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To: [bead@ntia.gov](mailto:bead@ntia.gov)

Subject: Comment in Response to Broadband Equity, Access and Deployment Alternative Broadband Technology Policy Notice, dated August 26, 2024

To Whom It May Concern:

The Critical Infrastructure Resilience Institute (CIRI) (a Department of Homeland Security Center of Excellence) at the University of Illinois respectfully submits the following comment for consideration of evaluation and administration of the BEAD grants.

The intent of this comment is to urge NTIA to endorse the use of BEAD grant funds for the identification and adoption of resilient back-up timing solutions to ensure the continuity of broadband service during short and long-term disruptions to timing signals. Sustained continuity will also ensure economic viability for these rural communities.

The BEAD grant fundamentally seeks to make broadband available for everyone in the US. There is an underlying assumption that installation of physical and wireless infrastructure will accommodate the servicing of areas previously unserved or underserved through Fiber, Cable Modem, Digital Subscriber Line, wireless and satellite. However, if the critical signals and data to be transmitted by this infrastructure is disrupted, the program's objective of expanding accessibility to these underserved communities will be frustrated. In other words, a fiber optic cable connection to a critical infrastructure owner/operator subscriber is of little value if the fiber is dark. The objective of "accessibility" presumably must encompass accessibility to the critical signal/data to be transmitted by the connectivity infrastructure.

The recent proposed policy guidance from NTIA seeks to broaden BEAD eligibility of expenditures by expanding to the use of alternative technologies beyond "Reliable Broadband Services". However, what is not expressly addressed in the original BEAD eligibility documentation or in this recently proposed guidance is the resilience of broadband itself to ensure its delivery and availability without disruption. Specifically, what we are describing is the dependence upon synchronized timing for broadband functioning. The strategic timing requirements across various communication systems serve as the invisible threads that hold the fabric of connectivity together. Whether it is the precise synchronization of IP networks, the millisecond accuracy in industrial control systems, or the robust timing in land-mobile communications, each system relies on tailored timing solutions to meet its specific needs.

Commercial availability and use of broadband is equally dependent upon precise timing solutions.

Modern telecommunications infrastructure in the United States relies heavily on precise timing signals, currently provided almost exclusively by GPS (Global Positioning System) satellites, for its efficient operation. Any loss, disruption or manipulation of these signals could render the broadband infrastructure inaccessible to subscribers, thus negating the primary goal of the BEAD program and the NTIA objectives.

There have been numerous instances worldwide where the timing function of broadband has been compromised due to accidental or malicious actions targeting and degrading GPS timing sources. These events have exposed vulnerabilities in the reliability of broadband infrastructure, necessitating the development of mitigation strategies to provide alternative backup timing sources. This is crucial to ensure the continuity of critical infrastructure and accessibility, both of which are vital to the intended beneficiaries of this grant program. A resilient broadband timing solution is not just important; it's foundational to the success of broadband delivery. There is an existential threat to broadband because of its vulnerability to intentional and unintentional disruption. The US currently has no backup timing systems in place to support broadband and critical infrastructure systems in the event of a catastrophic disruption event. This threat cannot be overstated.

It is imperative to address the need for a robust and resilient back-up timing signal source that does not include GPS signals, as part of the broadband deployment embodied in the BEAD program.

Terrestrial-based timing systems represent a solution that relies on ground-based infrastructure and signals, in contrast to satellite-based systems like GPS or GNSS (Global Navigation Satellite System). These terrestrial systems incorporate redundancy and backup mechanisms to ensure reliability, such as using multiple timing sources or paths to minimize the risk of timing disruptions due to equipment failures or other issues. Other timing sources include atomic clocks, Low Earth Orbit (LEO) constellations, and fiber optic cable.

This notion of using BEAD grant funding for this purpose has broad support within the US Government, particularly from DHS which has funded a project at CIRI (to be completed 30 September 2024) to identify and evaluate efficacious alternative back-up timing solutions. Additionally, DOT similarly recognizes the urgency of back-up timing solutions and has recently awarded nine contracts to conduct testing of complementary position, navigation and timing (PNT) solutions at the Volpe Center in Cambridge, MA, as the first batch to be evaluated in this new clearing house. DOT and DHS, in coordination with the National Security Council, have invested in identification of back-up timing signal generators and now there is an opportunity for DOC NTIA to endorse use of BEAD grant funds for the engineering and implementation of those back-up timing signals by public and private end users.

Providing backup timing is critical to ensure uninterrupted commerce and the stability of the US economy. Such an approach aligns with the public/private partnership philosophy promoted by Congress in the Infrastructure Investment and Jobs Act and BEAD Grant legislative language. Failure to address the resilience of the timing function in broadband infrastructure could undermine the goals and objectives of the BEAD Program and could diminish the return on the \$42 billion investment that has been appropriated to support the program.

Respectfully,  
Randy

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