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Equipment Ban Creates Static for Rural Telecom Operators

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Key Points:

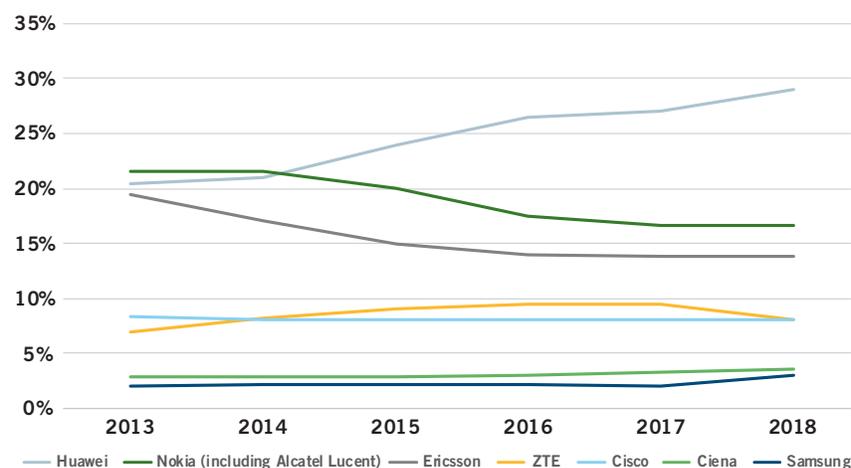
- Rural operators will be the ones hurt the most by the executive order, which will likely soon ban U.S. telecom operators from buying Huawei-made telecom equipment.
- A complete rip and replace of Huawei equipment will be expensive and disruptive to network operations, both short- and long-term.
- Proposed legislation would provide up to \$700 million in government support to help pay for the cost to replace Huawei equipment. CoBank estimates that the actual costs could top \$1 billion.
- Operators forced to replace equipment should implement a more vendor-agnostic approach through a network virtualization strategy.
- Without significant government support, rural America’s access to communication services will be damaged.

Introduction

On May 15, 2019, President Trump issued an executive order laying the groundwork to block certain Chinese telecommunication companies from selling equipment to U.S. companies. The executive order is extremely broad and gives the government a wide range of powers. The Commerce Department has 150 days after the executive order was signed to establish rules that identify “particular countries or persons” as foreign adversaries. Huawei was not specifically named in the executive order, but it’s conventional wisdom that they will be listed as a foreign adversary. In conjunction with the executive order, the Department of Commerce added Huawei to its “entity list,” which restricts how U.S. companies engage in commerce with certain foreign organizations.

Huawei is the telecommunications equipment industry’s global market share leader (*Exhibit 1*). It dominates the Chinese market and is a major player in Europe and emerging markets. In the U.S., Huawei’s presence is primarily limited to rural operators.

EXHIBIT 1: Worldwide Telecom Equipment Market Share



Source: Dell'Oro Group

Rural Operator Exposure

Many rural operators have had few options but to use Huawei's radio frequency (RF) and core technologies in their networks. In some cases, competing vendors would not respond to network equipment requests for proposals, or the prices quoted were 30% to 40% higher than what Huawei was offering. Before buying equipment from Huawei, many rural operators talked to the Federal Communications Commission (FCC) and the Rural Utilities Service (RUS) to ensure that such a relationship would not violate any laws, regulations, lending covenants, etc. When rural operators got the green light to work with Huawei, they believed they were being good stewards of their government subsidies to build communication networks.

More so than any other operators in the country, rural operators have to count their pennies. The lack of scale makes infrastructure, handsets, etc., more expensive for rural operators than for the national operators. Rural operators also face increased competition from national operators that are building out network footprints to support new programs such as AT&T's FirstNet and the proposed T-Mobile and Sprint merger network expansion. These threats not only represent new competition, they can also eat into rural operators' roaming revenue.

Money is Needed

It's not yet clear if operators who have Huawei equipment in their networks will be required to replace it with non-Chinese equipment. Doing so would be time-consuming and costly. We estimate that a typical rip and replace program would take three to seven years. According to a June 10, 2019, report from *The Wall Street Journal*, the cost to replace Huawei equipment is estimated to be \$5,000 per subscriber. It would be impossible for any rural operator to afford such a program without significant federal assistance.

U.S. legislators have introduced a bill that would provide up to \$700 million to help telecom carriers remove Huawei equipment from their networks. Our analysis shows it's conceivable that the cost to rip and replace banned equipment in rural networks are likely to top \$1 billion (*Exhibit 2*). Beyond the initial rip and replace, U.S. rural operators would be forced to pay western suppliers' higher software upgrade/licensing fees.

If U.S. carriers are required to rip and replace Huawei equipment, government support will be crucial to avoid putting rural operators in dire straits. The legislation is well intended, but the pathway to it becoming law is uncertain.

Operational Challenges

System-wide rip and replace is seldom done. Typically, equipment is retired gradually and replaced by next generation infrastructure, allowing carriers to replace the incumbent infrastructure vendor methodically. A system-wide rip and replace with a new vendor can lead to service outages and other operational issues that can affect network access.

Even if the government does not require a rip and replace, some operators may still be forced into doing so. Because manufacturers typically interpret industry specifications differently, mixing and matching vendor

EXHIBIT 2: Estimated Replacement Costs (Rip and Replace)

RF Estimates		
Total Number of Cell Sites	323,448	
Total Number of Macro Sites	291,103	
Percent of Macro Sites in Rural America	15%	
Total Macro Sites in Rural America	43,665	
Percent of Rural Sites Impacted by Executive Order	25%	
Rural Sites Impacted by Executive Order	10,916	
Equipment Costs to Rip and Replace	\$70,000	
Labor and Logistics	\$10,000	
Total Replacement Costs per Macro Site	\$80,000	
<i>Total RF Cost to Rip and Replace</i>		<i>\$873,309,600</i>
Network Core Estimate		
Number of Operators with Banned Cores	30	
Replacement Cost per Core	\$6,000,000	
<i>Total Network Core Replacement Costs</i>		<i>\$180,000,000</i>
Optical Equipment		
Number of Operators with Banned Equipment ¹	30	
Replacement Costs	\$750,000	
<i>Total Optical Replacement Costs</i>		<i>\$22,500,000</i>
<i>Estimated Network Replacement Costs</i>		<i>\$1,075,809,600</i>

Source: CoBank

¹This assumes banned equipment is limited to rural operators. If larger, regional operators are found to have such equipment, replacement costs would be higher.

equipment in a network can cause problems. For example, when networks have multiple RF vendors, product development and testing costs increase because new products need to be developed, tested, and supported on multiple vendor platforms.

In Europe, where Huawei's business has thrived, operators have mandated that their equipment work with Ericsson and Nokia. That has not happened in the U.S. as none of the national operators use Chinese-made wireless equipment. The lack of integration

between Chinese-made and western vendors in the U.S. is a problem for rural operators who want to integrate new equipment with legacy Huawei infrastructure.

Other Options

Cheaper and easier options exist. For example, security firms can monitor network traffic in real-time and flag suspicious activity. It's unlikely that hackers can get into networks by compromising RF equipment since such equipment is on the edge of the network and doesn't typically house customer data. However, the network core might be a different scenario, and Huawei does supply cores to many rural operators.

This option might address security-related concerns but likely doesn't fit into the administration's larger trade negotiation strategy.

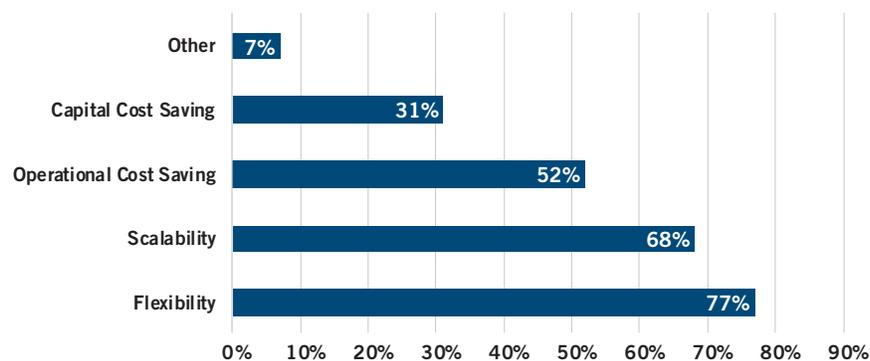
Network Strategies

If operators are required to rip and replace banned equipment, they should consider a vendor-agnostic approach such as "virtualization,"

which allows operators more flexibility and control over their network.

Historically, when a vendor like Cisco, Ericsson, or Nokia sold networking infrastructure to operators, they bundled proprietary software with their hardware. This bundling approach made the operators beholden to their suppliers, and required them to pay margin-rich licensing fees/software upgrade fees. With virtualization, operators decouple this bundle and take control of the software that runs their network, avoiding costly software fees. Also, the

EXHIBIT 3: Network Virtualization Benefits



Source: vmware survey

software typically runs on commodity hardware which reduces capital and operational expenditures. But equally important, virtualization gives operators a tremendous amount of supplier flexibility (*Exhibit 3*). Operators can much more easily mix and match vendors or replace an existing vendor. Rural operators will need this kind of leverage if Huawei is no longer an option for them. Lastly, network virtualization makes it much easier and cheaper to deploy new network products and services.

Conclusion

Without specific examples of how Huawei equipment poses a national security threat, it's difficult to predict how this dispute will play out. It's imperative that the executive order is implemented in such a way that rural communications services and networks are not negatively

impacted – anything less would run counter to the administration's efforts to bridge the urban-rural digital divide. It's clear that government support is required should operators need to rip and replace legacy Huawei equipment. This situation is not ideal, but it does represent an opportunity for operators to virtualize part of their network, which will give them flexibility that they've never had before. ■

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