



January 2021

# RDOF Broadband Results Raise Concerns About Execution, Financial Risk



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## Key Points:

- The FCC's recently-released results for the first round of the Rural Digital Opportunity Fund (RDOF) left many questioning how the commission decided to allocate the funds.
- Bids that included fixed wireless represented almost half of the proceeds awarded to the top 10 recipients. And while it's understandable why affordable fixed wireless played a large role in the initial round, gigabit speed claims seem optimistic.
- However, execution and financial risks could impede the ability of some of the smaller operators – who received a disproportionate amount of financial support – to follow through on their network build plans.
- The FCC also awarded significant financial support to SpaceX, which plans to use an unproven business model to provide high-speed, satellite broadband connectivity to rural America.
- RDOF success is defined by the FCC effectively distributing funds to maximize the impact on bridging the digital divide. Has the FCC done this? Time will tell, but there are doubters.

## Introduction

Last month the FCC released its initial results of the phase one RDOF auction, intended to bridge the digital divide by deploying high-speed broadband to unserved Americans. Based on industry reaction, there is a good bit of angst over how it played out.

Awards fell short of the commission's phase one \$16 billion budget allocation, awarding only \$9.2 billion. (The remaining \$6.8 billion will be rolled into phase two.) The cause of the uproar was how the money was allocated. For example, some Wireless Internet Service Providers (WISPs) received a significant amount of

**EXHIBIT 1: RDOF Auction Performance Tiers, Latency and Weights**

Performance Tier	Speed	Monthly Usage Allowance	Weight
Above Baseline	≥25/3 Mbps	≥250 GB or U.S. average, whichever is higher	50
Baseline	≥50/5 Mbps	≥250 GB or U.S. average, whichever is higher	35
Minimum	≥100/20 Mbps	≥2 TB	20
Gigabit	≥1 Gbps/500Mbps	≥2 TB	0

Latency	Requirement	Weight
Low Latency	≤100 ms	0
High Latency	≤750 ms & MOS ≥4	40

Source: FCC

government support that appears to be much larger than anything they have experience deploying. This naturally raises questions about execution and the ability to secure the necessary letters of credit (LOC). However, even more concerning is the FCC decision to award \$885.5 million to SpaceX, which is owned by the richest person in the world, for its unproven Low Earth Orbiting (LEO) satellite business.

This report examines what it would take for the winning wireless providers to meet their data speed claims, and the potential risks of falling short of their build plans. We also dig into the LEO satellite business and outline some of the challenges facing the technology.

### **RDOF Overview**

The Rural Digital Opportunity Fund (RDOF) is a 10-year, \$20.4 billion broadband funding program that is repurposing legacy landline support from the Universal Services Fund. It is the FCC's latest broadband incentive program and its largest effort to close the urban-rural digital divide.

RDOF is broken down into two phases. The first phase is exclusively for unserved areas while the second phase includes underserved markets. Phase one funds were awarded via a reverse auction whereby service providers bid on markets they wish to serve. The FCC is technology

agnostic, but it weighed bids based on speeds and latency (*Exhibit 1*). Winning bidders are required to secure a letter of credit to ensure the FCC has recourse to claw back awards in the event bidders do not meet network milestones.

It's important to recognize that organizations were incentivized to bid with network solutions that offer the fastest speeds for the lowest cost. Fixed wireless and satellite bids tend to maximize this equation, but network speeds and operators' ability to deliver on their bids are not always as they seem.

### **Fixed Wireless**

Fixed wireless played a key role in the RDOF as bids that included fixed wireless represented almost half of the proceeds awarded to the top 10 recipients (*Exhibit 2*). This is an interesting development as, historically, fixed wireless networks in rural America have largely consisted of Wi-Fi networks using unlicensed spectrum. These networks have struggled to provide consistent throughput speeds with business structures and management teams that do not always have the breadth and depth of experience vis-à-vis large regional and/or national operators. So, the disproportionate level of support awarded to WISPs/ fixed wireless left many scratching their heads. From a technology perspective, we can see a path to how these

**EXHIBIT 2: Top 10 RDOF Winners**

Company	Amount	States	Technology
LTD Broadband	\$1,320,920,718	15	fiber and fixed wireless
Charter Communications	\$1,222,613,870	24	fiber and cable
Rural Electric Cooperative Consortium	\$1,104,395,953	22	fiber
SpaceX	\$885,509,638	35	LEO satellites
Windstream	\$522,888,779	18	DSL, fiber, fixed wireless
Nextlink	\$429,228,072	12	fixed wireless
Frontier	\$370,900,832	8	fiber and fixed wireless
Resound Networks	\$310,681,608	7	fiber and fixed wireless
Starry	\$268,851,315	9	fiber and fixed wireless
Century Link	\$262,367,614	20	DSL and fiber
Total	\$6,698,358,399		
Fixed Wireless \$	\$3,223,471,324		
<b>Fixed Wireless %</b>		<b>48%</b>	

Source: LightReading; FCC

networks could be built. Fixed wireless equipment has evolved and new spectrum business models are enabling smaller operators to build carrier-grade fixed wireless networks at reduced costs. However, execution and financial risks could get in the way of deploying them.

### Technology

Some of the winning fixed wireless companies placed bids in the gigabit speed tier. This is technically possible, but is it practical? Verizon has been beating the high-speed fixed wireless drum for a couple years now. But unlike the RDOF recipients, they've been deploying the service in non-rural markets where the spectrum propagation challenges are less of an issue than in rural America. Despite these non-rural advantages, recent comments made by Verizon management suggests they may be walking back their ambitions. So the question is if Verizon is struggling to make high-speed fixed wireless work in non-rural markets, how could much smaller operators make it work in rural America, where it's even more costly to build?

In order to deliver gigabit speeds in rural America, an operator would need to use either millimeter wave spectrum, or the 6Ghz band for the "last mile" to the premise. The challenge is that millimeter wave spectrum only travels ~1,000 feet from the access point, assuming there is nothing in the way (think trees, hills, etc.). So, in order to serve a sparsely populated market with a gigabit fixed wireless service, the ratio of access points to users would be incredibly high – much higher than Verizon's ratio in non-rural markets. This raises questions about the economic feasibility of such a network.

Then there is the backhaul challenge. Some proponents suggest that through mesh networking and point-to-point microwave backhaul, fiber would not be needed very deep into the network. Perhaps in some cases this is true, but the devil is in the detail. The biggest challenge we see with microwave backhaul is the line-of-sight requirement. Also, depending on how far the service area is from the fiber connection, it's conceivable that it would need multiple hops between microwave links. This could slow down the backhaul connection, making it difficult to deliver gigabit speeds to the premise.



Another option for gigabit service is to use unlicensed spectrum in the 6GHz band where an enormous amount of capacity exists. The 6GHz signal propagates better than millimeter wave, but the national wireless operators – AT&T in particular – are concerned about interference with their existing networks, asking the FCC to implement a plan to mitigate interference from new users. Until this is resolved, it could hinder the adoption of this band for widespread fixed wireless deployments.

For those winning bidders who plan to offer above baseline speeds (defined as  $\geq 100/20\text{Mbps}$ ) things get much easier. These operators can use mid-band spectrum (such as unlicensed CBRS) that offers much better propagation characteristics. For example, homes can be reached over 8 miles from the access point and the signal isn't degraded by foliage or hills like it is with millimeter wave. This increased range also helps with backhaul as there would be less fiber needed and less hopping between microwave links.

### **Execution and Financing**

While the technical aspects will be challenging for those deploying gigabit fixed wireless networks, they are not insurmountable. Perhaps the bigger risk is one of execution and financing. On the execution front, some

bidders won a disproportionately large amount of support relative to the size of their network. LTD Broadband, the largest winner in the auction, won support to provide coverage in 15 states. Currently, LTD Broadband offers fixed wireless service in parts of South Dakota and Minnesota and based on the speeds advertised, it appears they are using basic off-the-shelf Wi-Fi equipment. For example, their fastest residential speed tops out at 35Mbps/7Mbps, which is just slightly higher than the FCC's broadband definition of 25Mbps/3Mbps. So with their RDOF proceeds, LTD Broadband plans to increase the number of states where it will offer service by a factor 7.5 with (presumably) technologies it has never deployed before. Seems like lots of execution risk to us.

On the financing front, RDOF winners are required to obtain a LOC so that in the event they fail to meet their buildout requirements, the FCC has recourse to claw back whatever awards that fell short of the commitment. And while this seems straightforward and logical, problems arise when the winning bidders do not have the financial strength to qualify for the necessary LOC.

### **Satellite Broadband**

SpaceX was another big winner at the auction with total proceeds of \$885.5 million, which is even more shocking than the dollars allocated to some of the smaller fixed wireless operators. SpaceX is a private company owned by Elon Musk, the richest person in the world. SpaceX plans to offer high-speed satellite service to remote parts of the world by deploying thousands of LEO satellites.

LEO satellite constellations promise to offer much faster speeds than their geostationary (GEO) counterparts. This is due to the fact that LEOs orbit the earth much closer than GEOs (think 100 – 1,200 miles versus 22,236 miles) making the time it takes for the signal to “roundtrip” the network much shorter. SpaceX, and other LEO proponents such as Amazon's Jeff Bezos, believe that technology advancements, reduced launch costs, and reduced ground station costs are reasons why LEO broadband is ready for prime time.

SpaceX launched its satellite broadband trial dubbed “Better Than Nothing Beta” last year and participants had to buy the ground equipment for \$499 then pay \$99 per month for the service. SpaceX said users could expect to see speeds between 50 to 150 Mbps but there would be brief periods of no connectivity.

At this point we think the jury is still out on LEO satellite broadband. There are lots of questions regarding the impact thousands of new LEOs in space will have on space junk. Additionally, will there be enough demand in rural markets and if not, does that mean LEO broadband providers need to compete in urban and suburban markets – likely a tough place for them to take share in. Finally, despite the fact that equipment costs have come down, \$500 for ground equipment is not cheap.

### **Conclusion**

The first phase of the RDOF was for unserved markets, so given their high-cost nature it makes sense that affordable fixed wireless played such a large role. In the subsequent round, we expect fixed wireless to play a reduced role in underserved areas, which tend to be more densely populated. Technically speaking, with enough government support, unserved markets can be connected with gigabit speeds via fixed wireless, but execution risks and the

ability to secure LOCs could impede an operator’s ability to deliver on its bid. On the satellite front, awarding such a large amount of money to an unproven business model, and to a company that has plenty of access to capital, is a questionable decision. At the end of the day, it’s important to recognize that success is defined by the FCC effectively distributing Universal Service Funds that maximize the impact on bridging the digital divide. Time will tell if they pulled it off. ■

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