

**Before the
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION,
U.S. DEPARTMENT OF COMMERCE**

In the Matter of)
)
Improving the Quality and Accuracy)
Of Broadband Availability Data) Docket No. 180427421-8421-01
)
)

COMMENTS OF DEERE & COMPANY

Deere & Company (NYSE: DE) (“Deere”), by its undersigned counsel, submits these comments in response to the National Telecommunications and Information Administration (“NTIA”) Notice and Request for Comment (“Notice”) in the above-referenced docket.¹ Deere applauds the NTIA’s recognition of the growing importance of broadband connectivity to the nation’s economic growth and social advancement yet the persistent significant disparity of broadband availability in rural areas. Deere agrees that “[k]nowing where the persistent gaps in broadband exist is crucial to enabling more efficient and effective investments in broadband infrastructure . . . “ but existing systems for identifying and measuring gaps in broadband availability are limited, incomplete and inaccurate. In Deere’s view, the lack of reliable and complete data regarding nationwide broadband availability significantly hampers and distorts policymaking and investment decisions and is itself a reason why rural areas continue to be left behind in the broadband economy.

Deere thus strongly supports the NTIA’s commitment to tackling this issue and to seeking public input on:

¹ *National Telecommunications and Information Administration Notice and Request for Comment*, 83 Fed. Reg. 24,742 (May 30, 2018) (“Notice”).

- the potential sources of broadband availability data,
- mechanisms to validate data, including those that use multiple data sources,
- new techniques and approaches to leverage such data, and,
- techniques to inform broadband planning at the state and national levels by promoting the most efficient use of state or federal funding in areas that are insufficiently served by broadband.²

As an active innovator and stakeholder in the rapid and extensive deployment of high-speed broadband in agricultural areas, Deere offers suggestions on new approaches and methodologies to collecting data, and improvements for identifying areas with insufficient broadband capacity, particularly in rural agricultural areas. Progress on the fundamental issue of how to improve measuring and mapping of broadband availability in the United States is important to rural areas in the United States³ and the U.S. agriculture sector⁴ but also has significance to the nation's position in international trade in agricultural products and global leadership in 5G and advanced services.

I. Modern Data-Intensive Smart Farming and Precision Agriculture Techniques Require Rapid and Comprehensive Broadband Deployment

Technology advancements -- and the related need to understand the status of broadband availability in rural areas -- are critical to the agriculture-based economies that exist in much of rural America. Since 1837, Deere has delivered innovative equipment and technologies to rural

² *Id.* At 24, 749.

³ The agricultural economy extends to a wide range of other sectors that contribute added value to the economy. In 2014, 17.3 million full- and part-time jobs were related to agriculture—about 9.3 percent of total U.S. employment. Direct on-farm employment provided over 2.6 million of these jobs.³ Employment in related industries supported another 14.7 million jobs. *See* USDA, Ag and Food Sectors and the Economy, available at: <http://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy.aspx>.

⁴ Agriculture and agriculture-related industries contributed \$835 billion to the U.S. gross domestic product (GDP) in 2014, a 4.8-percent share. *See* USDA, Ag and Food Sectors and the Economy, available at: <http://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy.aspx>.

⁴ *See id.*

America and today is a world leader in the manufacture of agricultural, construction, and forestry machinery, diesel engines, and other machinery equipment. Deere provides advanced agricultural, construction and other equipment and services to customers to cultivate, harvest, transform, enrich and build upon the land to meet the world's dramatically increasing need for food and materials.⁵ Today, Deere's agricultural technology includes pioneering state-of-the-art data and information solutions designed to greatly enhance productivity, environmental sustainability, and human safety.

Broadband services, especially mobile broadband, are critical to the nation's agricultural areas. Gone are the days when a producer's crop yield can be improved simply by using more and bigger agricultural machines. Instead of using equipment that is bigger, stronger and faster, producers must rely on technology that makes farming easier, smarter, and more efficient. With the use of "smart farming" technologies incorporated into smart tractors, combines and production systems and other moving machinery in the field, precision agriculture harnesses information technology to achieve material boosts in productivity.⁶

Modern farming operations increasingly demand high-speed mobile broadband to support "smart farming" approaches that are key to increasing crop yields, reducing costs, and managing environmental burdens. Modern agricultural machines equipped with state-of-the-art technologies share data between and among machines, the farmhouse, and third-party vendors

⁵ World population is projected to climb from approximately 7 billion today to approximately 9.7 billion by 2050. United Nations Department of Economic and Social Affairs, World Population Projected to Reach 9.7 billion by 2050, available at: <http://www.un.org/en/development/desa/news/population/2015-report.html>.

⁶ For example, informed decisions about irrigation, fertilization and harvesting can increase corn farm profitability by \$5 to \$100 per acre. Precision Agriculture Eats Data, CPU Cycles: It's a Perfect Fit for Cloud Services, K. Marko, 8/25/15, at www.forber.com/sites/kurtmarko/2015/08/25/precision-ag-cloud.

and dealers, 24 hours a day, capturing the full benefit of favorable weather conditions and peak growing seasons, and eliminating equipment downtime for repairs, reloading, refueling, etc.

While these information and communication technology-integrated systems started on large machines (tractors, combines, etc.), they have rapidly spread to the entire agricultural production chain. Machine-to-machine (“M2M”) communication and machine-to-farmhouse (“M2F”) communication are components of modern farming. John Deere’s Machine Sync™,⁷ Remote Display Access (“RDA”),⁸ Service Advisor Remote (“SAR”),⁹ and JDLink™¹⁰ are components of the in-field network. Real Time Kinematics (“RTK”)¹¹ systems leverage cellular connections to access dealer, vendor, and market applications.

Broadband services, especially mobile broadband, are critical to support modern agriculture. Unfortunately, despite the clear and growing demand, high-speed mobile broadband has not been consistently available to users involved in rural agricultural operations on croplands and rangelands.

⁷ John Deere Machine Sync™ allows coverage map sharing and guidance line sharing to improve planting, seeding, spraying and nutrient application. This increases efficiency in the field, because two machines can work simultaneously with each operator having immediate access to coverage maps and guidance lines to ensure complete field coverage. Machine Sync also makes harvesting easier with automated communication and logistics for combines and grain carts, by allowing the combine operator to automatically control the location of the tractor and grain cart while unloading on-the-go.

⁸ Remote Display Access (RDA) enables farm managers and dealers to remotely assist operators with machine setup, setting adjustments and operation. RAD allows farmers to establish a live connection to the GreenStar 2630 display in the cab of a machine.

⁹ Service Advisor Remote (SAR) allows a Deere dealer to remotely access a machine’s diagnostics systems so they can make sure it is running at peak performance. SAR reduces diagnostic call-outs, increases machine uptime, and identifies potential issues early.

¹⁰ JDLink™ allows farmers to manage operations in real-time without being in the cab. JDLink™ is John Deere's telematics system connecting all make/model machines in the field with the office and mobile devices. The technology is based on a modular telematics gateway (MTG) controller that collects and transmits data via cellular network, selective data points even in near real-time. The solution enables customers to keep track of their fleet, monitor work progress, manage logistics, access important machine information, analyze and optimize machine performance, receive alert SMS or eMail messages, perform remote operator support and automate data exchange.

¹¹ RTK supplements GPS signals to achieve up to one-inch location accuracy. It is not a stand-alone localization system such as GPS.

II. The FCC, NTIA And Other Agency Programs Aimed at Facilitating Broadband Deployment Should Not Limit Assessments of Broadband Availability to Census Blocks

At the outset, Deere urges the NTIA in its evaluation of how to improve the extent and accuracy of broadband mapping, to consider actions that would facilitate broadband deployment in areas where Americans live, work and travel. Accurate and reliable mobile broadband deployment data is essential to policymakers and consumers, both business and residential, but reporting and mapping have been unnecessarily skewed to coverage of residential populations without regard to other important sectors.¹² In particular, Deere welcomes this opportunity to provide its perspective on broadband mapping needs especially as it relates to identifying unserved and underserved agricultural lands, including croplands and ranchlands.

Deere agrees with NTIA that the Form 477 deployment data collected by the FCC, presently the only source of data depicting nationwide broadband availability, does not adequately or accurately capture the state of high-speed broadband deployment in rural areas.¹³ Form 477 data, self-reported semi-annually to the FCC by voice and broadband telecommunications carriers, reports services provided to residential populations as measured by Census Blocks. In rural areas where population densities are low, Census Blocks can cover very large geographic areas compared to urban and suburban areas. Nonetheless, in the current reporting system, carriers reporting broadband service deployment in a discrete area within a Census Block will report the entire block as covered. Thus, in rural areas, the Census Block reporting method is flawed because it can substantially overstate the extent of actual broadband service coverage. Given the very limited sources of broadband availability data, this reporting

¹² Accordingly, the NTIA's CPS Supplement detailed information on household adoption and Internet usage and the household usage questions in the American Community Survey provide helpful information about residential usage but does not address demand for broadband in other contexts.

¹³ Notice at 24,748

significantly distorts funding and other broadband deployment policies in a way that overlooks the needs of rural areas. Similarly, reporting programs that measure adoption and usage of *households* also skews data to reflect deployment status of residential population centers ignoring the important and growing demand for high-speed broadband by rural business and other users, large and small.

Deere applauds changes in agency rules that would update and improve the way broadband coverage is evaluated. For instance, the FCC's Mobility Fund rules were revised to expand how the FCC assesses where funds should be distributed beyond residential locations to include road miles. While the road miles metric appropriately expanded the agency's consideration beyond mere residential user locations, even this metric does not adequately cover significant areas of agricultural operations in which access to broadband services is increasingly important. Moving to a geographic-based metric further improves the way policymakers assess broadband deployment but the Census Block and Form 477 approach remains anchored in coverage defined by residential populations. As a result, it does not adequately identify significant areas of agricultural operations in which access to broadband services is increasingly important.

Deere urges that broadband availability include an assessment of "cropland" and "ranchland" coverage. Broadband availability should be, wherever possible, specifically identified by technology (LTE mobile, fixed wireless, wireline, cable, satellite, etc.) and available speeds. "Smart farming" and precision agriculture techniques use a variety of technologies but availability of high-speed LTE wireless is a priority. Transmission through wireline, fixed wireless, satellite or low power radios can help to augment and address very specific situations but none of these technologies standing alone or in combination, absent LTE

mobile, have the range, bandwidth, or lack of latency to meet the needs of modern agricultural operations. Given that agricultural operations are an important -- and often the most important -- economic driver in many rural areas, efforts to promote broadband deployment where people work, as well as live and travel, and to empower innovation in the nation's rural areas will fall short if assessments of broadband availability overlook these important agricultural areas.

III. The FCC and NTIA Should Incorporate Available Data and Definitions from Other Agencies and Laws to Identify Availability on Croplands and Ranchlands

With respect to the geographic determination of where broadband facilities are needed, but not currently deployed, Deere urges the NTIA to examine “cropland” and “ranchland” coverage as a key indicator of where broadband deployment gaps exist in the United States. There are a number of ways that such coverage can be evaluated. First, the NTIA should consider the USDA's GIS data for cropland.¹⁴ The USDA annually takes a very detailed, spatial analysis of crop operation boundaries in the United States, and publishes that information through its “Cropland Data Layer” (“CDL”). This information provides a deep analysis of those areas in the United States that are under cultivation, and provides specificity on the type of crop, as well as changes over time. In 2014, the USDA estimated that 330.5 million acres were planted with principal crops. Clearly, special focus should be paid to these and other geographic areas where agriculture plainly accounts for a significant portion of the local economy.

Second, the NTIA could consider the US Geological Survey's (“USGS”) Land Use information to review those areas of the country that are categorized as “cropland” or

¹⁴ See USDA GIS data for cropland at: <http://www.nass.usda.gov/research/Cropland/Release/index.htm>. See also, the USDA website at <http://www.ers.usda.gov/data-products/major-land-uses/glossary.aspx> for a discussion of total cropland, cropland used for crops (including cropland harvested, crop failure, and cultivated cropland), cropland used only for pasture, and idle cropland.

“agricultural land.” The USGS produces a map showing cropland areas in the United States, which may also be a point of information.¹⁵

Third, the NTIA could consider definitions related to agricultural operations set by other governmental bodies. For example, the definitions of “crop operation” and “crop operation property” in the Iowa Code may be informative, and if adopted by the Commission, would allow the Commission to clearly define those “cropland” areas that should be prioritized for support:

“Crop operation” means a commercial enterprise where a crop is maintained on the property of the commercial enterprise.

“Crop operation property” means any of the following:

- a. Real property that is a crop field, orchard, nursery, greenhouse, garden, elevator, seed house, barn, warehouse, any other associated land or structures located on the land, and personal property located on the land including machinery or equipment, that is part of a crop operation.
- b. A vehicle used to transport a crop that was maintained on the crop operation property.

Deere does not suggest that these are the *only* means of determining where agricultural activities exist, but provides only examples of different ways the NTIA can use existing government data and/or legal distinctions to aid in determining what geographic areas should be considered “cropland.” Other similar geographic-centric or functional use-centric metrics may exist to describe the locations of other activities that are not tied to population centers.

¹⁵ See USDA, National Agricultural Statistics Service, Iowa Corn Visit (July 2014), available at:

http://www.nass.usda.gov/Education_and_Outreach/Reports,_Presentations_and_Conferences/Presentations/NASS-SD-CB.pdf; See USGS, Global Croplands, available at: <https://croplands.org/app/map?lat=31.24099&lng=-69.08203125&zoom=4>.

IV. The NTIA Should Accept Other Sources of Coverage and Verification Data

The analytical data sources referenced should be cross-referenced to broadband availability data that could be made available from a wide range of sources including mobile carrier coverage maps, user machine modem connection statistics,¹⁶ information from other agency and state resources and private parties, with these and other similar land use or functional use data sources. These sources could be used to determine where broadband coverage is lacking, where it is not, and the quality of broadband services in those areas where it does exist.

To verify coverage information and confirm granular, accurate broadband deployment data, Deere urges the acceptance of some form of “on the ground” test data (via app or drive tests) to verify broadband coverage. Test results will help ensure the accuracy of coverage data showing the actual consumer experience.¹⁷ If crowd-source data provides timely and accurate data, the NTIA should accept such data as well.

¹⁶ For example, Deere assesses gaps in modem coverage in certain states for marketing purposes and to provide ongoing support to its equipment customers and dealers.

¹⁷ Speed-test requirements must be carefully drawn so as not to swamp providers, especially smaller providers, with excessively burdensome requirements

To the extent that the NTIA receives a broad range of suggestions for possible data collection and existing data sets, Deere urges NTIA to continue the public dialogue to determine how best to improve the scope and accuracy of broadband availability data.

Respectfully submitted,

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