

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Inquiry Concerning the Deployment of Advanced)	GN Docket No. 15-191
Telecommunications Capability to All Americans)	
In a Reasonable and Timely Fashion, and Possible)	
Steps to Accelerate Such Deployment Pursuant to)	
Section 706 of the Telecommunications Act of)	
1996, as Amended by the Broadband Data)	
Improvement Act)	

COMMENTS OF DEERE & COMPANY

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Dated: September 15, 2015

Executive Summary

Deere & Company (NYSE: DE) (“Deere”) appreciates the opportunity to provide input on the state of broadband availability in the United States, especially in rural and agricultural areas, as well as suggestions on how FCC policy can be directed towards bridging the gaps between those that have access to broadband and those that do not. Deere respectfully asserts that it is time for the FCC, and other U.S. government agencies with broadband deployment mandates, to view broadband availability through an additional lens--one that incorporates a geographic and functional usage metric aimed at advancing broadband deployment to industries and economic activities where access to this key input has fallen behind. In this context, Deere believes that the FCC needs to consider new approaches to examining broadband availability and usage in the United States, and needs to make deployment of broadband to rural and agricultural areas a priority.

As it undertakes a review of the “availability” of broadband services in the United States, the Commission should consider areas of the U.S. economy (and other areas that benefit the public interest) where broadband is unavailable from a functional usage perspective. There are a number of broadband use markets, such as agricultural operations, that are simply overlooked by the Commission’s current broadband deployment policies. By reviewing those areas of the economy that lack broadband access, rather than simply focusing on population-based coverage, Deere hopes that the Commission can start closing the broadband gap in rural and other underserved areas. In this regard, Deere urges the FCC to examine “cropland” coverage as a key indicator of where broadband deployment gaps exist.

Deere also respectfully submits that the Commission should update its single broadband speed standard to determine whether the needs of the various functional use markets are being

met. The Commission should recognize alternative frameworks that promote deployment of other levels of broadband to areas that currently lack any coverage. Machine-to-machine and machine-to-farm agricultural operations need broadband to support telematic services including voice, and the transfer of up-to-date information on environmental, market, weather, and other data to support agricultural operations. It would be better to establish policies to allow for the immediate deployment of technologies that can fit this need than force consumers to wait for years before providers are willing to enter the market at much higher speed tiers.

With respect to the transmission medium, wireless service – both fixed and mobile – will be the superior technology choice to achieve cost-effective coverage for many rural areas including farm-intensive areas with significant tracts of cropland. Deere supports stable and robust funding for mobile operations including continuing funding for Mobility Fund Phase II and targeted changes to the Commission’s eligibility and availability metrics to ensure coverage for all areas where people live, work and travel. The FCC should amend its CAF rules so that smaller rural providers can also receive and use support for upgrading middle-mile facilities--all carriers should be eligible to receive support for middle-mile facilities that support wireline backhaul for mobile broadband, not just for middle mile facilities that support wired last mile connections. The Commission should also consider farm institutions or “crop operations” as “anchor institutions” under the Commission’s support rules. Support should also be available for standalone broadband services, which prioritizes competition and advances consumer interests.

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COMMENTS OF DEERE & COMPANY

I. Introduction and Background

Deere & Company (NYSE: DE) (“Deere”), by its undersigned attorneys, submits these reply comments in response to the Notice of Inquiry in the above-referenced docket.¹ Deere is a world leader in the manufacture of agricultural, construction, and forestry machinery, diesel engines, and other machinery equipment. It provides advanced construction equipment to builders of infrastructure, and agricultural and other equipment and services to customers that cultivate, harvest, transform, enrich and build upon the land to meet the world’s dramatic increasing need for food. Deere has delivered innovative equipment since 1837, and today, is pioneering state-of-the-art data and information solutions designed to greatly enhance productivity and environmental safety.

Deere has also been a pioneer in agricultural technological advancement for over 150 years, giving farmers access to tools for increased efficiency and production. In today’s

¹ *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans In a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, Eleventh Broadband Progress Notice of Inquiry, FCC 15-101, GN Docket No. 15-191 (rel. Aug. 7, 2015) (hereinafter referred to as “*NOI*”).

agricultural sector, farmers are compelled to sustain unprecedented high levels of productivity by carefully managing costs and increasing yields from the same amount of land. To achieve this, farmers demand agricultural equipment and services that enable them to acquire and analyze real-time agricultural data to minimize the amount of seed, fertilizer and pesticides needed and reduce costs for fuel, labor, water, and identify best practices for fields in a given location. Deere's FarmSight™, for instance, gives farmers access to detailed agronomic information in the field essential for improved decision making with respect to managing costs and recourses.

Construction vehicles are likewise increasingly turning to highly advanced telematic systems to enhance the machinery and its efficiency.² Using WorkSight™ tools, operators know when machines are idling excessively, inactive, running at very high loads for long periods of time, or moving when they should not be. Operators are thereby able to reduce unnecessary fuel consumption, view engine load and energy consumption, match machine size to the job, monitor loader payloads and trip counters to ensure proper loads and maximize efficiency, and set up virtual fences and authorized hours of use to improve security. These information and analytical tools are thus essential to increase efficiency, cut costs, and monitor safety systems.

Deere recognized early on the potential productivity gains that could be achieved by tapping into the digital and information revolution, and nearly ten years ago, Deere started furnishing equipment with telemetrically enabled mobile systems. Since January 2011, all of Deere's large self-propelled agriculture, forestry and construction equipment models (except skid steer loaders) incorporate JDLINK™ telematic modems.

² Deere provides a range of information solutions under its WorkSight™ system that enable construction crews to optimize equipment use and safety, such as JDLINK™ Telematics, Machine Health Prognostics, Remote Diagnostics and Programming, Payload Weighing, and Grade Control.

While these information and communication technology-integrated systems started on large machines (tractors, combines, etc.), they rapidly spread to the entire agricultural production chain. Machine-to-machine (“M2M”) communication such as MachineSync™ and machine-to-field communication have become current practice. Remote Display Access (“RDA”), Service Advisor Remote (“SAR”) and JDLink™ are examples of these systems. Real Time Kinematics (“RTK”)³ systems leveraging cellular connections are also becoming widespread. Deere’s agricultural FarmSight™ system leverages a wide range of data points to provide individual remote monitoring of machines to enable preventative maintenance and optimized fuel consumption and output performance.

Deere appreciates the opportunity to provide input on the state of broadband availability in the United States, especially in rural and agricultural areas, as well as suggestions on how FCC policy can be directed towards bridging the gaps between those that have access to broadband and those that do not. Deere respectfully asserts that it is time for the FCC, and other U.S. government agencies with broadband deployment mandates, to view broadband availability through an expanded lens--one that incorporates a geographic and functional usage metric aimed at advancing broadband deployment to industries and economic activities where access to this key input has fallen behind. In this context, Deere believes that the FCC should be open to new approaches to examining and ultimately expanding broadband availability and usage in rural areas of the United States. In particular, the Commission can make new progress toward its broadband goals by making rural broadband deployment in the agricultural context a priority. The current framework overlooks geographic and functional usage areas that lack broadband availability. In this regard, Deere urges the Commission to include “cropland” or “crop

³ RTK supplements GPS signals to achieve up to one-inch location accuracy. It is not a stand-alone localization system such as GPS.

operations” as a key indicator of where demand for broadband deployment exists in America. To start closing the gaps where broadband availability is lacking, the Commission should utilize the Connect America Fund (“CAF”), and the Mobility Fund in particular, to incentivize broadband deployment to cropland areas. Further, it should define “anchor institutions” to include agricultural operations. Finally, the Commission should take steps to support and incentivize standalone broadband services.

II. Megatrends in Agriculture Increase the Importance of Broadband Deployment

World population is projected to climb from approximately 7 billion today to more than 9 billion by 2050. This means that every hour, there are an additional 9,000 new mouths to feed, which equates to roughly enough new people in a day to fill Washington Nationals Stadium more than five times. Incomes around the world are rising as many people join the ranks of the middle class. This creates more demand for meat and animal protein in particular, in turn creating greater demand for grains.

Global markets are also more interrelated than ever before. Market volatility has increased. The extreme movements of commodity prices in recent years indicate a real threat to world food security. In most of the world there is a rising trend in the increase of farm sizes, scale and specialization as economies develop. Environmental sustainability and compliance is a growing challenge, and the supply of skilled labor for agriculture is not enough to meet the demand. Agriculture and agriculture-related industries contributed \$789 billion to the U.S. gross domestic product (GDP) in 2013, a 4.7-percent share.⁴ The agricultural economy also touches a wide range of other sectors that contribute added value to the economy. In 2013, 16.9 million

⁴ 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>.

full- and part-time jobs were related to agriculture—about 9.2 percent of total U.S. employment. Direct on-farm employment provided over 2.6 million of these jobs. Employment in related industries supported another 14.2 million jobs.⁵

While the U.S. economy is now in its sixth year of recovery from the Great Recession of 2007-2009, it nonetheless remains weak in some aspects, especially in rural areas. While urban employment now exceeds pre-recession levels, rural employment remains well below its 2007 peak.⁶ Rural population has declined over the last several years, and 779 rural counties continued to lose jobs in 2014.⁷ The population, economic and employment pressures in rural America continue to affect the agricultural industry. Between 2007 and 2012, the number of U.S. farms decreased by 4.3%.⁸ Nonetheless, innovative technologies continue to an important bright spot for growth in rural economies. The USDA asserts that increased productivity, arising from innovation and changes in technology, is the main contributor to economic growth in U.S. agriculture.⁹

The challenging economics of farming and the need to meet growing demand for worldwide food supply have transformed agriculture in the U.S. and many other countries into a technology-driven sector. Technology solutions to these challenges will continue to proliferate with the adoption of precision agriculture. Due to the pressures faced by American farmers

⁵ *See id.*

⁶ *See* USDA, Rural America at a Glance, 2014, at 1, available at: <http://www.ers.usda.gov/media/1697681/eb26.pdf>.

⁷ *See id.* at 1.

⁸ *See* USDA, Preliminary Report Highlights, U.S. Farms and Farmers (Feb. 2014), available at: http://www.agcensus.usda.gov/Publications/2012/Preliminary_Report/Highlights.pdf.

⁹ *See* USDA, Agricultural Productivity, available at: <http://www.ers.usda.gov/topics/farm-economy/agricultural-productivity.aspx>.

today, agriculture operators need to continually improve their efficiency, environmental stewardship, and output. To do so, agricultural producers need access to high speed broadband to communicate with customers and vendors, follow commodity markets, obtain real-time information on weather and other environmental factors, and manage regulatory compliance.

Broadband is also critical for M2M communications in and from the field that make possible significant improvements in real-time productivity and cost management. However, many farming operations are challenged by the lack of adequate cellular coverage in the fields where agricultural equipment operates. As agricultural demand increases, Deere expects data transmission completion rates to worsen in the next two to three years from about 70% today to about 50%. In contrast, where broadband networks exist to allow precision agriculture systems to function properly, the benefits can be significant, especially to small farmers. According to recent reports, data-driven decisions about irrigation, fertilization and harvesting can increase corn farm profitability by \$5 to \$100 per acre, and a recent 6-month pilot study found precision agriculture improved overall crop productivity by 15%.¹⁰

Summary:

- Increased productivity, arising from innovation and changes in technology, is the main contributor to economic growth in U.S. agriculture.
- Agricultural producers need access to high speed broadband to communicate with customers and vendors, follow commodity markets, obtain real-time information on weather and other environmental factors, and manage regulatory compliance.
- Broadband is also critical for M2M communications in and from the field that make possible significant improvements in real-time productivity and cost management.
- Many farming operations are challenged by the lack of adequate cellular coverage in the fields where agricultural equipment operates.

¹⁰ See Kurt Marko, Forbes, Precision Agriculture Eats Data, CPUC Cycles: It's a Perfect Fit for Cloud Services (Aug. 25, 2015), available at: <http://www.forbes.com/sites/kurtmarko/2015/08/25/precision-ag-cloud/>.

III. The FCC Needs to Adjust Its Focus to Facilitate Broadband Deployment in Rural Agricultural Areas

Deere urges the Commission to weigh the importance of broadband deployment specifically for rural agricultural operations. As detailed below, the Commission could and should take specific steps now to bridge the gap between rural and agricultural broadband availability as compared to urban and suburban broadband availability. By doing so, it will unleash the potential for American farmers and consumers to reap the significant rewards of innovation both in broadband and agricultural technologies.

A. Mobile, as Well as Fixed Broadband, is Essential to Rural Areas and Modern Agricultural Operations

At the outset, the NOI seeks comment on whether “advanced telecommunications capability” should be defined to include capabilities of mobile broadband and whether advanced telecommunications capability should be deemed to be available in any area only when both fixed and mobile broadband meeting our benchmark standards are available.”¹¹ Deere strongly supports a redefinition of advanced telecommunications capability to include mobile broadband services. Mobile services are essential to broadband deployment in rural and remote areas where infrastructure, land acquisition and right of way costs are higher on a per capita basis than that of urban and suburban areas and where deployments have lagged.

To enable real-time sharing of data and communications, precision agriculture technology requires access to reliable mobile and wireline broadband services. Through these advanced systems, mobile broadband is now an essential service for agricultural operations that form the economic heart of many American rural communities. As these machine populations continue to grow and our solutions continue to rely on high speed machine connections, our

¹¹ NOI at paras. 6,8.

reliance on rural broadband coverage will only increase, and the ability of farmers using Deere’s agricultural equipment and systems to improve efficiency, yield, and smart resource use will depend on their ability to leverage high speed broadband connections capable of enabling real-time M2M and machine to farm (“M2F”) interaction. The “Internet of Things” in rural America will include not only smart meters and smart appliances, but also smart farming equipment and systems needed to drive local economies.

Summary:

- Deere strongly supports a redefinition of advanced telecommunications capability to include mobile broadband services.
- The FCC needs to focus its attention towards a functional use framework that recognizes those areas and economic markets where broadband is lacking.
- The Commission’s current analytical framework overlooks geographic and functional areas that require broadband deployment, areas which can improve the circumstances of millions of Americans in rural areas.

B. The Commission Should Consider Broadband Advancement to Geographic Areas and Functional Usages that Lack Coverage

The NOI seeks comment on how the Commission’s understanding of “advanced telecommunications capability” should address consumer needs and features associated with mobile service, such as mobility.¹² The NOI also requests “alternative standards for determining the availability of advanced telecommunications capabilities.”¹³ At the outset, Deere asserts that the FCC needs to consider new approaches to examining broadband availability and usage in the United States. Historically, FCC, NTIA and USDA programs aimed at spurring broadband deployment have focused on enabling last-mile connection to residential consumers and “anchor

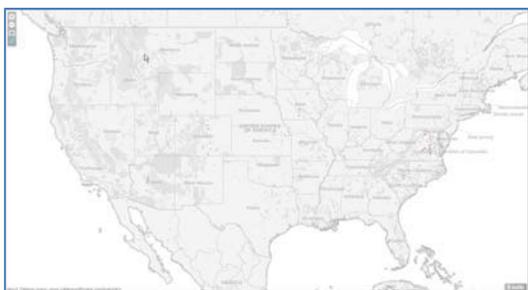
¹² See NOI, ¶ 18.

¹³ *Id.*

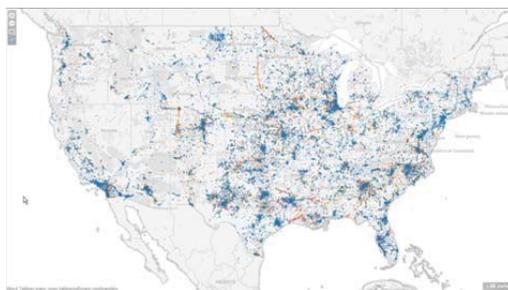
institutions” (such as healthcare providers, schools, and libraries) as well as middle-mile facilities that enable last-mile connections to these ends.¹⁴

However, this historical framework overlooks significant geographic and functional-use areas in the assessment by the FCC and other government agencies of broadband demand and coverage, and the benefits that deployment to such unserved and underserved areas can create. Large swaths of agricultural areas in the United States (where people do not reside, but where they work and contribute to the rural and national economy) are wholly lacking broadband coverage.¹⁵ While coverage has increased over the past ten years, there are still very significant coverage gaps in areas under cultivation.

Broadband Infrastructure Gaps



2006



2010



2011



2012

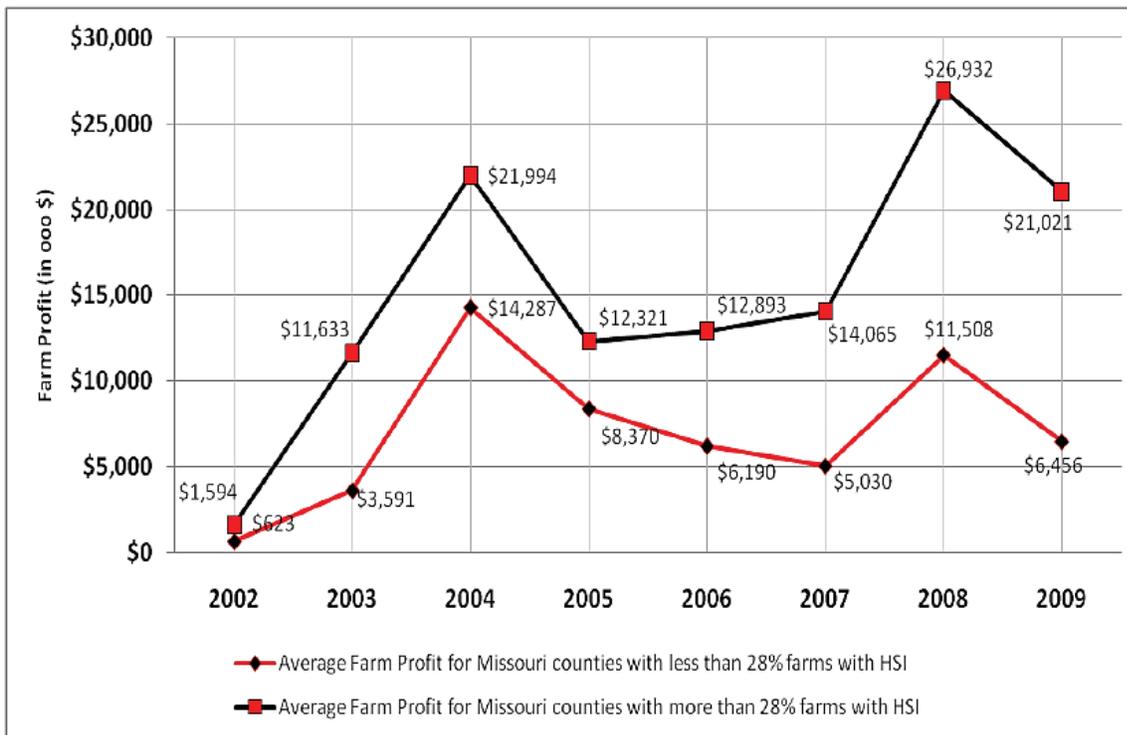
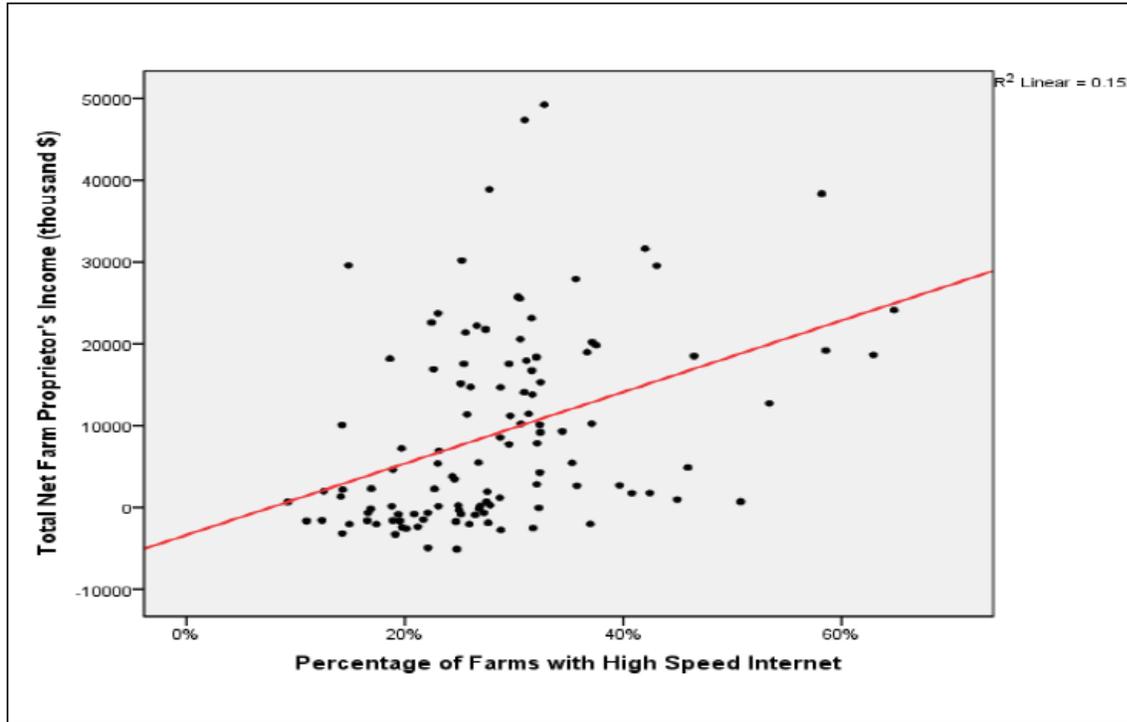
¹⁴ For the purpose of high-cost support, “community anchor institutions” refers to schools, libraries, health care providers, community colleges, other institutions of higher education, and other community support organizations and entities. 47 C.F.R. § 54.5.

¹⁵ See Attachment 1, which provides an overview of the lack of broadband coverage in agricultural areas.

According to the USDA, sixty-seven percent (67%) of U.S. farms had Internet service (DSL, wireless, cable, and satellite) in 2013, compared with sixty two percent (62%) in 2011.¹⁶ These statistics, however, reflect connectivity to the farm house, not to the acreage under crop production. The Commission needs to focus its attention on these areas to ensure that it meets its mandate under Section 706 of the Act.

In its quest to expand residential and consumer access to broadband in rural and other hard-to-reach areas, the FCC and other government agencies responsible for broadband deployment programs should focus their attention towards a functional use framework that recognizes those areas and economic markets where broadband is lacking. Most rural economies in the United States are largely driven by agricultural operations. Serving those agricultural operations serves the community and the rural economy. Progress in expanding broadband availability to the whole of farming operations will ultimately strengthen the entire community and enhance the prospects for sustainable residential and consumer broadband services. The availability of broadband in cropland areas, for example, would provide an immediate and significant positive economic impact on farming institutions, rural economies, and the national economy, as well as expand access to consumers that work and live in these areas. A 2011 study by the University of Missouri demonstrates the significant impact that increasing access to broadband can have for farmers.

¹⁶ See USDA, Farm Computer Usage and Ownership, 2013.



The results are clear: an increase in high speed Internet connectivity leads to significant expansion of economic opportunities for agricultural producers. The FCC should take steps to

both factor in the lack of broadband coverage for those unserved and underserved agricultural operations, and take steps to fill those gaps.

While the premise of serving “anchor institutions” as an element for broadband funding decisions in rural, unserved and underserved areas focuses on a functional use of broadband rather than on residential population coverage, the “anchor institution” framework ignores other significant rural economic activities and establishments. Farming institutions, for example, generate rural jobs and support the rural American economy. But unlike community centers, healthcare centers, schools, libraries, scientific institutions, and other similar enterprises that can (and do) build where broadband services are available, agriculture happens where the farmland is. Farms cannot re-locate operations in order to follow the broadband. Thus, unlike many other important types of American institutions, agricultural operations are structurally most at risk of being left behind the broadband economy.

Given the information above, to answer the overarching question posed by the NOI on “whether advanced telecommunications capability is being deployed to all Americans on a reasonable and timely basis,”¹⁷ the answer is: “no”--not for Americans that live and work in rural areas, and not for farmers and other agricultural operations that support rural economies.

Summary:

- The Commission should adopt a more holistic view towards the broadband ecosystem and factor in core uses, especially for mobile broadband. By doing so, it will further its underlying goals of promoting consumer broadband availability in those areas where broadband is currently unavailable.

¹⁷ See NOI, ¶88.

IV. To Ensure Consumer Availability of Broadband, the Commission Needs to Update its Review of Broadband Deployment to Include Availability by Agricultural Operations

The Commission has long-recognized the gap between urban and rural broadband availability, and much work remains to be done to close that gap. “[T]he 2015 Broadband Progress Report highlighted the existence of a persistent ‘digital divide’ with Americans in rural areas and on Tribal lands disproportionately lacking access to broadband, even at speeds below the threshold for advanced telecommunications capability.”¹⁸ The Commission’s current analytical framework overlooks geographic and functional areas that require broadband deployment, areas which can improve the circumstances of millions of Americans in rural areas.

A. The FCC Should Expand Its Availability Analysis to Include Geographic- and Function-Based Broadband Coverage Metrics

The FCC should ensure that its analysis of broadband availability accounts for user segments with more of a geographic-based need for mobile broadband coverage rather than would be found purely under a population-based model. There are myriad of cases where broadband users are not necessarily positioned in population centers, but which nonetheless play an important role in the American economy and public safety. Examples of geographic-based broadband users include (but are not limited to):

- i. Public safety (local, state and FirstNet)
- ii. Transportation (smart cars and positive train control)
- iii. Utilities (oil, gas, electric and water)

¹⁸ NOI, at ¶2 (citing *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 14-126, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, 30 FCC Rcd 137, 1378, 1454, ¶¶ 5-6, 133-36 (2015) (2015 Broadband Progress Report)).

- iv. Agriculture (technology driven agriculture equipment in cropland; farmhouse connectivity)

As it undertakes a review of the “availability” of broadband services in the United States, the Commission should consider areas of the U.S. economy (and other areas that benefit the public interest) where broadband is unavailable from a functional usage perspective. While agricultural operations are a prime example of a functional usage that lacks broadband availability, the Commission should consider other functional usage areas such as healthcare, transportation, public safety, educational operations, and even rural (and often small) commercial users that also lack broadband coverage that may not be considered under a framework focused on “consumer” or residential availability, and that will not necessarily come to light using the FCC’s consumer-based Form 477 broadband data collection framework.

The Commission needs to better examine functional and geographic areas where broadband deployment is lacking in order to truly address whether the mandate of section 706 is being met, and if not, what steps should be taken to close those gaps. Deere encourages the FCC to consider specific, real-world needs of rural Americans and economies in its review of broadband deployment, especially wireless broadband.

Summary:

- The FCC’s broadband availability analysis should include review of geographic- and functional-based need for mobile broadband coverage.
- As it undertakes a review of the “availability” of broadband services in the United States, the Commission should consider areas of the U.S. economy (and other areas that benefit the public interest) where broadband is unavailable from a functional usage perspective

B. The FCC Should Evaluate Broadband Coverage of U.S. Croplands

With respect to the Commission’s geographic determination of where broadband networks are needed, but not currently deployed, Deere urges the FCC to examine “cropland”

coverage as a key indicator of where broadband deployment gaps exist in the United States. Given that agricultural operations are an important --and often the most important -- economic driver in many rural areas, the FCC cannot promote broadband deployment where people work and to empower innovation if it does not recognize the need for broadband services on U.S. croplands.

While fixed broadband has penetrated the residential and business areas of many rural communities, the cropland areas where farming is done lags far behind in adequate mobile broadband access. By supporting increased broadband deployment to those areas where most farming operations occur (*i.e.*, in the fields), the U.S. economy will benefit through increased economic efficiency in the agricultural sector, improved environmental stewardship, and enhanced food security. The positive benefits of rural broadband deployment to the agricultural industry also spill over to other aspects of rural life including consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private-sector investment, entrepreneurial activity, job creation and economic growth.

1. How the FCC Should Define Cropland

There are a number of ways that “cropland” coverage can be evaluated. First, the FCC should consider the USDA’s GIS data for cropland.¹⁹ 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

¹⁹ 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.

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. In 2014, the top ten states with the most acres of principal crops planted were:²⁰

State	Acres Planted (in 1,000s)
Iowa	24,955
Texas	24,054
Illinois	23,565
Kansas	23,217
North Dakota	22,848
Minnesota	20,142
Nebraska	19,242
South Dakota	17,946
Missouri	14,649
Indiana	12,550

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 FCC could consider the US Geological Survey’s (“USGS”) Land Use information to review those areas of the country that are categorized as “cropland” or “agricultural land.” The USGS produces a map showing cropland areas in the United States, which may also be a point of information that the FCC and other interested parties can use to determine where “cropland” exists both in the U.S. and around the world.²¹

²⁰ 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.

²¹ See USGS, Global Croplands, available at: <https://croplands.org/app/map?lat=31.24099&lng=-69.08203125&zoom=4>.

Third, the Commission can 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 so 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 to provide a number of examples of different ways the Commission can use existing government data and/or legal distinctions to aid the FCC 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 (such as those listed in Section III.A. above). Deere encourages the FCC and interested parties to consider these analytical data sources, and to cross-reference broadband availability data (such as mobile coverage maps, machine modem connection statistics, etc.), with these and other similar land use or functional use data sources to determine where broadband coverage is lacking, where it is not, and the quality of broadband services in those areas where it does exist.

Summary:

- Deere urges the FCC to examine “cropland” coverage as a key indicator of where

broadband deployment gaps exist in the United States.

- There are a number of ways that “cropland” coverage can be evaluated:
 - FCC could rely on the USDA’s GIS data for cropland,
 - the FCC could rely on the US Geological Survey’s (“USGS”) Land Use information to review those areas of the country that are categorized as “cropland” or “agricultural land,”
 - the FCC could adopt definitions set by other governmental bodies, such as the definitions of “crop operation” and “crop operation property” in the Iowa Code.

C. The FCC’s Broadband Deployment Data Sources Do Not Accurately Reflect Broadband Availability to Large Portions of the U.S. Economy

The FCC correctly points out that data is key to understanding where broadband deployment has been insufficient. Specifically, “the Commission anticipates that the new Form 477 data on mobile and satellite broadband service, as well as information from other sources such as Measuring Mobile Broadband America, Ookla, Rootmetrics, and Google M-Lab, are likely to allow consideration of mobile services in making the determination concerning broadband deployment and availability required by section 706.” While the NOI seeks comment on issues raised by changes in broadband deployment data sources,²² it does not question whether these data sources are truly sufficient to determine the availability of broadband services in the United States.

Form 477 data may provide a rich set of information on consumer and residential broadband access, but it lacks granularity on non-consumer broadband availability on a functional or geographic use basis. While the broadband availability map may demonstrate that certain wireless carriers offer service in a particular census tract area, it simply fails to show the real-world unavailability of mobile broadband in areas away from population centers and highways. Likewise, the broadband map may be a useful tool for consumers to determine what ISPs are available in their neighborhood, and the speeds those ISPs are advertising, but it does

²² See NOI, ¶ 58.

not tell the American farmer which of her fields are covered by mobile broadband, and whether those services are adequate to utilize M2M and M2F telematics services.

Further, the other broadband availability data sources cited in the NOI focus heavily on consumer broadband services, and most consider coverage and speeds in urban areas exclusively. Many rely on consumer smartphone applications which necessarily collect information only from a fraction of the broadband economy. And none provides significant detail on real-world, rural area availability. Again, these sources may tell smartphone users where coverage can be found in a downtown population center, it does not tell farming operators, first responders, or other service institutions outside of those population centers where broadband data coverage will fall off.

While the Commission's revised data collection is an improvement, the data collected does not fully reveal all important differences between rural and urban populations and economies and overlooks the important needs of rural populations in agricultural areas. The Commission needs to consider ways to supplement its existing information collection to include broadband coverage in non-residential/consumer settings, and on a granular, real-world geographic basis.

The NOI asks for comment on other data sources the FCC can use to assess the performance of mobile broadband services.²³ As a first step, the Commission should count machine-to-machine mobile broadband transmissions by agricultural equipment in the field and associated operators' mobile devices when assessing the status of mobile broadband deployment.²⁴ By counting the number of machines with modems working the 300+ million

²³ See NOI, ¶69.

²⁴ Such statistics could be gathered through USDA or other governmental surveys, academic research sources, or other similar means.

acres of cropland in the United States, the Commission will have better information to more accurately assess the availability and lack of availability of advanced broadband services in rural areas, and can then consider targeted ways to strengthen funding to those rural areas of the country that need it most.

Summary:

- The revised 477 data collection still does not fully reveal all important differences between rural and urban populations and economies and consequently important needs of rural populations in agricultural areas are being overlooked.
- The Commission should count machine-to-machine mobile broadband transmissions by agricultural equipment in the field and associated operators' mobile devices when assessing the status of mobile broadband deployment.

V. The Commission Should Consider a Framework that Facilitates Faster Broadband Coverage to Areas That Lack Any Access Today

The NOI requests comment on the appropriate speed benchmarks to use in order to make its statutory determination under Section 706.²⁵ Currently, there are a number of different broadband speed tiers that govern U.S. policy and broadband funding programs:

- 100/10 Mbps – Forward Looking Benchmark Proposed in the NOI
- 25/3 Mbps – 2014/2015 FCC 706 Report/Standard for Consumer Fixed
- 10/1 Mbps – FCC Mobility Fund Standard
- 4/1 Mbps – USDA Broadband Loan Programs (with eye towards 25/3 Mbps)

The consumer-centric 25/3 Mbps standard may be useful for purposes of considering fixed broadband coverage in residential areas, but it may not be flexible enough to accommodate different use cases. Rather than adopt a single, one-size-fits-all broadband speed standard, the Commission should take a nuanced approach and determine whether the needs of the various functional use markets are being met. A 25/3 Mbps standard may be the correct standard for

²⁵ See NOI, ¶ 22.

residential-centric fixed broadband availability. But different functional use groups may not need that broadband speed—or may need an even higher speed.

In this regard, the Commission should consider alternative frameworks to incentivize other levels of broadband to geographic and functional areas that currently lack coverage. Current demand for broadband is to support telematic services including voice communications, and the transfer of up-to-date data on environmental, market, weather, and other data to support agricultural operations.

The NOI seeks comment on whether a different speed standard should be set for mobile broadband services than was set for fixed services.²⁶ From Deere’s perspective, for those geographic and functional use areas that currently lack broadband connectivity, it may be better to start at a 10/1 Mbps standard tomorrow for mobile broadband services (with a goal of eventually towards moving to 25/3 Mbps standard) rather than being forced to wait for years in order to obtain access to a service that starts at 25/3 Mbps. As the Commission considers policies that affect carrier incentives to deploy broadband services (such as the Connect America Fund or other programs) it should recognize the fact that different broadband speed tiers may be suitable for different use cases, and to structure its policies and programs accordingly. It should not tie speed benchmarks to technologies, but rather should examine the uses of the different forms of broadband services, and create a more nuanced view towards determining if broadband is available, at the speeds necessary, to support different uses beyond basic consumer broadband.

Summary:

- The Commission should update its single broadband speed standard to determine whether the needs of the various geographic and functional use markets are being met.
- The Commission should recognize alternative frameworks that promote deployment of other levels of broadband to geographic and functional areas that currently lack any

²⁶ See NOI, ¶ 28.

coverage.

- M2M and M2F agricultural operations need broadband to support telematic services including voice, and the transfer of up-to-date information on environmental, market, weather, and other data to support agricultural operations.

VI. There Are a Number of Steps the FCC Should Take to Facilitate Broadband Availability Where it is Currently Lacking

Given the importance of agriculture to the U.S. economy and security, as well as the strong link between rural opportunity and agriculture, the expansion of rural broadband in agricultural areas should be a top priority of the FCC. Expanded broadband deployment in unserved and underserved rural agricultural areas will also benefit important rural economic, educational, healthcare and other public interest goals. Deere supports rural broadband funding that promotes deployment of the full range of infrastructure necessary to support innovative broadband solutions in rural areas, including areas where construction, forestry, agriculture, and mining machines operate. This includes support for wireless broadband, wired facilities, middle-mile facilities, and other infrastructure that supports broadband services.

Deere supports the expansion of Universal Service Fund/CAF funding to include middle-mile projects and backhaul capacity. Effective rural broadband service requires backhaul capacity to keep up with expanding broadband demand. Currently, the large price cap local exchange carriers receiving CAF support can use support for middle mile facilities where at least 50% of the locations served by the middle mile facility are in unserved areas. The FCC should amend its rules so that smaller rural providers can also receive and use support for upgrading middle-mile facilities. All carriers should be eligible to receive support for middle-mile facilities that support wireline backhaul for mobile broadband, not just for middle mile facilities that support wired last mile connections.

Not only will expansion in these areas aid in agricultural productivity, they will spill over to populations that serve these agricultural operations through enhanced mobile broadband access as well as the middle-mile infrastructure to support enhanced communications services to nearby residential and commercial areas.

However, for agricultural operations in particular, it is essential that the Commission take steps that will increase the deployment of advanced mobile services. Wireless service – both fixed and mobile – will be the superior technology choice to achieve cost-effective coverage for many rural areas including farm-intensive areas with significant tracts of cropland. Fixed broadband brings many benefits to rural communities containing farm buildings, but additional wireless facilities are needed in America’s rural areas, including croplands, to meet the growing demand for mobile broadband.

A. The FCC Should Utilize the CAF, and the Mobility Fund in Particular, to Incentivize Broadband Deployment

Deere strongly supports using the CAF to provide affordable broadband access to rural areas, including cropland areas. Rural businesses and residents need support for high speed broadband access. The FCC should continue to ensure that CAF funding – whether for wireline or wireless service; whether allocated for price-cap carriers or small rural telephone companies – is properly focused on bringing broadband to the unserved and underserved rural areas where support is most needed, including to those geographic and functional use areas that lack any broadband coverage whatsoever.

Further, the Commission’s rural broadband funding initiatives should promote the deployment of the full range of infrastructure necessary to support innovative broadband solutions in rural areas, including areas where construction, forestry, agriculture, and mining

machines operate. This includes support for wireless broadband, wired facilities, and other middle-mile infrastructure that supports broadband services in these areas.

Deere has long supported the creation and use of the Mobility Fund within CAF as a means of targeting deployment of broadband coverage to rural and cropland areas. Commissioner Clyburn recently urged the FCC to finish its work to create a dedicated mobility fund. She noted that for four years the funding for competitive eligible telecom carriers has been frozen at 60 percent of the 2011 support levels, with no guarantee that any of the support is going to extend to broadband. She also noted that a dedicated mobility fund is needed to ensure that “all areas of our nation have service,” and that the FCC should ensure that the spectrum auctions it undertakes attract carriers with smaller service footprint and less capital than nationwide providers but have a strong desire to acquire more spectrum so they can better serve their markets.²⁷ Deere agrees. The FCC should expeditiously adopt rules for the Phase II Auction that would promote broadband deployment in unserved and underserved rural areas. Rural residents and businesses, including agricultural businesses, are at a competitive disadvantage every day they do not have access to broadband technology. As the Commission develops this, and other funding mechanisms in the future, it should add a category of “cropland” for determining mobile broadband coverage.

²⁷ See Prepared Remarks of Commissioner Mignon L. Clyburn, Rural Wireless Association Summit (Sept. 10, 2015), available at: <https://www.fcc.gov/document/commissioner-mignon-clyburn-remarks-rural-wireless-summit-2015>. See also *Ex Parte* Letter from Erin P. Fitzgerald, Rural Wireless Association, Inc. to Marlene H. Dortch, FCC, Docket Nos. WT 10-208 & WC 10-90 (dated Aug. 26, 2015) (urging the FCC to follow through on its commitment to rural Americans by implementing a second phase of the Mobility Fund, arguing that there is a need for ongoing support for expanding and sustaining 4G LTE mobile services in high-cost areas where there is no business case for deployment by unsubsidized carriers, and to ensure that existing funding not be phased down until the Mobility Fund Phase II was in place and funds are substantially disbursed).

B. The FCC Should Include “Crop Operations” as Anchor Institutions for Purposes of Targeting Broadband Funding

The Commission should consider farm institutions or “crop operations” as “anchor institutions” under the Commission’s CAF support rules as a means of promoting broadband deployment to such areas. Doing so would be consistent with the underlying premise behind the emphasis on “anchor institutions” in broadband deployment programs.

The general concept of an “anchor institution” emerged over ten years ago as a way of thinking about the role that location-based institutions can play in addressing societal problems.²⁸ In its most recent iterations, under the Notice of Fund Availability as well as NTIA's Broadband Technology Opportunities (“BTOP”) Program Glossary, community anchor institutions are “schools, libraries, medical and healthcare providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and agencies that provide outreach, access, equipment and support services to facilitate greater use of broadband service by vulnerable populations, including low-income, the unemployed and the aged.”

The USDA’s Rural Utility Service (“RUS”) similarly defined anchor institutions as “schools, libraries, healthcare providers, colleges, and critical community facilities, provide essential services for the safety, health, education, and well-being of residents.”²⁹ In the *USF/ICC Transformation Order*, the FCC notes that “community anchor institutions” as defined in the Recovery Act include schools, libraries, medical and healthcare providers, community

²⁸ See Anchor Institutions: An Interpretive Review Essay, available at: http://www.margainc.com/files_images/general/Literature_Review_2013.pdf.

²⁹ See Connecting Rural America Report, available at: http://www.usda.gov/documents/RBB_report_v16.pdf.

colleges and other institutions of higher education, and other community support organizations and entities.³⁰

Clearly, the concept of the “anchor institution” has evolved over the past decade. Deere believes that farming operations, which are location-based institutions that run many rural economies, should be included in the concept of the “anchor institution.” These operations should benefit from programs that incentivize broadband deployment to such institutions given their importance to rural and national welfare.

C. The Commission Should Promote Standalone Broadband

Particular attention should also be paid towards policies that support and incentivize standalone broadband services. All providers should be eligible for support to provide broadband services that are not tied to traditional telephone services. The Commission has long-recognized that the availability of standalone broadband service leads to significant benefits to consumers in the form of competition in the market for voice and other services.³¹ On the other hand, the practice of tying broadband service to other services prevents free consumer choice and essentially forces consumers to purchase local services they do not want. The net effect is to depress the adoption of broadband and new IP technologies.

Policies that promote standalone broadband services also promote “over-the-top” providers that compete with traditional service providers in a wide range of services. The

³⁰ See *Connect America Fund et al.*, WC Docket No. 10-90 et al., Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, para. 283 (2011) (“*USF/ICC Transformation Order*”) (citing 47 U.S.C. § 1305(b)(3)(A)).

³¹ See, e.g., *Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control*, Memorandum Opinion and Order, WC Docket No. 05-75, n.320 (rel. Nov. 17, 2005) (finding that Verizon’s commitment to offer stand-alone DSL broadband service as a condition of its merger with MCI to be in the public interest); see also *SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control*, Memorandum Opinion and Order, WC Docket No. 05-65, n.322 (rel. Nov. 17, 2005) (same).

competition between over-the-top providers and traditional providers, for example, has resulted in significant direct and indirect cost savings for consumers over the past decade.

Given the significant public interest benefits that flow from standalone broadband services, the Commission should examine its support mechanisms and other areas of policy to ensure that standalone broadband is incentivized as much as possible, be it through CAF funding mechanisms, merger conditions, or other policy avenues.

Summary:

- Wireless service – both fixed and mobile – will be the superior technology choice to achieve cost-effective coverage for many rural areas including farm-intensive areas with significant tracts of cropland.
- Deere supports stable and robust funding for mobile operations including continuing funding for Mobility Fund Phase II and targeted changes to the Commission’s eligibility and availability metrics to ensure coverage for all areas where people live, work and travel.
- The FCC should amend its CAF rules so that smaller rural providers can also receive and use support for upgrading middle-mile facilities--all carriers should be eligible to receive support for middle-mile facilities that support wireline backhaul for mobile broadband, not just for middle mile facilities that support wired last mile connections.
- The Commission should consider farm institutions or “crop operations” as “anchor institutions” under the Commission’s support rules. Deere also strongly supports using the CAF to provide affordable broadband access to rural areas, including cropland areas.
- Support should be available for standalone broadband services

VII. Conclusion

Deere appreciates the Commission's efforts to accelerate deployment of broadband services and encourages consideration of the steps described in these comments.

Respectfully submitted,

DEERE & COMPANY

/s/

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It's Attorneys

Dated: September 15, 2015