the administrative burdens that would arise from requiring service providers to disaggregate their costs, and furthermore, it avoids the potential incentive issues associated with service providers self-reporting their own costs. For example, where part of a legacy support recipient's service area would be served by a 5G Fund winner while its remaining area would continue to receive legacy support, the legacy support recipient would have the incentive to overestimate the amount of high-cost support flowing to the area that would continue to receive legacy support, thus maximizing the funds it would receive through preservation of service support. In addition, while we acknowledge that the adjustment factor does not account for all factors that affect network costs, the Commission indicated that the adjustment factor is meant to give an estimate of how a carrier may allocate legacy high-cost support within the area for which it receives such support. It is not meant to reflect the actual cost of deployment in that area. We maintain that applying an adjustment factor in the disaggregation process will lead to a more equitable distribution of legacy funding. Applying the adjustment factor will better reflect the distribution of high-cost support by accounting for cost differences arising from terrain elevation variation and business case differences arising from income disparities within a service area. Thus, we will use the adjustment factor values in Fig. 1 for the disaggregation of legacy high-cost support.

Federal Communications Commission.

**Marlene Dortch,**

**Secretary.**

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