

NOTICE OF FUNDING OPPORTUNITY

Public Wireless Supply Chain Innovation Fund Grant Program – Expanding Testing and Evaluation

EXECUTIVE SUMMARY

A. Federal Agency Name

National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce

B. Funding Opportunity Title

Public Wireless Supply Chain Innovation Fund Grant Program – Expanding Testing and Evaluation

C. Announcement Type

Initial

D. Funding Opportunity Number

NTIA-PWSCIF-2023

E. Assistance Listing (CFDA Number)

11.038

F. Key Dates

Complete applications must be submitted through Grants.gov no later than 11:59 p.m. Eastern Daylight Time (EDT) on June 2, 2023.

NTIA expects to make awards on a rolling basis with initial awards issued no later than August 8, 2023.

G. Application Submission Address

Complete application packets must be submitted electronically through the Grants.gov website. Application packages or portions thereof submitted through postal mail, courier, email, facsimile, or other means will not be accepted. See [Section 3](#) of this NOFO for detailed information concerning application submission requirements.

H. Funding Opportunity Description

This NOFO is the first in a series that NTIA will issue and administer under the Public Wireless Supply Chain Innovation Fund (Innovation Fund). The purpose of the Innovation Fund Program is to fund efforts that accelerate the development, deployment, and adoption of open and interoperable radio access networks (RAN) through a competitive grant program. In response to this first NOFO, NTIA looks forward to receiving and reviewing a broad range of applications proposing creative ways to: (1) expand industry-accepted testing and evaluation to effectively facilitate and assess the interoperability, performance, and/or security of open and interoperable, standards-based 5G radio access networks; and (2) develop new and/or materially improve existing testing methodologies to test, evaluate, and validate the interoperability, performance, and/or security of these networks, including their component parts, in order to address needs not currently met by industry-accepted tests and best practices. See [Section 2.4](#) of this NOFO for the full Program Description.

I. Funding Instrument

Grant

J. Eligibility

Eligible applicants include for-profit companies, non-profit companies, institutions of higher education, industry groups, and consortia consisting of two or more such entities, with exclusions as listed in [Section 2.2](#).

K. Anticipated Amounts

NTIA will make up to \$140,500,000 available for federal financial assistance under this initial Innovation Fund NOFO. NTIA expects to make awards within the following funding range: \$250,000 to \$50,000,000. The period of performance for grants awarded under this NOFO ends up to five (5) years from the date on which the grant funds are made available to the eligible entity.

L. Cost Sharing/Matching

There is no mandatory cost share requirement under Section 9202(a)(1) of the *William M. Thornberry National Defense Authorization Act for Fiscal Year 2021*, Pub. L. No. 116-283, 134 Stat. 3388 (Jan. 1, 2021) (*FY 21 NDAA*) (which authorized the program) nor the *CHIPS and Science Act of 2022*, Pub. L. No. 117-167, 136 Stat. 1392 (Aug. 9, 2022) (which appropriated funds for the program). Accordingly, NTIA will not require an entity applying for or receiving grant funding under this NOFO to commit to providing, or to provide cost share (cash or in-kind). NTIA will give preference, however, to applications that demonstrate cost sharing in their project plan and project budget. See [Section 2.3](#) of this NOFO for more information.

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1. Program Description

The National Telecommunications and Information Administration (NTIA) issues this Notice of Funding Opportunity (NOFO) to describe the requirements under which it will begin awarding grants in connection with the Public Wireless Supply Chain Innovation Fund (Innovation Fund), authorized by Section 9202(a)(1) of the *William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021*, Pub. L. No. 116-283, 134 Stat. 3388 (Jan. 1, 2021) (*FY21 NDAA*) and appropriated by Div. A., Section 106 of the *CHIPS and Science Act of 2022*, Pub. L. No. 117-167, 136 Stat. 1392 (Aug. 9, 2022).

Pursuant to the *FY21 NDAA*, the Innovation Fund aims to facilitate the adoption of open and interoperable wireless networks by:

- Accelerating commercial deployment of open, interoperable equipment;
- Promoting and deploying compatibility of new 5G equipment;
- Managing integration of multi-vendor network environments;
- Identifying criteria to define equipment as compliant with open standards; and
- Promoting and deploying security features and network function virtualization for multi-vendor, interoperable networks.

The first NOFO focuses on activities that will promote and improve the open and interoperable RAN testing and evaluation ecosystem, as well as research and development into test methods, and is responsive to feedback NTIA received during listening sessions and the Request for Comment period. These activities are foundational to the ultimate success of open and interoperable wireless networks and will help build confidence in the viability of Open RAN solutions and remove barriers to adoption. NTIA will support two specific research focus areas under this first NOFO: (1) Expanding industry-accepted testing and evaluation (T&E) activities to assess and facilitate the interoperability, performance, and/or security of open and interoperable, standards-based 5G radio access networks; and (2) Developing new and/or improved testing methodologies to test, evaluate, and validate the interoperability, performance, and/or security of networks, including their component parts.

This NOFO is the first, and future funding opportunities will build upon this work, as well as insights from future stakeholder listening sessions and recommendations from the Innovation Fund Federal Advisory Committee.¹

1.1. Overview

The Innovation Fund aims to foster competition, lower costs for consumers and network operators, support innovation across the global telecommunications ecosystem, and strengthen the 5G supply chain. The overall objectives include unlocking opportunities for innovative companies, particularly small and medium enterprises, to compete in a market historically dominated by a few suppliers, some of which present a high security risk.

¹ Section 9202(1)(F) of the *FY21 NDAA* requires NTIA to establish an Innovation Fund Federal Advisory Committee to help inform i) the strategic direction of the Innovation Fund, and ii) efforts of the Federal Government to promise a more secure, diverse, sustainable, and competitive supply chain. Creation of the advisory committee is forthcoming as of the publication date of this NOFO.

Open and interoperable wireless networks offer numerous benefits over traditional, closed networks that will lower the barriers of entry for new and emerging companies. Using open and interoperable wireless networks allow operators to procure the best solutions for their specific needs by mixing and matching network components, rather than procuring proprietary end-to-end solutions from a single supplier. Open and interoperable networks may also reduce costs for consumers and network operators by increasing competition between 5G radio access network suppliers and/or potentially lowering capital expenditures and operating expenses. Thus, the shift to open networks enhances 5G supply chain security by increasing competition and resilience in the global telecommunications equipment market.

In line with the Executive Branch’s policy² to promote the development of Open Radio Access Networks (or Open RAN), alongside other policies,³ technologies, and architectures that support 5G supplier diversity and foster market competition, the *CHIPS and Science Act of 2022* provided critical appropriations for the Innovation Fund, investing \$1.5 billion over 10 years to accelerate the development and deployment of open and interoperable, standards-based Radio Access Network (RAN).

This NOFO is the first that NTIA will administer under the Innovation Fund grant program. NTIA looks forward to receiving and reviewing a broad range of applications in response to this NOFO proposing creative ways to: (1) expand T&E activities to effectively facilitate and assess the interoperability, performance, and/or security of open and interoperable, standards-based 5G radio access networks; and/or (2) develop new and/or materially improve existing testing methodologies to test, evaluate, and validate the performance, interoperability, and/or security of these networks, including their component parts, in order to address needs not currently met by industry-accepted tests and best practices. (See [Section 2.4](#) for full description.)

1.2. Definitions and Acronyms

5G New Radio (NR) – Specifications developed by the 3rd Generation Partnership Project (3GPP) for 5G technology in 3GPP Release 15 and later specifications.

Assistant Secretary – The Assistant Secretary of Commerce for Communications and Information and NTIA Administrator, or the individual who holds any equivalent or successor position. The terms “Assistant Secretary” and “NTIA Administrator” refer to the same position.

Central Unit (CU) – The logical element of a radio access network that provides higher-layer processing for radio signals and coordinates traffic handover with other base stations.

CISA – The Department of Homeland Security’s Cybersecurity and Infrastructure Security Agency.

Construction – Construction, rehabilitation, alteration, conversion, extension, repair, or improvement of buildings, highways, or other real property.

² See The White House, [National Cybersecurity Strategy \(March 2, 2023\)](#)

³ See e.g., The White House, [Statement by NSC Spokesperson Emily Home on U.S. Support for the Third Annual Prague 5G Security Conference \(December 2, 2021\)](#)

Cost Share – The non-federal portion of a project budget, also known as “match.”

Covered Nation – As currently defined in 10 U.S.C. § 4872(d)(2), the following countries are covered nations: The Democratic People’s Republic of North Korea, the People’s Republic of China, the Russian Federation, and the Islamic Republic of Iran.

Distributed Unit (DU) – The logical element of a radio access network that provides lower-layer processing for radio signals.

Federated Lab – A laboratory that is affiliated with one or more laboratories that expand access to similar capabilities in a coordinated manner or increase the total capabilities by leveraging unique capabilities of each lab, or both.

Foreign Entity of Concern – The term is as defined in 15 U.S.C. §4651(8) and 15 CFR § 231.106, subject to any further rulemaking promulgated by the Department of Commerce.⁴

Industry-accepted testing and evaluation methods – Methods for testing and evaluating 5G radio access network solutions that have been developed by industry consensus or through industry-wide adoption have become a *de facto* standard. NTIA reserves the right to make the final determination on whether an applicant has met this standard.

Material Improvement – Improving upon or redefining an existing test or evaluation method to provide clear commercial value to the telecom industry.⁵

Neutral Host Facility – A host facility not affiliated with, owned by, or under direct influence of a 5G radio access network equipment or solution provider, as to avoid bias or appearance of bias toward a particular company.

NIST Grants Office – The National Institute for Standards and Technology Grants Office, which serves as the official certified Grants Officer for the Innovation Fund.

NTIA – The United States Department of Commerce’s National Telecommunications and Information Administration.

⁴ See Preventing the Improper Use of CHIPS Act Funding, available at <https://www.federalregister.gov/documents/2023/03/23/2023-05869/preventing-the-improper-use-of-chips-act-funding>.

⁵ Two illustrative, non-exclusive examples are: (1) if a DU test method is currently written such that it can only measure performance of hardware-based CU appliances, a material improvement would be a revised test method that can accurately and equitably measure both hardware-based CU appliances and software-based CU appliances (running on general purpose computing hardware or as a cloud application), or (2) if a base station efficiency test method only takes an instantaneous snapshot of power consumption and is not able to take into account new developments in base station energy efficiency that allow for improved granular radio transmitter control (e.g., cycling transmitter power in less than 10ms intervals), a material improvement would be a revised test that increases precision to accurately measure improvements in energy efficiency from these new advances. An example of what would not be considered a material improvement would be increasing precision of a radio power measurement method from 1 mW to 0.001 mW if there is no market desire for commercial production radios with more granular power output control than +/- 1 mW.

NTIA Administrator – The Assistant Secretary of Commerce for Communications and Information and NTIA Administrator, or the individual who holds any equivalent or successor position. The terms “Assistant Secretary” and “NTIA Administrator” refer to the same position.

Open Radio Access Network (Open RAN) – An approach to radio access network design that leverages open, interoperable, and standards-based RAN elements to form a virtualized and disaggregated RAN.

Radio Access Network (RAN) – The network of elements providing over-the-air radio access to devices in mobile networks. In 5G New Radio (NR) networks, this includes the Radio Unit (RU), Central Unit (CU), and Distributed Unit (DU).

Radio Unit (RU) – The physical element of a radio access network that provides over-the-air radio access to a 5G system.

Red Teaming – A cybersecurity practice of human-interactive attempts to penetrate a network or device to determine security vulnerabilities in development, deployment, and configuration.

Socially and economically disadvantaged individual (SEDI) owned business – A SEDI owned business is a) a business that is owned and controlled by individuals or whose current majority founders are individuals who have had their access to credit on reasonable terms diminished compared to others in comparable economic circumstances, due to their: (1) membership in a group that has been subjected to racial or ethnic prejudice or cultural bias within American society; (2) gender; (3) veteran status; (4) limited English proficiency; (5) disability; (6) long-term residence in an environment isolated from the mainstream of American society; (7) membership in a federally or state-recognized Indian Tribe; (8) long-term residence in a rural community; (9) residence in a U.S. territory; (10) residence in a community undergoing economic transitions (including communities impacted by the shift towards a net-zero economy or deindustrialization); or (11) membership in an underserved community.⁶

Specific Research Focus Area – For the purposes of this program, a “Specific Research Focus Area” is a topic area funded by the Innovation Fund subject to the maximum recipient award amounts as required by *FY21 NDAA* Section 9202(a)(1)(B)(ii). For this NOFO, there are two specific research focus areas: (1) Expanding Testing and Evaluation Activities and (2) Test Method Research and Development.

Testing and Evaluation (T&E) Activities – The first of two Specific Research Focus Areas covered in this NOFO. Testing and evaluating the degree to which different manufacturers and

⁶ Underserved communities are populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life because of, for example: race, color, religion, sex, sexual orientation, gender identity, disability, residence in a rural community; and persistent poverty. See 31 C.F.R. 35.27(g)(11)(ii). “Underserved communities” includes Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders, and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. (See 31 C.F.R. 35.27(g)(11)(ii)).

vendor equipment, components, and software can operate as an open, interoperable, and standards-based RAN, including in a virtualized and disaggregated environment RAN, using testing and evaluation methods currently accepted by industry. The T&E must address one or more of the following: interoperability of the components, the performance of the system, and/or the security of the system. (See [Section 3.3](#) for more information.)

Testing Events – Events that bring multiple Open RAN solution providers together to test products against common criteria to facilitate and determine a solution’s level of interoperability, performance, and/or security. Testing events may be time-limited (*i.e.*, a fixed, simultaneous testing window for all participants) or on a rolling basis (*i.e.*, up to a certain number of participants can test simultaneously over time and if a participant completes or terminates testing, another participant can begin testing). Testing may be conducted in-person, remotely, and/or in a hybrid format.

Testing Methods Research and Development (R&D) – The second of two research focus areas covered under this NOFO. The process to identify new methods or to materially improve existing methods of testing, evaluating, and validating the interoperability, performance, and/or security of open, interoperable, and standards-based RAN elements, addressing needs not currently met by existing, industry-accepted tests and best practices.

Vulnerability Scans – An automated process that determines whether software/equipment contain any pre-defined vulnerabilities, including but not limited to insecure protocols, known vulnerable software libraries, and use of common or default authentication credentials.

1.3. Period of Performance

The period of performance (POP) for grants awarded under this NOFO may be up to five (5) years in duration. Applicants must include the estimated POP in the milestone section each of the technical proposals it is submitting, as described in [Section 3.3](#).

1.3.1. Extensions

If a project’s POP is fewer than five (5) years, a grant recipient may submit a request for an extension of the POP, which must include the justification for such an extension and describe all relevant circumstances. The Assistant Secretary may recommend that the NIST Grants Office extend the period of performance by not more than one (1) year if the grant recipient certifies to the Assistant Secretary’s satisfaction that:

- a) the grant recipient has a plan for use of the grant funds; and
- b) work completed during the extended time would provide sufficient value to advancing goals outlined in the NOFO and accepted proposal, as determined by the government.

Requests for extensions will be granted at the sole discretion of the Assistant Secretary or their designee. Per Department of Commerce guidelines,⁷ the period of performance, inclusive of all extensions, shall not exceed five (5) years.

⁷ See Department of Commerce, [Grants and Cooperative Agreements Manual](#) (April 20, 2021), Section 9.I.2.a.(1).

1.3.2. Reversion of Funds

Any remaining unspent funds at the end of a grantee’s POP, inclusive of any extensions granted, will be de-obligated and will be made available for other Innovation Fund grantees.

1.4. Place of Performance

T&E Activities and Testing Methods R&D shall be conducted in the United States and its territories and possessions. Solutions that include virtualized or remote testing shall be conducted by entities facilitating those activities from within the United States and its territories and possessions.

1.5. Award Amount

NTIA expects to make awards under this phase of the Innovation Fund grant program within the following funding range \$250,000 - \$50,000,000. If an entity receives both a grant for T&E Activities and a grant for Testing Methods R&D, a separate award will be issued for each to facilitate monitoring and reporting. This range does not reflect any mandatory minimum. However, by statute, grants for a particular research focus area cannot be more than \$50,000,000.

1.6. Limitation on Grant Awards

In accordance with Section 9202(a)(1)(B)(ii) of the *FY21 NDAA*, the amount of a grant award to a recipient for a “specific research focus area” may not exceed \$50,000,000. For this initial NOFO, two specific research focus areas have been identified and have the following estimated award sizes:

Specific Research Focus Area	Expected Range of Individual Awards
T&E Activities	\$10,000,000 to \$50,000,000
Testing Methods R&D	\$250,000 to \$2,000,000

Awards made under this NOFO will not impact a recipient’s ability to apply for grants in future Innovation Fund NOFOs or to receive awards up to the statutory maximum for other future specific research focus areas.

1.7. Type of Funding Instrument

The funding instrument for awards made pursuant to this NOFO will be in the form of competitive grants.

2. Eligibility Information and Program Details

2.1. Eligible Applicants

Eligible applicants and subgrantees include for-profit companies, non-profit companies, institutions of higher education, industry groups, and consortia including two or more such entities.

2.2. Ineligible Applicants and Participants in Grant-funded Activities

As described below, certain entities are not eligible to receive grants or participate in grant-funded activities under the Innovation Fund. NTIA will review applications for involvement of

such entities and will not approve any applications that raise unacceptable concerns with respect to promoting a more secure, diverse, sustainable, and competitive wireless technology supply chain. For example, an entity—through control,⁸ access to information, or other mechanisms—may pose an undue risk to a project or U.S. national security interests. Applicants are required to provide information via the Standard Form (SF)-328 at the time of application to enable an initial assessment of these issues. Additional information, beyond the scope of the SF-328 form, may be required in due diligence, to further identify and, if necessary, mitigate potential concerns and risks to national security. NTIA may also require additional information to enable identification and mitigation of other concerns and national security risks posed by involvement of certain entities that may arise after an application is approved.

For example, NTIA may request participation records in monitoring and/or audit activities to ensure compliance with this requirement in accordance with [Section 5.8](#). Awardees should be prepared to provide records demonstrating ownership and control and should plan to obtain sufficient information from participants for NTIA to understand the ownership and control of participants in grant-funded activities.

Ineligible applicants and participants include, but are not limited to, any applicant, sub-applicant, participant, or other entity that is owned or controlled by an organization that is:

- 1) A foreign entity of concern;⁹
- 2) Identified on [the People’s Republic of China \(PRC\) Military Companies List](#) established in accordance with Section 1260H of *FY21 NDAA*;
- 3) Included on the [System for Award Management \(SAM\) Exclusion List](#).
- 4) Included on the Bureau of Industry and Security's Entity List ([15 CFR part 744](#), supplement no. 4);
- 5) Included on the Department of the Treasury's list of Non-SDN Chinese Military-Industrial Complex Companies (NS-CMIC List); or
- 6) Identified in the Federal Communications Commission's list of Equipment and Services Covered By section 2(a) of the Secure and Trusted Communications Networks Act of 2019 as providing covered equipment or services.

2.3. Cost Sharing or Matching

Cost sharing or matching for proposals under this first NOFO is voluntary. While not required, NTIA will give preference to applications that demonstrate cost sharing or matching in their project plan and project budget.

⁸ The term “control” for this purpose is defined as any direct or indirect investment (or loan) in an entity that provides the investor (or lender) with the means to influence important matters affecting the project. The term “means to influence important matters” includes membership or observer rights on, or the right to nominate an individual to a position on, the board of directors or equivalent governing body of the entity; any involvement, other than through voting of shares, in substantive decision-making by the entity; and consultation rights with respect to technology licensing to third parties.

⁹ As defined in 15 U.S.C. §4651(8) and 15 CFR § 231.106, subject to any further rulemaking promulgated by the Department of Commerce. See Preventing the Improper Use of CHIPS Act Funding, available at <https://www.federalregister.gov/documents/2023/03/23/2023-05869/preventing-the-improper-use-of-chips-act-funding>.

If an applicant wishes to provide a cost share, a full accounting of matching cost sources and the basis for the valuation must be included in project budget narrative and SF-424A. (See [Section 3.2](#).) Both direct costs (such as cash, equipment, personnel, and facilities) and indirect costs (such as overhead and management and administrative costs) will be considered as match. Applicants proposing a match should be aware that non-federal cost sharing incorporated into the budget of an approved financial assistance award is subject to audit in the same general manner as Federal award funds (See 2 CFR Part 200, Subpart F).

In order for a proposed cost share to be eligible, the cost must be allowable as a direct cost. (See [Section 3.8](#) for more details on eligible and ineligible uses of funds). Cost share will be considered as component of relative cost effectiveness of an application and will be used by the selecting official as a factor in making award decisions. (See [Section 4.1.4](#).)

2.4. Funding Opportunity Detailed Description

This funding opportunity covers two specific research focus areas that applicants can apply for: (1) T&E Activities; and (2) Testing Methods R&D. The key difference between these two focus areas is the stage of maturity: T&E Activities will test and evaluate open and interoperable, standards-based networks utilizing existing industry-accepted tests and best practices. The Testing Methods R&D projects will focus on addressing needs not currently met by industry-accepted tests and best practices. Applicants may apply for grants for one or both focus areas.

2.4.1. Specific Research Focus Area 1: T&E Activities

NTIA seeks proposals to expand industry-accepted T&E, within the United States and its territories and possessions, to test, evaluate, facilitate, and assess, the interoperability, performance, and/or security of open and interoperable, standards-based 5G radio access networks. NTIA is seeking proposals that make access to T&E more widely available and affordable in order to lower the barriers of entry for new and emerging industry entities.

Grant applications will be evaluated based on the mandatory and optional objectives outlined below. The mandatory objectives include regular testing events to achieve these goals. The optional objectives include other functions that can be performed in addition to the mandatory objectives. (See Merit Review [Section 4.1.2](#) for information regarding how these mandatory and optional objectives will be evaluated.)

2.4.1.1. Mandatory Objectives

All applications for grants advancing this specific research focus area must include industry-accepted T&E Activities to allow open and interoperable network suppliers to test equipment and software interoperability, performance, and/or security against industry-accepted test cases and best practices for 5G systems (e.g., 3GPP specifications, O-RAN Alliance specifications, and/or other relevant industry-accepted test cases). The applicant shall demonstrate how their strategy will increase the availability, affordability, and accessibility of testing and evaluation in the United States in support of the development, deployment, and adoption of open and interoperable, standards-based radio access networks. The applicant shall also demonstrate how the testing and evaluation activities will lead to sustained and accessible testing resources and data that advance industry adoption of open and interoperable wireless networks beyond the period of performance of this NOFO.

The T&E Activities must also support testing of the interoperability, performance, and/or security, of the Radio Unit (RU), Central Unit (CU), and/or Distributed Unit (DU) solutions of the 5G NR Radio Access Network. The performance of ancillary components (e.g., accelerator cards) shall only be tested as a part of a complete RU, CU, or DU solution. Testing of systems not unique to 5G radio access networks (e.g., general purpose computing equipment) is not an eligible project under this first NOFO, except as required for testing a complete RU, CU, or DU solution.

Grant-funded testing events must be accessible to entities eligible to do business in the United States and shall be held within the United States and its territories and possessions at regular intervals as determined by the applicant or on a rolling basis. If a grantee elects to provide remote access for participants, the grantee shall implement technical and policy solutions to adhere to the requirements in [Section 3.8.2.5](#).

Grantees and or subgrantees conducting the testing events shall use industry-accepted testing methods to conduct the tests and will document test results and any conclusions that can be drawn from the test results on the state of the industry. If grantees charge registration fees, those fees must be used to defray the costs of conducting events and will be considered program income. Grantees may use projected registration fees as part of their proposed cost share. (See [Section 3.2](#)).

Grantees will be required to maintain testing records and data to be aggregated, analyzed, and distributed to industry, government, and public stakeholders. Grantees must share individual testing results with participating companies for their products, and participating companies will have sole discretion for sharing their individual product results. T&E Activity grantees must safeguard individual company results but as noted above, will use data to aggregate results from individual events and to track trends over time. NTIA expects grantees to conduct testing in a secure manner (i.e., taking appropriate cybersecurity measures) in order to reduce risk of data leakage and other threats. Raw and pre-processed datasets should be made available in a machine-readable format that does not require any proprietary software (i.e., can only be read by a single specific software tool) and provide necessary metadata to understand values contained in datasets.

The grantees shall also provide NTIA with after-action summaries after the completion of testing events, or in quarterly intervals if testing is conducted on a rolling basis. Grantees will be encouraged to participate in virtual and in-person meetings that NTIA facilitates with industry groups and other grantees to share lessons learned, identify test gaps and best practices, and make recommendations for future programming.

As discussed above, participating entities shall receive feedback from the T&E Activity grantee on the participating entity's results. The participating entity may return for subsequent testing events to re-evaluate their components. NTIA may use anonymized results of testing and evaluation to track industry trends, identify gaps in testing, and inform future research into open and interoperable 5G systems. (See [Section 5.1](#) for how the Government will protect proprietary

and business-confidential information). The industry may use the results to establish improved test standards, certification programs, and to innovate components and systems.

2.4.1.2. Optional Objectives

Grant applicants may, at their discretion, also propose additional activities to be undertaken in connection with their T&E Activities. These activities, which will be considered as secondary criteria (*see* evaluation criteria in [Section 4.1.2.](#)) in our evaluation of T&E Activity proposals, could include, but are not limited to, the following:

- a) Operating neutral host facilities for the testing and evaluation of equipment and/or software developed by small and medium-sized companies, start-ups, and SEDI businesses, on an ongoing or as needed basis. The goal of this is to provide small and medium-sized companies, start-ups, and SEDI businesses access to laboratory resources that otherwise may not be able to afford high-cost test equipment for product development, outside of regular T&E activities.
- b) Offering technical assistance sessions and resources to participating entities, with a focus on new and emerging industry entities, to enable them to successfully participate in T&E Activities. Topics for technical assistance may include, but are not limited to: understanding and interpreting test results, steps and tips for preparing for T&E Activities, and how to improve future test results. The goal of this is to assist participants with more individualized assistance in developing interoperable, performant, and/or secure 5G RAN solutions, than may be possible during typical T&E Activities.

2.4.2. Specific Research Focus Area 2: Testing Methods R&D

To address the growing need for testing and evaluation of open and interoperable, standards-based 5G radio access networks, NTIA intends to fund Testing Methods R&D projects that address needs not currently met by industry-accepted tests and best practices. These projects fall into two categories:(1) develop new and emerging performance indicators and/or (2) develop enhanced methods for existing test criteria that make material improvements on current methods needed to assess interoperability, performance, and/or security on these networks and their component parts. Grants within this specific research focus area will target R&D of new and enhanced testing methods and assessment criteria that are capable of being repeated in a variety of environments (*e.g.*, lab, field, etc.) and different stages of product development. Flexibility of the testing methods while maintaining suitable accuracy is a priority. The following are two illustrative but non-exclusive examples of test flexibility maintaining accuracy:

- Accurately measuring energy consumption of RAN equipment for dis-similar power supply methods (*e.g.*, 120/240V AC mains power, -48V DC power, etc.) such that energy consumption can be compared between systems.
- Including provisions for measuring performance of radios that support direct-cabled testing and radios that only have integrated antennas, such that radio RF performance can be accurately compared between the two to the maximum extent practical.

More generally, examples of Testing Methods R&D include, but are not limited to:

- a) Developing new and emerging performance indicators such as for energy and spectrum efficiency of 5G radio access networks;
- b) Developing enhanced methods for existing 5G radio access network test criteria, where the goal is to make material improvement on current methods;

- c) Developing new means of cybersecurity testing in 5G radio access networks;
- d) Developing innovative testing solutions not contemplated by (a), (b), or (c) above. An example of such a solution might be a virtualized testing environment that allows open and interoperable, standards-based 5G RAN products to be tested individually or in a stack at a more iterative pace than is permitted by “in real life” testing events.

An applicant may propose one or more of the above topics, or additional topics, for Testing Methods R&D that further the goals of the program. Applicant must demonstrate a clear strategy for how to facilitate industry adoption of a new method successfully developed through this research.

3. Application and Submission Information

3.1. Address to Request Application Package

NTIA requires applicants to submit their applications online through Grants.gov. The Funding Opportunity number for this NOFO is: **NTIA-PWSCIF-2023**. Applications will be accepted until the deadline and will be processed on a rolling basis. Application packages, or portions thereof, submitted by other means, including by postal mail, courier, email, paper, or facsimile will not be accepted.

3.2. Content and Form of Applications

Important Note: Any applicant proposing more than one specific research focus area must submit a separate application for each focus area, as applications will be evaluated individually. If an entity is applying for more than one R&D project, a separate technical proposal, SF- 424A, and budget narrative and justification must be submitted for each project.

Applications for the Innovation Fund must be complete, follow the required content and format set forth below, and otherwise comply with this NOFO. Complete applications must be received through Grants.gov no later than 11:59 p.m. Eastern Daylight Time (EDT) on **June 2, 2023**. NTIA will not accept any application materials submitted prior to the public release of this NOFO.

Items a through d below are part of the standard application package in Grants.gov and can be completed through the download application process in Grants.gov.

Additional attachments, including but not limited to the items found in b.1 and e through i must be uploaded to Grants.gov as attachments to field 15 of the SF-424 form by clicking on “Add Attachment.”

The application must contain the following:

a. SF-424, Application for Federal Assistance.

The SF-424 must be signed by an authorized representative of the applicant organization.

1. Item 8.d. Zip/Postal Code field, should reflect the Zip code + 4 (#####-####) format.
2. Item 12 should list the NOFO number **NTIA-PWSCIF-2023**.
3. Item 18 should list the total budget information for the duration of the project.
4. The list of certifications and assurances referenced in Item 21 is contained in the Federal Financial Assistance Certifications and Representations (Certs and Reps) as part of the SAM.gov entity registration.

b. SF-424A, Budget Information for Non-Construction Programs.

The budget should reflect anticipated Federal and non-Federal expenses for the entire project, considering all potential cost increases and including cost of living adjustments.

1. The applicant should reflect each year of the project, up to the first four (4) years, on the SF-424A form that appears as part of the mandatory forms in the Grants.gov application package. If a fifth year is being proposed, the second SF-424A form should be submitted to cover year five (5) of the project. A fillable SF-424A form can be found at <https://www.grants.gov/web/grants/forms/sf-424-family.html> near the top of the screen and labeled “Budget Information – Non-Construction Program SF-424A”. Applicants should download the fillable SF-424A form, complete the information for year five (5) of the project and submit the completed form as an attachment.
2. In Section A, the Grant Program Function or Activity on Line 1 under Column (a) should be entered as Public Wireless Supply Chain Innovation Fund Grant Program – Expanding Testing and Evaluation, CFDA 11.038, or an abbreviation thereof. The Catalog of Federal Domestic Assistance Number on Line 1 under Column (b) should be entered as “11.038”. The total Federal budget amount for the term of the award should be listed in Section A, Line 1, Column (e).
3. Section B, Column (1) of the SF-424A should reflect the costs for each object class category, to include indirect charges, for the first year of the award. Section B, Column (2) of the SF-424A should reflect the costs for each object class category, to include indirect charges, for the second year of the award. Section B, Column (3) of the SF-424A should reflect the costs for each object class category, to include indirect charges, for the third year of the award. Section B, Column (4) of the SF-424A should reflect the costs for each object class category, to include indirect charges, for the fourth year of the award. If a fifth year is being proposed, an additional SF-424A will need to be attached for the final year, please refer to [Section 3.2.b.1](#) for details.

4. Section C should list the sources and amount of non-Federal cost sharing if proposed.
5. Section D requires a breakdown of the first year's Federal share and non-Federal share of the budget by quarter.
6. Section E requires the budget estimate of Federal funds needed for each year of the project. The budget estimate for the first year of the award should be entered in Section E, Line 16, Column (b). The budget estimate for the second year of the award should be entered in Section E, Line 16, Column (c). The budget estimate for the third year of the award should be entered in Section E, Line 16, Column (d). And the budget estimate for the fourth year of the award should be entered in Section E, Line 16, Column (e). If a fifth year is being proposed, on the separate SF-424A enter the estimates for the fifth year in Section E, Line 16, Column (b) of the separate SF-424A form.

c. CD-511, Certification Regarding Lobbying.

Enter "NTIA-PWSCIF-2023" in the Award Number field. Enter the title of the application, or an abbreviation of that title, in the Project Name field.

d. [SF-LLL, Disclosure of Lobbying Activities](#) (if applicable).

Click the hyperlink to follow instructions.

e. [SF-328, Certification Pertaining to Foreign Interests](#).

Click the hyperlink to follow instructions.

f. Budget Narrative and Justification.

There is no set format for the Budget Narrative and Justification; however, further explanation must be provided for the specific cost categories and line items identified in the SF-424A form as well as any other information the applicant deems necessary for consideration.

The written justification should include the necessity and the basis for the cost, as described below. Proposed funding levels must be consistent with the project scope, and only allowable costs should be included in the budget. Information on cost allowability is available in the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards at 2 C.F.R. Part 200, which apply to awards in this program.

This section will be reviewed to determine if all costs are reasonable, allocable, allowable, and necessary as defined in 2 C.F.R. Part 200 Subpart E, Cost Principles.

Information required for each budget category is as follows:

- 1) **Personnel**– At a minimum, the budget justification for all personnel should include the following: job title, commitment of effort on the proposed project in terms of average number of hours per week or percentage of time, salary rate, total personnel charges for each identified position on the proposed project, description of the role of the individual on the proposed project, and the work to be performed.
- 2) **Fringe Benefits**– Fringe benefits for each position should be identified separately from salaries and wages and based on rates determined by organizational policy. The items included in the fringe benefit rate (e.g., health insurance, parking, etc.) should not be charged under another cost category.
- 3) **Travel**– For all travel costs, the budget justification for travel should include the following: destination; names or number of people traveling; dates and/or duration; mode of transportation, lodging, and subsistence rates; and description of how the travel is directly related to the proposed project. For travel that is yet to be determined, please provide best estimates based on prior experience. If a destination is not known, an approximate amount may be used with the assumptions given for the location. Additionally, grantees will be encouraged to participate in meetings or symposia of all grantees and industry stakeholders annually to share lessons learned, identify test gaps, identify best practices, and make recommendations on future work or changes. Costs for attending such meetings is an allowable grant cost. Applicants should account for preparation costs and travel expenditures for at least one meeting per year in their budget narratives and justification.
- 4) **Equipment**- Equipment is defined as an item of property that has an acquisition cost of \$5,000 or more (unless the organization has established lower levels) and an expected service life of more than one year. The budget justification should list each piece of equipment, the cost, and a description of how it will be used and why it is necessary to the successful completion of the proposed project. Please note that any general use equipment (computers, etc.) charged directly to the award should be allocated to the award according to expected usage on the project.
- 5) **Supplies**– Supplies are defined as all tangible personal property other than that described as equipment. Provide a list of each supply, and the breakdown of the total costs by quantity or unit of cost. Include the necessity of the cost for the completion of the proposed project.
- 6) **Contractual (i.e., Contracts or Subawards)**– Each contract or subaward should be treated as a separate item. Identify the cost and describe the services to be provided and the necessity of the subaward or contract to the successful performance of the proposed project. Contracts are for obtaining goods and services for the applicant’s own use and creates a procurement relationship

with the contractor. A subaward is for the purpose of carrying out a portion of a Federal award and creates a Federal financial assistance relationship with the subrecipient.

- 7) **Construction**– Not an allowable cost under this NOFO.
- 8) **Other Direct Costs**– For costs that do not easily fit into the other cost categories, please list the cost, and the breakdown of the total costs by quantity or unit of cost. Include the necessity of the cost for the completion of the proposed project. Only allowable costs can be charged to the award.
- 9) **Indirect Costs**– Commonly referred to as Facilities & Administrative Costs, Indirect Costs are defined as costs incurred by the applicant that cannot otherwise be directly assigned or attributed to a specific project. The justification should include a cost calculation that reflects the applicable indirect cost rate. Additionally, applicants are required to clearly break out if non-federal funds will be used to cover indirect costs and the dollar amounts of non-federal funds used to cover indirect costs. If the applicant does not plan to use non-federal funds to cover indirect costs this should be clearly stated in the budget narrative/justification under this category.
- 10) **Program Income**– Any gross income earned by the applicant that is directly generated by a supported activity or earned as a result of the Federal award during the period of performance is considered program income. This includes registration fees for events or for services provided. The applicant should provide projected amounts of program income it anticipates generating through the life of the award, what activity will generate the program income, and how the applicant plans to use the additive or cost-sharing/matching method for this income as outlined in 2 CFR § 200.307.

g. Indirect Cost Rate Agreement.

If indirect costs are included in the proposed budget, provide a copy of the approved negotiated agreement if this rate was negotiated with a cognizant Federal audit agency. If the rate was not established by a cognizant Federal audit agency, provide a statement to this effect. If a successful applicant includes indirect costs in the budget and has not established an indirect cost rate with a cognizant Federal audit agency, the applicant will be required to obtain such a rate in accordance with Section B.06 of the Department of Commerce Financial Assistance Standard Terms and Conditions, dated November 12, 2020. Alternatively, in accordance with 2 C.F.R. § 200.414(f), applicants that do not have a current negotiated (including provisional) indirect cost rate except for those non-Federal entities described in Appendix VII, paragraph D.1.b. of 2 CFR 200 may elect to charge a de minimis rate of 10 percent of modified total direct costs (MTDC). Applicants proposing a 10 percent de minimis rate pursuant to 2 C.F.R. § 200.414(f) should note this election as part of the budget portion of the application.

h. Technical Proposal
(See [Section 3.3](#) for requirements).

i. Consortiums (if applicable)

An applicant applying on behalf of a consortium should detail the key participants, including a description of the role each participant will play, a description of the structure of the consortium, and the benefits of applying as a consortium. The applicant should also provide documentation and evidence of the planned operating model, such as the working model, governance structure, decision-making authority/rights, contractual obligations, financial obligations, roles and responsibilities, and any memoranda of understanding.

The consortium must select a principal applicant, who will serve as the primary point of contact during the application period and post award. The principal applicant will be the signatory on the grant application.

Consortium members are expected to be active collaborators and to align behind the content of their application. As a demonstration of commitment to the project, members of the consortium are required to provide letters of commitment (e.g., one letter with signatures from all members) evidencing that each consortium member has read the application and is committed to executing its roles, responsibilities, or commitments related to the application.

j. Other (optional)

Any materials on which the applicant seeks to rely in demonstrating its satisfaction of the eligibility criteria, merit review criteria, and programmatic review criteria set forth in [Section 4.1](#) of this NOFO.

3.3. Technical Proposals

The Technical Proposal shall be based on the specific research focus area, shall not exceed 20 pages, and shall be submitted as an attachment through Grants.gov.

3.3.1. T&E Activities

a) Executive Summary

Provide a short summary of the proposed project. If the project is selected for funding, the executive summary may be used by NTIA in award announcement materials and posted on the public NTIA.gov website. Therefore, applicants should ensure that no proprietary or business confidential information is included in the executive summary.

b) Technical Objectives

Describe the mandatory testing events and the objectives of the testing that will be conducted. For example, is the primary purpose to test interoperability, performance, and/or security? Will it test the interactions between and among these areas (e.g., how security does or does not affect performance)? How will the testing conducted assist

participants in understanding the status of their products and what needs to be done to remedy any problems to facilitate interoperability? Explain in detail the rationale behind which testing areas are being selected and how the testing will help promote the development and adoption of open and interoperable radio access networks. Ensure that your application includes detailed information on each testing area to be addressed during events. Examples of testing areas include, but are not limited to, the following:

1) Interoperability:

- a. Interoperability among key 5G interfaces (*e.g.*, Xn, F1, E1, Open Fronthaul/CPRI, etc.) of RAN subcomponents (*i.e.*, RU, CU, DU, etc.);
- b. Service Management and Orchestration (SMO) interoperability (*e.g.*, ability for SMO solutions to control network elements from more than one supplier/manufacturer); and/or
- c. Supplier-agnostic support of computing solutions:
 - 1) Hardware – operates on hardware from different server manufacturers;
 - 2) Virtualization – supports different hypervisors; and/or
 - 3) Cloud – supports different cloud hosting providers and/or private cloud solutions.

2) Performance:

- a. Network Capacity Performance (*e.g.*, maximum number of users);
- b. Network Throughput Performance (*e.g.*, maximum throughput under varying conditions);
- c. Computing Efficiency (*e.g.*, number of supported users per compute core, throughput per available compute core); and
- d. Energy Efficiency (*e.g.*, power consumption under varying load conditions or deployment configurations).

3) Security:

- a. Conformance of end-to-end systems and individual RAN elements with industry-accepted specifications (*e.g.*, 3GPP SA3 specifications, O-RAN Alliance specifications, NIST guidance on 5G cybersecurity, ESF security guidance, CISA’s Open RAN security paper, etc.);
- b. Red Teaming of open and interoperable 5G solutions to identify vulnerabilities in deployment and/or operation of RAN systems; and
- c. Vulnerability Scans.

c) Work Plan

Provide a detailed work plan of how the T&E activities will be operated.

The work plan shall include descriptions of the following:

- 1) How tests will evaluate and facilitate interoperability, performance, and/or security, be conducted equitably, and ensure that repeatable and verifiable results are received.

- 2) What tests will be used and the sources of the test cases, identifying the relevant standards development organization or similar organization where applicable. Indicate how the test reflects industry-accepted best practice.
- 3) Proposed plans to recruit and engage participants to maximize participation and planned/anticipated number of participants in T&E activities. Also discuss plan for ensuring only eligible entities can access the activities.
- 4) The accessibility, affordability, frequency, and duration for T&E Activities (if time-limited) or maximum number of concurrent tests (if rolling).
- 5) If rolling or remote/virtual testing is proposed, how the applicant will ensure that results are accurate and can provide objective assessment of participant capabilities absent simultaneous participation from many entities.
- 6) If the grantee intends to provide remote access or virtual testing, describe the technical and policy measures taken to adhere to the remote access requirements set forth in [Section 3.8.2.5](#).
- 7) Any other information pertaining to how testing will be operated and managed.

d) Milestone Plan

Each applicant shall provide a quarterly milestone plan of its activities. The duration of the project is at the discretion of the applicant, but the period of performance may not exceed five years. The plan, at a minimum, should show when T&E events will be conducted, including major planning and after-action activities related to the events.

e) Related Activities and Unique Aspects of Proposal

Describe how the proposed work complements other T&E programs conducted by government or the private sector or how it fills a critical gap. Explain how the proposal is unique or would integrate with existing testing processes to minimize overlap.

f) Record Retention and Data Analysis

Describe how results and lessons learned from the proposed events are to be distributed, including public distribution, how the results will be accessible, and how results and lessons learned will be used to influence future development of technical specifications, test cases in standards or specification organizations, or certification programs.

Describe data/record retention plans and how information will be safeguarded and controlled. How will testing results be shared with participants? How will information be aggregated and shared with industry and the public? How soon would after-action reports be made available to NTIA?

Describe in sufficient detail policies, procedures, and any relevant technical measures taken to ensure that propriety and business confidential information and data of event participants are not disclosed to unauthorized parties.

g) Partnering and Collaboration

Describe how the applicant intends to identify and collaborate with like-minded organizations and facilities performing similar work. Questions to consider when providing a description include but are not limited to: Will there be a “federated” lab capability? Will the applicant be providing subgrants to, or entering into contracts with, unaffiliated laboratories to perform specific testing events? Will the applicant’s events, results, and procedures be coordinated with those of similar labs outside of the United States? Applications should include descriptions of the parameters and data protections in place for engaging labs outside of the United States.

Applicants may include any Letters of Commitment for partner labs who will be integral to the success of the effort. Letters of Commitment must be signed by an individual with authority to legally bind the partner lab to its commitment and do not count against the page limit of the Technical Proposal.

Additionally, grantees will be encouraged to participate in meetings or symposia of all grantees and industry stakeholders annually to share lessons learned, identify test gaps, identify best practices, and make recommendations on future work or changes. Costs for attending such meetings is an allowable grant cost. Applicants should account for preparation costs and travel expenditures for at least one meeting per year in their budget narrative and justification.

h) Consultants, Contracts, and Subawards

The purpose of this section is to show that any third-party assistance contemplated by the proposal would materially benefit the proposed effort and that arrangements for such assistance are in place at the time of the application’s submission. Outside involvement in the project is encouraged where it strengthens the conduct of the research.

The applicant must include Letters of Commitment from any participating consultants, subrecipients, or subcontractors. Letters of Commitment must be submitted by all funded and unfunded entities that will have an active role in executing the activities outlined in the Technical Proposal. Letters must address the level of participation, qualifications of the personnel who will be actively involved, and how successful completion of this project would benefit open and interoperable 5G industry adoption. They must also specify any voluntary committed cost-share, including the specific services and/or products to be used in the project. Letters of Commitment must be signed by an individual with authority to legally bind the organization to its commitment. The letters do not count against the page limit of the Technical Proposal.

i) Cybersecurity

It is the policy of the United States to strengthen the security and resilience of its critical infrastructure against both physical and cyber threats. Each applicant selected for Federal funding under this notice must demonstrate efforts to address cybersecurity risks relevant to the type and scale of the project.

Applicants must employ appropriate cybersecurity practices within their enterprise and throughout the lifecycle of the project, including planning, design, and implementation. Applicants must describe measures taken to ensure that practices are consistent with current industry best practices for cybersecurity, such as the [NIST Cybersecurity Framework](https://www.nist.gov/cyberframework/framework)¹⁰ and Cybersecurity and Infrastructure Security Agency (CISA) [Cybersecurity Performance Goals \(CPGs\)](https://www.cisa.gov/cross-sector-cybersecurity-performance-goals)¹¹.

These performance goals provide a baseline set of cybersecurity practices broadly applicable across critical infrastructure with known risk-reduction value, a benchmark for critical infrastructure operators to measure and improve their cybersecurity maturity, and a combination of recommended practices for information technology (IT) and operational technology (OT) owners, including a prioritized set of security practices.

j) Cybersecurity Supply Chain Risk Management (C-SCRM)

Describe measures taken to ensure prioritization of C-SCRM practices which are consistent with current industry best practices for supply chain risk management, such as the NIST Cyber Supply Chain Risk Management Practices for Systems and Organizations¹², and including Foundational Practices referenced therein.

k) Qualification of Applicant

Explain the qualifications of the applicant to conduct T&E Activities to advance the state of open and interoperable, standards-based 5G radio access networks. Provide examples of success conducting previous T&E events and track record engaging industry participants.

l) Fee Structure

Explain the proposed fee structure for participating in the T&E Activities and how it supports the availability, affordability, and accessibility of testing and evaluation in the United States in support of the development, deployment, and adoption of open and interoperable, standards-based radio access networks

m) Facilities and Equipment

Describe proposed facilities and equipment, including total capacity for testing events. If funding is requested for additional equipment, provide an itemized list and a justification for each such acquisition.

n) Long-Term Sustainability

Explain plans to continue relevant testing and evaluation beyond the period of performance of the federally funded program. This plan could include long-term financing plans and/or long-term industry partnerships that will enable continued efforts.

¹⁰ <https://www.nist.gov/cyberframework/framework>

¹¹ <https://www.cisa.gov/cross-sector-cybersecurity-performance-goals>

¹² <https://csrc.nist.gov/publications/detail/sp/800-161/rev-1/final>

For Optional Objectives Only:

o) Host Facilities for Other T&E

Describe 1) the applicant's capacity to provide a neutral host for ongoing T&E outside of T&E scheduled events; 2) the facility and personnel capacity; 3) the kinds of testing that can be conducted; 4) the applicant's ability to tailor T&E to different technical maturity levels of participants; and 5) the applicant's fee structure for ongoing testing participants. Describe how the facility will expand access to laboratory resources to companies, including small and medium-sized companies, start-ups, and SEDI owned business, which otherwise may not be able to afford high-cost test equipment for product development. Describe the type of industry partners required to participate in a successful neutral T&E program and how the applicant will engage and retain participation from these partners.

p) Technical Assistance

Describe the applicant's capability to provide technical assistance, as described in [Section 2.4.1.2\(b\)](#) to industry entities, including to small and medium-sized companies, start-ups, SEDI owned businesses, and vendors new to the 5G market.

3.3.2. Testing Methods R&D

a) Executive Summary

Provide a short summary of the proposed project. If the project is selected for funding, the executive summary may be used by NTIA in award announcement materials and may be posted on the public NTIA.gov website. Therefore, applicants should ensure that no proprietary information or business confidential information is included in the executive summary.

b) Testing Methods Research Area

The first paragraph of the proposal must describe a research project that addresses one or more testing methods applicable to measuring interoperability, performance, and/or security of open and interoperable, standards-based 5G radio access networks.

c) Identification and Significance of the Problem or Opportunity

Make a clear statement of the specific research problem or opportunity addressed, its innovativeness, and why the research is important. Proposals should include reference to external stakeholders or researchers who have identified the problem as significant.

d) Rationale for Need

Proposals addressing new testing methodologies should describe what will be tested and how this will benefit 5G Open RAN development, including likelihood of a new method being adopted by industry. Proposals addressing an existing testing method should describe why the existing testing methodology is not sufficient. Applications

shall clearly indicate whether the problem or opportunity is specific to current generation (5G) technology or if could be applicable to successor technologies.

e) Technical Objectives

State the specific objectives of the effort, including the technical questions the project will try to answer, to assess the feasibility of the proposed approach.

f) Work Plan

The plan should indicate what research will be done, where it will be done, and how the research will be carried out. The method(s) planned to achieve each objective or task should be discussed in detail. This shall also include steps to be taken to promote industry adoption of a successfully developed test method.

g) Related Research/Research & Development

Describe significant related research and research and development that are directly related to the application, including any conducted by the principal investigator. Describe how it relates to the proposed effort and any planned coordination with outside sources. The applicant must persuade evaluators of the applicant's awareness of key, recent related research and research and development conducted by others for the topic covered by the proposed project.

h) Key Individuals and Bibliography of Related Work

Identify key individuals involved, including their related education, experience, and publications.

i) Qualification of Applicant

Explain the qualifications of the applicant to develop new tests likely to lead to broad adoption. Please provide examples of success engaging with industry and external participants to develop relevant products.

j) Facilities and Equipment

Provide a description of, and information regarding the availability and location of, instrumentation and physical facilities. Any new facility or equipment costs, including software and services, should be itemized and justified. (See [Section 3.8.2.4](#) for more information regarding restrictions on the use certain equipment and services from untrusted vendors.)

k) Consultants, Contracts, and Subawards

The purpose of this section is to show that any third-party research assistance contemplated by the proposal would materially benefit the proposed effort and that arrangements for such assistance are in place at the time of the application's submission. Outside involvement in the project is encouraged where it strengthens the conduct of the research.

The applicant must include Letters of Commitment from any participating consultants, subrecipients, or subcontractors. Letters of Commitment must be submitted by all funded and unfunded entities that will have an active role in executing the activities outlined in the Technical Proposal. Letters must address the level of participation, qualifications of the personnel who will be actively involved, and how successful completion of this project would benefit open and interoperable 5G industry adoption. They must also specify any voluntary committed cost-share, including the specific services and/or products to be used in the project. Letters of Commitment must be signed by an individual with authority to legally bind the organization to its commitment. The letters do not count against the page limit of the Technical Proposal.

D) Current and Pending Support.

Any application that includes investigators, researchers, and key personnel must identify all sources of current and potential funding, including this proposal, in a Current and Pending Support Attachment. Any current project support (e.g., Federal, state, local, public or private foundations, etc.) must be listed. The proposed project and all other projects or activities requiring a portion of time of the Principal Investigator (PI), co-PI, and key personnel should also be included in the attachment, even if no salary support is received. The total award amount for the entire award period covered, including indirect costs, must be shown as well as the number of person-months per year to be devoted to the project, regardless of the source of support. Similar information must be provided for all proposals already submitted or that are being submitted concurrently to other potential funders. The Current and Pending Support Attachment does not count against the page limit of the Technical Proposal.

Applicants must provide the following information for each individual identified as a PI, co-PI, a key personnel role:

- 1) Name of investigator
- 2) List all current and planned projects
- 3) Status of project – current, pending, submission planned in near future
- 4) Source of support for project
- 5) Total Award Amount
- 6) Total Award Period Covered
- 7) Location of Project
- 8) Your time committed to the project per year

3.4. Application Format

NTIA will only accept applications submitted electronically via Grant.gov. Other methods of submission, including paper, email, and facsimile submissions, will not be accepted.

Requirements for Application Attachments:

- a) Figures, graphs, images, and pictures – Should be of a size that is easily readable or viewable and may be presented in landscape orientation.

- b) Font – Easy to read font (11-point minimum). Smaller type may be used in figures and tables but **must be clearly legible**.
- c) Line spacing – Applicants may use single spacing or double spacing.
- d) Margins – One inch top, bottom, left, and right margins.
- e) Page Layout – Portrait orientation, except for figures, graphs, images, and pictures. Paragraphs are to be clearly separated from each other by double spacing, paragraph formatting, or equivalent.
- f) Page Numbering – Number pages sequentially.
- g) Page Size – Pages must be 8½ inches by 11 inches, excluding network or system diagrams.
- h) Application Language – English.
- i) Typed Document – All applications, including forms, must be typed.
- j) Page Limits – Technical proposal are limited to 20 pages, not including letters of support.

3.5. How to Register to Apply through Grants.gov

Read the instructions below about registering to apply for Innovation Fund grants. Applicants should read the registration instructions carefully and prepare the information requested before beginning the registration process.

Organizations must have an active System for Award Management (SAM) registration which provides a Unique Entity Identifier (UEI), and Grants.gov account to apply for grants. If individual applicants (those submitting on their own behalf) are eligible to apply for this funding opportunity, they need only refer to steps 2 and 3 below.

Creating a Grants.gov account can be completed online in minutes, but SAM registration may take weeks. Therefore, an organization's registration should be done in sufficient time to ensure it does not impact the entity's ability to meet required application submission deadlines.

Organization registration instructions can be found on Grants.gov

here: <https://www.grants.gov/web/grants/applicants/organization-registration.html>

- 1) *Register with SAM:* All organizations (entities) applying online through Grants.gov must register with the System for Award Management (SAM). Failure to register with SAM will prevent your organization from applying through Grants.gov. SAM registration must be renewed annually. For more detailed instructions for registering with SAM, refer to:
<https://www.grants.gov/web/grants/applicants/organization-registration.html>.
- 2) *Create a Grants.gov Account:* The next step is to register an account with Grants.gov. Follow the on-screen instructions provided on the registration page.
- 3) *Add a Profile to a Grants.gov Account:* A profile in Grants.gov corresponds to a single applicant organization the user represents (*i.e.*, an applicant) or an individual applicant submitting on their own behalf. If you work for or consult with multiple organizations, you can have a profile for each organization under one Grants.gov

account. In such cases, you may log in to one Grants.gov account to access all your grant profiles. To add an organizational profile to your Grants.gov account, enter the UEI (Unique Entity Identifier) for the organization in the UEI field. If you are an individual applicant submitting on your own behalf, you do not need a UEI to add the profile. For more detailed instructions about creating a profile on Grants.gov, refer to: <https://www.grants.gov/web/grants/applicants/registration/add-profile.html>.

- 4) *Electronic Business Point of Contact (EBiz POC) Authorized Profile Roles:* After you register with Grants.gov and create an Organization Applicant Profile, the applicant's request for Grants.gov roles and access is sent to the EBiz POC. The EBiz POC is then expected to log in to Grants.gov and authorize the appropriate roles, which may include the Authorized Organizational Representative (AOR) role, thereby giving you permission to complete and submit applications on behalf of the organization. You will be able to submit your application online any time after you have been assigned the AOR role. For more detailed instructions about creating a profile and authorized profile roles on Grants.gov, refer to: <https://www.grants.gov/web/grants/applicants/registration/authorize-roles.html>.
- 5) *Track Role Status:* To track your role request, refer to: <https://www.grants.gov/web/grants/applicants/registration/track-role-status.html>.
- 6) *Electronic Signature:* When applications are submitted through Grants.gov, the name of the organization applicant with the AOR role that submitted the application is inserted into the signature line of the application, serving as the electronic signature. The EBiz POC of the organization must authorize people who are able to make legally binding commitments on behalf of the organization as a user with the AOR role; this step is often missed and it is crucial for valid and timely submissions.

3.6. How to Submit an Application for this NOFO via Grants.gov

Grants.gov applicants can apply online using Workspace. Workspace is a shared, online environment where members of a grant team may simultaneously access and edit different webforms within an application. For each NOFO, you can create individual instances of a workspace.

For an overview of applying on Grants.gov using Workspaces, refer to:

<https://www.grants.gov/web/grants/applicants/workspace-overview.html> Applicants using unreliable internet connections should be aware that the process of completing the Workspace can take some time. Therefore, applicants should allow enough time to prepare and submit the application before the package closing date.

- 1) *Create a Workspace:* Creating a workspace allows you to complete an application online and route it through your organization for review before submitting.

- 2) *Complete a Workspace*: Add participants to the workspace to work on the application together, complete all the required forms online or by downloading PDF versions, and check for errors before submission. The Workspace progress bar will display the state of your application process as you apply. As you apply using Workspace, you may click the blue question mark icon near the upper-right corner of each page to access context-sensitive help.
 - a. *Adobe Reader*: If you decide not to apply by filling out webforms, you can download individual PDF forms in Workspace. The individual PDF forms can be downloaded and saved to your local device storage, network drive(s), or external drives, then accessed through Adobe Reader.

NOTE: Visit the Adobe Software Compatibility page on Grants.gov to download the appropriate version of the software at: <https://www.grants.gov/web/grants/applicants/adobe-software-compatibility.html>.
 - b. *Mandatory Fields in Forms*: In the forms, you will note fields marked with an asterisk and a different background color. These fields are mandatory fields that must be completed to successfully submit your application.
 - c. *Complete SF-424 Fields First*: These forms are designed to fill in common required fields across other forms, such as the applicant name, address, and SAM UEI. Once it is completed, the information will transfer to the other forms.
- 3) *Submit a Workspace*: An application may be submitted through Workspace by clicking the “Sign and Submit” button on the “Manage Workspace” page, under the “Forms” tab. Grants.gov recommends submitting your application package at least 24-48 hours prior to the close date to provide you with time to correct any potential technical issues that may disrupt the application submission.
- 4) *Track a Workspace Submission*: After successfully submitting a workspace application, a Grants.gov Tracking Number (GRANTXXXXXXXX) is automatically assigned to the application. The number will be listed on the Confirmation page that is generated after submission. Using the tracking number, access the “Track My Application” page under the “Applicants” tab or the “Details” tab in the submitted workspace.

For additional training resources, including video tutorials, refer to: <https://www.grants.gov/web/grants/applicants/applicant-training.html>.

Applicant Support: Grants.gov provides applicants 24/7 support via the toll-free number 1-800 518-4726 and email at support@grants.gov. For questions related to the specific grant opportunity, contact the number listed in the application package of the grant you are applying for.

If you are experiencing difficulties with your submission, it is best to call the Grants.gov Support Center and get a ticket number. The Support Center ticket number will assist NTIA with tracking your issue and understanding background information on the issue.

3.7. Submission Dates and Times

Complete applications must be received through Grant.gov no later than 11:59 p.m. Eastern Daylight Time (EDT) on June 2, 2023. Complete applications or portions thereof submitted by postal mail, courier, email, or by facsimile will not be accepted. All application forms and documents must be included with an applicant's complete application packet submission through Grants.gov.

When developing the submission timeline, each applicant should keep in mind that: (a) all applicants are required to have current registrations in the electronic System for Award Management (SAM.gov); and (b) the free annual registration process in SAM.gov may take weeks. Please note that a Federal assistance award cannot be issued if the designated recipient's registration in SAM.gov is not current at the time of the award.

NTIA expects to make awards on a rolling basis with initial awards issued no later than August 8, 2023.

3.8. Funding Restrictions

3.8.1. Eligible Uses of Funds for the Innovation Fund Program

Grant recipients may only use Federal award funds and any non-federal cost share committed by the recipient to pay for allowable costs under the Innovation Fund Program. Allowable costs are determined in accordance with the Federal cost principles identified in 2 C.F.R. Part 200, Subpart E. In addition, costs must be reasonable, necessary, allocable, and allowable for the proposed project, and must conform to generally accepted accounting principles as defined in 2 C.F.R. Part 200, Subpart E.

3.8.2. Ineligible Costs

Ineligible costs include those costs that are unallowable under the applicable Federal cost principles. If costs do not satisfy the criteria of reasonableness, necessity, allocability, and allowability, they are unallowable. Please note that costs ineligible for this NOFO may not be paid for with the non-federal cost share committed to an award. In addition, the following costs are specifically identified as prohibited:

3.8.2.1. Construction

Construction costs are not allowed under this grant program.

3.8.2.2. Prohibition on Profit and Fees

A profit, fee, or other incremental charge to the government above actual cost incurred by an award recipient or subrecipient is not an allowable cost for activities funded under this Program. This does not prohibit registration fees for T&E activities, as described in [Section 2.4.1.1](#), used for non-federal cost share, however grantees must use all collected registration fees for the defrayment of event costs.

3.8.2.3. Prohibition on Use of Grant Funds to Support or Oppose Union Organizing

An award recipient or any subrecipient may not use grant funds, whether directly or indirectly, to support or oppose union organizing.

3.8.2.4. Equipment, Supplies, and Services from Untrusted Vendors

Award recipients are prohibited from using grant funds for certain telecommunications and video surveillance services and equipment in accordance with 2 C.F.R. § 200.216. Additionally, consistent with *Section 2.2*, ineligible costs include vendor costs (for example, for equipment, supplies, and services from vendors) where that vendor (or equipment or services) is, including but not limited to:

- 1) A foreign entity of concern;¹³
- 2) Providing Equipment, Software, or Services produced or sold by companies found on [the People's Republic of China \(PRC\) Military Companies List](#) established in accordance with Section 1260H of *FY21 NDAA*;
- 3) Included on the System for Award Management (SAM) Exclusion List;
- 4) Included on the Bureau of Industry and Security's Entity List ([15 CFR part 744](#), supplement no. 4);
- 5) Included on the Department of the Treasury's list of Non-SDN Chinese Military-Industrial Complex Companies (NS-CMIC List); or
- 6) Identified in the Federal Communications Commission's list of Equipment and Services Covered By section 2(a) of the Secure and Trusted Communications Networks Act of 2019 (codified as amended at 47 U.S.C. §§ 1601-1609) as providing covered equipment or services, which the FCC refers to as its Covered List.¹⁴

Award recipients should be prepared to provide documentation that allows NTIA to verify that its vendors or equipment or services do not pose an undue risk to promoting a more secure, diverse, sustainable, and competitive wireless technology supply chain.

3.8.2.5. Support of Remote Access

If a T&E Activity proposal includes support for remote access for testing or debugging, the award recipient shall not allow remote access to any personnel or entities that pose an undue risk to promoting a more secure, diverse, sustainable, and competitive wireless technology supply chain. This includes but is not limited to personnel or entities that are owned or controlled by, a foreign entity of concern¹⁵ or a covered nation as defined by 10 U.S.C. § 4872(d)(2). Award

¹³ See Section 2.2.

¹⁴ See [List of Equipment and Services Covered By Section 2 of The Secure Networks Act | Federal Communications Commission \(fcc.gov\)](#).

¹⁵ See Section 2.2.

recipients should be prepared to provide NTIA with sufficient records to demonstrate that their remote access plan does not pose such a risk.

3.8.2.6. Other

As a condition of receiving a grant under the Innovation Fund Program, an entity that is receiving the grant is prohibited from using grant amounts:

- a) As collateral for a loan made by any public or private lender;
- b) For pre-application expenses, including previously incurred administrative costs or previously purchased supplies or equipment.

3.9. Material Representations and Public Disclosure of Applications

Any statement made on any form or supporting document submitted as part of the complete application packet will be treated as a material representation of fact upon which NTIA will rely in awarding grants. Misrepresentation of material facts may be the basis for denial of an application. Penalties upon conviction may include fine and imprisonment. For details concerning fraud, please refer to 18 U.S.C. § 1001.

Applicants should be aware that NTIA may make all or portions of their applications for grants under the Innovation Fund Program publicly available as required under applicable Federal laws. (See [Section 5.1](#) of this NOFO for additional information concerning the confidentiality of information contained in an application.)

3.10. Other Submission Requirements

3.10.1. Timely Receipt Requirements and Proof of Timely Submission

All applications must be received by 11:59 p.m. Eastern Daylight Time (EDT) on June 2, 2023. Proof of timely submission is automatically recorded by Grants.gov. An electronic date/time stamp is generated within the system when the application is successfully received by Grants.gov. The applicant's Authorized Official Representative (AOR), who submitted the application, will receive an acknowledgement of receipt and a tracking number (GRANTXXXXXXXX) from Grants.gov with the successful transmission of their application. The AOR will also receive the official date/time stamp and Grants.gov Tracking number in an email serving as proof of their timely submission.

When NTIA successfully retrieves the application from Grants.gov, and acknowledges the download of submissions, Grants.gov will provide an electronic acknowledgment of receipt of the application to the email address of the applicant's AOR. Again, proof of timely submission shall be the official date and time that Grants.gov receives your application. Applications received by Grants.gov after the established due date for the program will be considered late and will not be considered for funding by NTIA.

Grants.gov will provide either an error or a successfully received submission message in the form of an email sent to the applicant's AOR.

3.10.2. Material Revisions

An applicant shall not be permitted to make any material revision to its application after the submission deadline. NTIA may, however, request or accept clarifications, revisions or submissions for completeness that are non-material. It is in the Assistant Secretary's sole discretion whether a revision is material or not.

3.10.3. Amendments

Any amendments to this NOFO or additional program guidance will be announced on Grants.gov and NTIA.gov. Applicants using Grants.gov Workspace will see an alert on the Manage Workspace page to update their application. Applicants who have signed up for email notifications will be automatically notified of the changes via email.

4. Application Review Information

4.1. Review Process for Innovation Fund Program

All applications will be evaluated on a competitive basis. Applications will be initially screened to determine eligibility, completeness, and responsiveness to this NOFO. Applications passing the initial screening will move on to the Merit Review phase. In this phase, the application will be assigned to three reviewers, who will evaluate the merits of the proposals and will individually score technical proposals in accordance with the evaluation criteria (See [Section 4.1.2](#)). Each application will be judged on its own merit. Once the Merit Review phase is completed, NTIA staff will conduct a Programmatic Review (See [Section 4.1.3](#)) to ensure that the proposed activities align with the program requirements, that the budget and budget narrative are complete, and that costs appear allowable, allocable, and reasonable. NTIA is under no obligation to fund any application. NTIA may elect to fund several or none of the applications that are similar in scope.

4.1.1. Initial Administrative and Eligibility Review of Complete Applications

NTIA will download applications from the Grants.gov portal and conduct an initial review of applications to determine eligibility, completeness, and responsiveness to the programmatic requirements of the first NOFO in the Innovation Fund Program, including a review of the project narrative and budget justification.

Applications submitted by any entity other than an eligible applicant will be eliminated from further review, as will any applications that fail to meet any of the requirements of [Section 3](#) of this NOFO. NTIA may elect to continue the initial administrative review process for an application that is timely submitted by an eligible applicant, but that is missing non-material documentation required by this NOFO. The applicant will have seven (7) calendar days to submit materials responsive to the feedback provided by NTIA, unless this period is extended by NTIA. An eligible applicant's failure to remedy deficiencies in a timely manner may result in NTIA's denial of the application.

Applications that satisfy the Initial Administrative and Eligibility Review will enter Merit Review. Program staff will sort applications by like-focused project type. All T&E Activity proposals will be sorted into one list. Testing Methods R&D projects will be sorted into sub-categories according to test method focus area (interoperability, performance, and/or security)

and/or the specific project sub-topic, such as Xn interface interoperability, energy performance, data integrity, etc.

4.1.2. Merit Review and Application Review Criteria

During Merit Review, applications will be evaluated by a panel of at least three (3) reviewers composed of government staff or non-federal experts in accordance with the following weighted criteria for a maximum of 100 points. Reviewers may discuss the applications with each other but will assign scores on an individual basis. The reviewers will evaluate applications against the criteria described below.

For T&E Activities:

a) Project Purpose and Benefits (75 points)

1. The applicant clearly and credibly describes how their T&E Activity will increase the availability, affordability, and accessibility of testing and evaluation in the United States in support of the development, deployment, and adoption of open and interoperable, standards-based radio access networks. (20 points)
2. The applicant demonstrates a clear understanding of how to conduct open and interoperable, standards-based 5G T&E Activities with a comprehensive and feasible technical approach, work plans, and milestone plans. (15 points)
3. The applicant demonstrates that the proposed T&E Activities will lead to sustained and accessible testing resources and data that advance industry adoption of open, secure, and interoperable radio access network technologies. (15 points)
4. The applicant's plan for the analysis and safeguarding of data collected from the testing and the applicant's plan for how to share information with participants and other interested parties. (5 points)

Optional Tasks: Applications that do not propose the following optional tasks will receive a score of -0- for the optional elements.

5. The applicant's approach to provide ongoing neutral T&E outside of T&E events and the resources provided expand access to companies to develop open and interoperable 5G radio access network solutions, including small and medium-sized companies, start-ups, and SEDI owned businesses, which otherwise may not be able to afford high-cost test equipment for product development. (8 points)
6. The applicant's approach to provide technical assistance and support to new and emerging industry entities in the 5G T&E ecosystems. (8 points)
7. Other additional activities proposed to facilitate the programs goals. (4 points)

b. Competence, Capability, Budget, and Long-Term Sustainability (25 points)

1. Applicant's competence (skill, expertise, experience) and organizational capability (personnel, facilities) to complete the specific project proposed. (5 points)
2. Reasonableness of the applicant's proposed budget. (10 points)
3. Project's fiscal sustainability beyond the award period. (10 points)

For Testing Methods R&D:

- a. Project Purpose and Benefits (80 points)
 1. The applicant's proposed technical approach is comprehensive and feasible and demonstrates a clear understanding of the research area. (30 points)
 2. The applicant demonstrates that the proposed research program will lead to a successful product, service, or method with a viable pathway to industry adoption. The applicant is addressing a testing method not currently met by industry-accepted tests and best practices (30 points)
 3. The principal/key investigators, supporting staff, and consultants have the qualifications and experience to accomplish the proposed research effort. In addition, reviewers will evaluate, as applicable, the extent to which the applicant has access to the facilities and equipment necessary to complete the proposed research. (20 points)
- b. Competence, Capability, and Budget (20 points)
 1. Applicant's competence (skill, expertise, experience) and organizational capability (personnel, facilities, equipment) to complete the specific project proposed. (10 points)
 2. Reasonableness of the applicant's proposed budget. (10 points)

4.1.3. Programmatic Review

NTIA will conduct a programmatic review to verify that proposed activities align with the first NOFO objectives and overall Innovation Fund Program goals and that the proposed budget appears allowable, allocable, and reasonable. NTIA may ask applicants to submit additional information, as appropriate, to clarify or to further substantiate the representations made in their applications, which will be taken into consideration before completing the programmatic review. If the programmatic review staff request information to address comments or concerns raised by merit reviewers, the supplemental information will be provided to the merit review panel, which will be requested to re-score the technical proposal based on the additional information. NTIA Innovation Fund Program staff will do a final review of the application to confirm eligibility and allowability, and ensure that the application contains sufficient information and explanation to support the recommendation for award.

Applicants will have five (5) calendar days to respond to a request for information, unless this time period is extended by NTIA. Applications whose supporting documents are not complete, accurate, and timely submitted, or that do not adequately substantiate the representations they set out, may be denied.

4.1.4. Selecting Official Approval

All applications will be rank-ordered by total of the three merit scores, within their like-focused project lists. The lists will be provided to the Selecting Official, the Assistant Secretary of Commerce for Telecommunications and Information and NTIA Administrator, who will make a final award recommendation to the National Institute of Standards and Technology (NIST) Grants Officer. The Selecting Official will review and make award selections using the following selection factors:

- a) The availability of funding.
- b) Relative cost-effectiveness between like-focused applications. Factors that may be considered in determining cost-effectiveness include total project costs, amount of cost share provided, number and scope of T&E Activities to be conducted, and scope of testing to be conducted. A meritorious project that demonstrates a match will be given priority over projects that do not include a match.
- c) Regional diversity. For T&E Activity projects, NTIA will give preference to applications from different geographic areas of the United States, in order to support T&E availability and accessibility. Therefore, the Selecting Official may select lower merit review scoring application from a different region before selecting a second applicant within the same region.

The Selecting Official retains discretion to select and recommend an application for funding out of rank order based upon one or more of the selection factors listed above. The Selecting Official will submit the applications recommended for funding, along with the basis for the selection decisions, to the NIST Grants Officer, who serves as the Grants Officer for the Innovation Fund Grant Program. The final approval of selected applications and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

4.1.5. Grants Office Action – Federal Awarding Agency Review of Risk Posed by Applicants

After applications are proposed for funding by the Selecting Official, the NIST Grants Management Division (GMD) performs pre-award risk assessments prior to final award, in accordance with 2 C.F.R. § 200.206.

Where the total Federal share is expected to exceed the simplified acquisition threshold (currently \$250,000), NIST GMD will review and consider the publicly available information about that applicant in SAM.gov under the “Responsibility/Qualification” (R/Q) section, previously known as the Federal Awardee Performance and Integrity Information System (FAPIS). An applicant may, at its discretion, review and comment on information about itself previously entered into FAPIS/SAM.gov R/Q by a Federal awarding agency. As part of its review of risk posed by applicants, NIST GMD will consider any comments made by the applicant in SAM.gov R/Q in making its determination about the applicant’s integrity, business ethics, and record of performance under Federal awards. Upon completion of the pre-award risk assessment, the Grants Officer will make a responsibility determination concerning whether the applicant is qualified to receive the subject award and, if so, whether appropriate specific

conditions that correspond to the degree of risk posed by the applicant should be applied to an award.

The final approval of selected applications and the issuance of awards will be made by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final. All awards are subject to the availability of Federal award funds at the time of award. Unsuccessful applicants will be notified in writing after all selections are finalized. (See [Section 4.4](#)).

4.2. Anticipated Announcement and Award Dates

NTIA, through NIST, will make awards on a rolling basis with initial awards issued no later than August 8, 2023.

4.3. Federal Award Notices

A grants officer from the NIST Grants Office will serve as the Grants Officer for awards issued pursuant to this NOFO. An applicant will be notified in writing by the NIST Grants Officer if its application is selected for an award. If the application is selected for funding, the NIST Grants Officer will issue the grant award (Form CD-450), which is the authorizing financial assistance award document. By signing the Form CD-450, the recipient agrees to comply with all award provisions, terms, and conditions.

If an applicant is awarded funding, neither NTIA nor NIST is under any obligation to provide any additional future funding in connection with that award or to make any future award(s). Amendment of an award to extend the period of performance is at the discretion of NTIA and the NIST Grants Officer, in accordance with DOC Policy.

4.4. Notification to Unsuccessful Applicants

Unsuccessful applicants will be notified in writing by e-mail and will have the opportunity to receive a debriefing after the final award decisions have been announced. Applicants must make a request within ten (10) business days of the email notification to receive a debrief from NTIA. NTIA will then work with the unsuccessful applicant in arranging a date and time for the debrief.

4.5. Retention of Unsuccessful Applications

Unsuccessful applications will be retained in accordance with NTIA recordkeeping requirements.

4.6. Administrative and National Policy Requirements

Grant recipients will comply with applicable statutes and regulations, including but not limited to the following:

4.6.1. Uniform Administrative Requirements, Cost Principles, and Audit Requirements

Through 2 C.F.R. § 1327.101, the Department of Commerce adopted Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards at 2 C.F.R. Part 200, which apply to awards in this program.

4.6.2. Federal-Wide Research Terms and Conditions as adopted by the Department of Commerce

Projects funded under the Testing Methods R&D will involve research, development, or related activities. The Department of Commerce (DOC) will therefore designate these award as “Research and Development” under 2 CFR § 200.1 for purposes of grants administration. The policies and requirements in 2 CFR Part 200 that apply to “research” awards will apply to awards under this specific research focus area.

4.6.3. Department of Commerce Financial Assistance Standard Terms and Conditions

The Department of Commerce will apply to each award in this program the Financial Assistance Standard Terms and Conditions in effect on the date of award. The current version, dated November 12, 2020, is accessible at [Department of Commerce Financial Assistance Standard Terms and Conditions](#).

4.6.4. Pre-Award Notification Requirements

The Department of Commerce will apply the Pre-Award Notification Requirements for Grants and Cooperative Agreements dated December 30, 2014 accessible at [79 FR 78390](#).

4.6.5. Property Trust Relationship and Public Notice of Filings for Grant-Acquired Property

In accordance with 2 C.F.R. § 200.316, any real property, equipment, and/or intangible property, acquired or improved with a Federal award must be held in trust by the recipient or subrecipient as trustee for the beneficiaries of the project or program under which the property was acquired or improved. This trust relationship exists throughout the duration of the property’s estimated useful life, as determined by the Grants Officer in consultation with the Program Office, during which time the Federal government retains an undivided, equitable reversionary interest in the property (Federal Interest). In this connection, NTIA may require the grantee to record liens or other appropriate notices of record to indicate that personal or real property has been acquired or improved with a Federal award and that use and disposition conditions apply to the property. Awards issued pursuant to this NOFO may contain specific award conditions pertaining to the use and disposition of grant-acquired property and to a requirement that the recipient or subrecipient file certain public notices (e.g., UCC-1, Covenant of Purpose, Use and Ownership, etc.) with respect to grant-acquired property. NTIA may provide information regarding the useful life schedules associated with assets acquired with grant funds.

4.6.6. Reporting

The Department of Commerce understands the importance of undertaking systematic data collection and other rigorous evaluative activities to assess the outcomes related to funds given under this NOFO. NTIA and the NIST Grants Office are committed to this goal, and all applicants should expect this will be a requirement of all awards. NTIA and the NIST Grants Office intend to collect a range of data from recipients, which include, but are not limited to information on: current maturity state of open, interoperable, standards-based 5G technology; the advancement of maturity of such technology over time; progress in expanding access to testing and evaluation resources for open, interoperable, and standards-based 5G radio access network technology; and progress in addressing gaps in availability of methods for testing and evaluating

such technology. This data will be instrumental in understanding the effects of individual funded projects and will enable the NTIA to assess the extent to which the strategic objectives have been achieved.

All award recipients will be expected to comply with any reporting requirements, as well as any program evaluation activities. More detail regarding reporting requirements will be included in the terms and conditions.

Here a list of standard documents that will enable the NTIA and NIST Grants Office to collect information about program activities that grantees should expect to prepare:

a. Baseline/Expenditure Plan

Within forty-five (45) calendar days of the award date, the grantee shall submit to the NIST Grants Office a Baseline Report for the entire performance period that will include planned activities and major milestones and spending by quarter for the period of performance.

b. Federal Financial Report

Grantees must report on obligations and expenditures using the Federal Financial Report (Standard Form 425) semi-annually. The report is submitted to the NIST Grants Office and is due 30 calendar days following the end of quarters ending in March and September. A report must be submitted for each calendar quarter that the grant is active, including partial calendar quarters or when no financial activity occurs.

c. Bi-annual Performance Progress Reporting

The semi-annual Performance Progress Reports (PPR) will contain the following information: (a) a comparison of actual accomplishments during the reporting period with the goals and dates established in the Baseline/Expenditure Plan for the reporting period; (b) a description of any problems that have arisen or the reasons why established goals have not been met; and (c) actions taken to remedy any failures to meet goals. The report is submitted to the NIST Grants Office and is due 30 calendar days following the end of quarters ending in March and September.

d. Final Report and Closeout Reporting

In addition to the above requirements and those reporting requirements found in 2 C.F.R. Part 200, any entity that receives an award will be required to submit a final report as a part of the grant close-out process that describes the programmatic objectives achieved through the funding and completion of the grant-funded project, including those elements collected in the bi-annual report.

4.6.7. Recipient Integrity and Performance Matters

In accordance with Section 872 of Public Law 110-417 (as amended; see 41 U.S.C. § 2313), if the total value of a recipient's currently active grants, cooperative agreements, and procurement contracts from all Federal awarding agencies exceeds \$10,000,000 for any period of time during the period of performance of an award made under this NOFO, then the recipient shall be subject to the requirements specified in Appendix XII to 2 C.F.R. Part 200, for maintaining the currency of information reported to SAM that is made available in the Federal Awardee Performance and

Integrity Information System (FAPIS) about certain civil, criminal, or administrative proceedings involving the recipient.

4.6.8. Audit Requirements

The grant regulations in 2 C.F.R. Part 200, Subpart F, adopted by the Department of Commerce through 2 C.F.R. § 1327.101, require any non-federal entity that expends Federal awards of \$750,000 or more in the recipient’s fiscal year to conduct a single or program-specific audit in accordance with the requirements set out in the Subpart. Additionally, unless otherwise specified in the terms and conditions of the award, entities that are not subject to Subpart F of 2 C.F.R. Part 200 (e.g., commercial entities) that expend \$750,000 or more in grant funds during their fiscal year must submit to the Grants Officer either: (i) a financial audit of each DOC award or subaward in accordance with Generally Accepted Government Auditing Standards; or (ii) a project specific audit for each award or subaward in accordance with the requirements contained in 2 C.F.R. § 200.507. Applicants are reminded that NTIA, the Department of Commerce Office of Inspector General, or another authorized Federal agency may conduct an audit of an award at any time.

4.6.9. Federal Funding Accountability and Transparency Act of 2006

In accordance with 2 C.F.R. Part 170, all recipients of a Federal award made on or after October 1, 2010, are required to comply with reporting requirements under the Federal Funding Accountability and Transparency Act of 2006 (Pub. L. No. 109-282). In general, all recipients are responsible for reporting sub-awards of \$30,000 or more. In addition, recipients that meet certain criteria are responsible for reporting executive compensation. Applicants must ensure they have the necessary processes and systems in place to comply with the reporting requirements should they receive funding.

4.6.10. Federal Awarding Agency Contact(s)

Questions should be directed to:

Subject Area	Point of Contact
Programmatic and Technical Question	Carolyn Dunn Innovation Fund Grants Lead cdunn@ntia.gov
Technical Assistance with Submission	Grants.gov Help Desk 1-800-518-4726 support@grants.gov
Grants Rules and Regulations	Lisa Ko Grants Office Team Lead Lisa.ko@nist.gov
Media Inquiries	Virginia Bring NTIA Press Secretary press@ntia.gov

5. Other Information

5.1. Protected and Proprietary Information

The applicant acknowledges and understands that information and data contained in applications for financial assistance, as well as information and data contained in financial, performance, and other reports submitted by the applicant, may be used by the Department of Commerce in conducting reviews and evaluations of its financial assistance programs and for statistical purposes. For this purpose, information and data may be accessed, reviewed, and evaluated by Department of Commerce employees, other Federal employees, Federal agents and contractors, and/or by non-federal personnel, all of whom enter into appropriate confidentiality and nondisclosure agreements covering the use of such information. As may be provided in the terms and conditions of a specific financial assistance award, applicants are expected to support Program reviews and evaluations by submitting required financial and performance information and data in an accurate and timely manner, and by cooperation with the Department of Commerce and external program evaluators. In accordance with 2 C.F.R. § 200.303(e), applicants are reminded that they must take reasonable measures to safeguard protected personally identifiable information and other confidential or sensitive personal or business information created or obtained in connection with a Department of Commerce financial assistance award.

NTIA will protect confidential and proprietary information from public disclosure consistent with applicable law, including the Trade Secrets Act, as amended (18 U.S.C. § 1905) and the Economic Espionage Act of 1996 (18 U.S.C. § 1831 *et seq.*). In the event that a submission contains information or data deemed to be confidential commercial information or that otherwise should not be publicly disclosed, that information should be identified, bracketed, and marked as Privileged, Confidential, Commercial or Financial Information. Based on these markings, the confidentiality of the contents of those pages will be reviewed for protection consistent with applicable law.

5.2. Funding Availability and Limitation of Liability

Funding for the program listed in this NOFO is contingent upon the continued availability of appropriations. In no event will NTIA, NIST, or the Department of Commerce be responsible for application preparation costs, including, but not limited to, if program is amended or cancelled by governing law. Publication of this NOFO does not oblige NTIA, NIST or the Department of Commerce to award any specific project or to obligate any available funds. NTIA will fund only projects that are deemed likely to achieve the Innovation Fund Program's goals and for which funds are available.

5.3. Third Party Beneficiaries

The Innovation Fund Program is not intended to and does not create any rights enforceable by third party beneficiaries.

5.4. Environmental and Historic Preservation

Any federally funded grant is required to comply with Environmental and Historic Preservation (EHP) laws and the National Environmental Policy Act (NEPA).¹⁶ Application submittals should address if it is anticipated that the project may impact EHP resources and describe how they will comply with applicable environmental and national historical preservation requirements. It is the eligible applicant's and subgrantee's responsibility to obtain all necessary federal, state, and local governmental permits and approvals necessary for the proposed work to be conducted. Projects and other eligible activities are expected to be designed so that they minimize the potential for adverse impacts on the environment. Eligible applicants will be required to cooperate with NTIA in identifying feasible measures to reduce or avoid any identified adverse environmental impacts of their proposed projects or other eligible activities. The failure to do so may be grounds for not making an award. Proposals will be reviewed to ensure that they contain sufficient information to allow agency staff to conduct a NEPA analysis so that appropriate NEPA documentation can be submitted to NTIA, along with the recommendation for funding of the selected projects or other eligible activities.. If additional information is required after an application is accepted for funding, funds can be withheld by NTIA under a special award condition requiring the awardee to submit additional environmental compliance information sufficient for the agency to make an assessment of any impacts that a project may have on the environment.

5.5. Research Activities Involving Human Subjects, Data, or Recordings Involving Human Subjects Including Software Testing.

Any application that includes research activities involving human subjects or data or recordings from or about human subjects must satisfy the requirements of the Common Rule for the Protection of Human Subjects ("Common Rule"), codified for the Department of Commerce at 15 C.F.R. Part 27.¹⁷ Research activities involving human subjects that fall within one or more of the classes of vulnerable subjects found in 45 C.F.R. Part 46, Subparts B, C and D must satisfy the requirements of the applicable subpart(s). In addition, any such application that includes research activities on these subjects must comply with all applicable statutory requirements imposed upon the Department of Health and Human Services (DHHS) and other Federal agencies, all regulations, policies and guidance adopted by DHHS, the Food and Drug Administration (FDA), and other Federal agencies on these topics, and all Executive Orders and Presidential statements of policy on applicable topics. The website of the Office of Human Research Protection (OHRP) in the DHHS contains the applicable regulatory, policy and guidance and (includes links to FDA, but may not include all applicable FDA regulations and policies).

While unlikely that the kinds of research envisioned in this NOFO will trigger the Human Subject Common Rule, all grantees conducting research must consider the types of activities to be conducted and will be required to affirmatively certify, by separable task, all research activities believed to be exempt or non-exempt research involving human subjects, and if non-

¹⁶ See, e.g., National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) and the National Historic Preservation Act (NHPA) (54 U.S.C. 300101 et seq.).

¹⁷ NTIA uses the Common Rule definitions for research and human subjects research contained in 15 C.F.R. § 27.102.

exempt, the expected institution(s) where the research activities involving human subjects may be conducted, and the institution(s) expected to be engaged in the research activities. This certification must be submitted to the Federal Program Officer within 30 days of award.

For further information about this requirement: <https://www.nist.gov/oaam/grants-management-division/nist-nofo-information/nist-notice-funding-opportunity-requirements>.

5.6. Waiver Authority

It is the general intent of NTIA not to waive any of the provisions set forth in this NOFO. However, under extraordinary circumstances and when it is in the best interest of the Federal government, the Assistant Secretary or their designee, upon their own initiative or when requested, may waive any provision in this NOFO. Waivers may only be granted for requirements that are discretionary and not mandated by statute or other applicable law. Any request for a waiver must set forth the extraordinary circumstances for the request.

5.7. Paperwork Reduction Act

This NOFO contains an information collection requirement subject to the Paperwork Reduction Act (PRA) (44 U.S.C. § 3501 *et seq.*). The PRA requires each Federal agency to seek and obtain OMB approval before collecting information from the public. Federal agencies may not collect information unless it displays a currently valid OMB control number. For purposes of the Innovation Fund Program, NTIA will use Standard Forms 424 (Application for Federal Assistance), 424A (Budget Information for Non-Construction Programs), 425 (Federal Financial Report), 328 (Certificate Pertaining to Foreign Interests), and LLL (Disclosure for Lobbying Activities) under the respective control numbers 4040-0004, 4040-0006, 4040-0014, 0704-0579, and 4040-0013.

5.8. Transparency, Accountability, and Oversight Required

NTIA, recipients, and subrecipients have a critical role to play in ensuring that the Innovation Fund Program is implemented in a manner that ensures transparency, accountability, and oversight sufficient to, among other things:

- a) Minimize the opportunity for waste, fraud, and abuse;
- b) Ensure that recipients of Innovation Fund grants use grant funds to further the overall purpose of the Program in compliance with the requirements of this NOFO, 2 C.F.R. Part 200, and other applicable law; and
- c) Allow the public to understand and monitor grants and subgrants awarded under the Program.

To that end, NTIA shall:

- a) Conduct such monitoring activities of recipients as are necessary and appropriate;
- b) Develop monitoring plans, subject to the approval of the Assistant Secretary or their designee, that may include site visits or desk reviews, technical assistance, and random sampling of compliance requirements; and
- c) Impose specific conditions on grant awards designed to mitigate the risk of nonperformance where appropriate.

Each award recipient shall:

- a) Comply with the reporting requirements set forth in [Section 4.6.6](#); and
- b) Comply with the obligations set forth in 2 C.F.R. Part 200 and the Department of Commerce's Financial Assistance Standard Terms and Conditions.

NTIA may also recommend to the NIST Grants Office enforcement action related to applicable rules and laws. The NIST Grants Office may impose penalties for failure to meet statutory obligations, or wasteful, fraudulent, or abusive expenditure of grant funds. Such penalties include, but are not limited to, imposition of additional award conditions, payment suspension, award suspension, grant termination, de-obligation/clawback of funds, and debarment of organizations and/or personnel.

5.9. U.S. Department of Commerce Office of Inspector General

The U.S. Department of Commerce Office of Inspector General (OIG) seeks to improve the efficiency and effectiveness of the Department's programs, including deterring and detecting fraud, waste, abuse, and mismanagement. The OIG accomplishes this mission primarily through investigations, audits, and inspections of Department activities, including grants, cooperative agreements, loans, and contracts.

a) Disclosures

Recipients of financial assistance originating from the Department of Commerce, which includes NTIA and NIST, shall timely disclose, in writing, to the OIG and awarding agency, whenever, in connection with the award, performance, or closeout of this grant or sub-award thereunder, the recipient has credible evidence that a principal, employee, agent, or sub-recipient has committed:

- 1) A violation of Federal criminal law involving fraud, conflict of interest, bribery, or gratuity violations found in Title 18 of the United States Code; or
- 2) A violation of the civil False Claims Act (31 U.S.C. §§ 3729-3733).

b) Reporting

The OIG maintains a hotline to receive allegations of fraud, waste, or abuse. To report such allegations, please visit <https://www.oig.doc.gov/Pages/Hotline.aspx>. Upon request, the OIG will take appropriate measures to protect the identity of any individual who reports misconduct, as authorized by the Inspector General Act of 1978, as amended. Reports to the OIG may also be made anonymously.

5.10. Whistleblower Protection

Recipients, sub-recipients, and employees working on this grant award will be subject to the whistleblower rights and remedies established under 41 U.S.C. § 4712. An employee of a recipient or sub-recipient may not be discharged, demoted, or otherwise discriminated against as a reprisal for disclosing information that the employee reasonably believes is evidence of: gross mismanagement of a Federal contract or award; a gross waste of Federal funds; an abuse of authority (*i.e.*, an arbitrary and capricious exercise of authority that is inconsistent with the mission of NTIA or the Department of Commerce or the successful performance of a contract or grant awarded by NTIA or the Department) relating to a Federal contract or award; a substantial and specific danger to public health or safety; or a violation of a law, rule, or regulation related to a Federal contract (including the competition for or negotiation of a contract) or grant. The recipient or sub-recipient shall inform its employees and contractors, in writing, in the

predominant language of the workforce or organization, of employee whistleblower rights and protections under 41 U.S.C. § 4712, as described above and at <https://www.oig.doc.gov/Pages/Whistleblower-Protection-Program.aspx>.

5.11. Enforcement

NTIA shall take enforcement action against recipients as necessary and appropriate. A recipient (or applicable subrecipient) that fails to comply with any requirement under the FY21 NDAA or this NOFO shall be required to return up to the entire amount of the award at the discretion of the Assistant Secretary (or, in the case of a subrecipient, the Assistant Secretary or the recipient).

5.12. Unauthorized Use of Funds

To the extent that the Assistant Secretary or the Inspector General of the Commerce Department determines that an Innovation Fund Program recipient or subrecipient has expended grant funds received under the Innovation Fund Program in violation of the requirements set forth in 47 U.S.C. § 906, 2 C.F.R. Part 200, the terms and conditions of the award, or other applicable law, the Assistant Secretary shall, if appropriate, recover the amount of funds that were so expended.