

NOTICE OF FUNDING OPPORTUNITY
Public Wireless Supply Chain Innovation Fund (PWSCIF) Grant Program
NOFO 2 – Open Radio Commercialization and Innovation

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 - Open Radio Commercialization and Innovation

C. Announcement Type

Amended

D. Funding Opportunity Number

NTIA-PWSCIF-24-01

E. Assistance Listing (CFDA Number)

11.038 – Public Wireless Supply Chain Innovation Fund

F. Key Dates

Complete applications must be submitted through Grants.gov no later than 11:59 p.m. Eastern Daylight Time (EDT) on July 17, 2024.

NTIA expects to make awards on a rolling basis.

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 4*](#) of this NOFO for detailed information concerning application submission requirements.

H. Funding Opportunity Description

This NOFO is the second in a series that NTIA will issue and administer under the Public Wireless Supply Chain Innovation Fund (Innovation Fund). This NOFO is

divided into two topic areas: open radio unit (RU) commercialization and open RU innovation. Throughout this document, open RU commercialization is referred to as “specific research focus area 1” (SRFA 1) and open RU innovation is referred to as “specific research focus area 2” (SRFA 2). A brief description of each SRFA is below:

- **SRFA 1:** Accelerating the development of open RU products to the point where they meet carrier needs and are ready for commercial trials; and
- **SRFA 2:** Improving the overall performance and capabilities of open RUs through targeted research and development.

Applications in response to this NOFO must address either SRFA 1 or SRFA 2. ***A single application cannot address both SRFAs. If an application is submitted addressing both SRFAs, it will be rejected.*** Applicants interested in applying for both SRFAs ***must submit a separate application for each SRFA.*** Applicants may only include one project per application, regardless of SRFA. ***Individual submissions containing multiple proposed projects will be rejected.*** Each applicant may submit a maximum of one SRFA 1 application and three SRFA 2 applications. Each SRFA 2 application must address at least one, and may address more than one, topic area listed in [Section 3.3.1](#).

I. Funding Instrument

Grant

J. Eligibility

Eligibility varies for each SRFA. SRFA 1 eligibility is found in [Section 2.2.1](#) and SRFA 2 eligibility is found in [Section 3.2.1](#).

Additional eligibility requirements applicable to both SRFAs can be found in [Section 6.1](#).

K. Anticipated Amounts

NTIA will award up to \$420,000,000 under this NOFO. The amount of funding NTIA expects to award per project differs by SRFA, as follows:

- **SRFA 1:** NTIA expects to award \$25,000,000-\$45,000,000 per project.
- **SRFA 2:** NTIA expects to award \$5,000,000-\$10,000,000 per project.

L. Cost Sharing/Matching

There is a 10% minimum cost share requirement for SRFA 1. SRFA 1 applicants who provide a cost share of 16% or more will receive favorable weighting of their application during

Programmatic Review. See [Section 2.2.3](#) and [Section 5.1.3](#) of this NOFO for more information.

SRFA 2 applicants are not required to provide a cost share. See [Section 3.2.3](#) of this NOFO for more information.

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Section 1 – Overview

The National Telecommunications and Information Administration (NTIA) issues this Notice of Funding Opportunity (NOFO) to describe the requirements under which it will continue awarding grants in connection with the Public Wireless Supply Chain Innovation Fund (Innovation Fund).

1.1. PROGRAM AUTHORITY

The Innovation Fund is 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*), codified at 47 U.S.C. § 906(a)(1).

The Innovation Fund is 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).

1.2. PROGRAM OVERVIEW

The Innovation Fund aims to foster competition and innovation across the global telecommunications ecosystem, lower costs for consumers and network operators, and strengthen the 5G and successor wireless technology supply chains. The program's 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.

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 allows 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 and successor radio access network suppliers, leading to rapid innovation and/or potentially lowering capital expenditures and operating expenses. This increased competition will also drive innovation, leading to the development of new and improved radio access network (RAN) features. Ultimately, the increase in competition spurred by the shift to open networks will bolster resilience in the global telecommunications equipment market and enhance 5G and successor wireless technology supply chain security.

Pursuant to the *FY21 NDAA*, the Innovation Fund facilitates the adoption of open and interoperable wireless networks through the following statutory objectives:¹

¹ This list of statutory objectives has been abridged for clarity. The verbatim list of statutory objectives can be found at 47 U.S.C. § 906(a)(1)(C).

- i. Promoting and deploying technology, including software, hardware, and microprocessing technology, that will enhance competitiveness in 5G and successor wireless technology supply chains that use open and interoperable interface radio access networks (RAN).
- ii. Accelerating commercial deployments of open interface standards-based compatible, interoperable equipment.
- iii. Promoting and deploying compatibility of new 5G equipment with future open standards-based, interoperable equipment.
- iv. Managing integration of multi-vendor network environments.
- v. Identifying objective criteria to define equipment as compliant with open standards for multi-vendor network equipment interoperability.
- vi. Promoting and deploying security features enhancing the integrity and availability of equipment in multi-vendor networks.
- vii. Promoting and deploying network function virtualization to facilitate multi-vendor interoperability and a more diverse vendor market.

The *CHIPS and Science Act of 2022* provided critical appropriations for the Innovation Fund, investing \$1.5 billion in the program.

The program's first NOFO focused on expanding testing and evaluation (T&E) activities and developing new and improved testing methods to advance the interoperability, performance, and security of these networks.² This second NOFO builds upon that critical work by investing in the technological development and commercial deployment of open radio units (RUs) – a core RAN component making up the largest part of a carrier network in terms of capital expenditures (CAPEX). This next NOFO marks a key step in advancing the adoption of open and interoperable wireless networks in line with Innovation Fund Program goals, as detailed in the *FY21 NDAA*.

1.3. FUNDING OPPORTUNITY OVERVIEW

NTIA will support two specific research focus areas (SRFAs) under this NOFO:

SRFA 1 – Open RU Commercialization: Accelerate the development of open RU products to the point where they meet carrier needs and are ready for commercial trials.

SRFA 2 – Open RU Innovation: Improve the overall performance and capabilities of open RUs through targeted research and development.

These activities aim to address the complex technical and market challenges hindering open and interoperable network adoption to better facilitate commercialization. Like NTIA's first funding opportunity, this NOFO is responsive to feedback received during NTIA's listening session³ and

² NTIA, Notice of Funding Opportunity, [Public Wireless Supply Chain Innovation Fund Grant Program – Expanding Testing and Evaluation \(April 12, 2023\)](#)

³ A video recording of NTIA's listening session is available on the [NTIA.Gov YouTube channel](#).

the Request for Comment (RFC)⁴ period, as well as via ongoing market analysis. NTIA plans to publish additional NOFOs that build upon this work, insights from future engagement sessions, and learnings from NTIA’s forthcoming Innovation Fund Advisory Committee.⁵

1.3.1. NOFO Structure

This NOFO is organized as follows:

Section 1 (Overview) provides an overview of the Innovation Fund and the focus of this NOFO: open RU commercialization and innovation. It then provides background information as to how this NOFO meets the statutory objectives of the Innovation Fund.

Section 2 (Specific Research Focus Area 1 – Open RU Commercialization) provides the specific objectives and eligibility, technical scope, and application requirements for SRFA 1.

Section 3 (Specific Research Focus Area 2 – Open RU Innovation) provides the specific objectives and eligibility, technical scope, and application requirements for SRFA 2.

Section 4 (Application and Submission Information) explains the application submission process that all applicants must follow and information that they must provide in their application package, *regardless of SRFA*. This includes application format, instructions for electronic filing, the revision process, and other submission requirements.

Section 5 (Application Review Process) explains each step of application review: Initial, Merit, Programmatic, and Selecting Official Approval. It also includes projected dates for awards and information on the applicant notification process.

Section 6 (General Requirements, Prohibitions, and Other Information) offers information related to ineligible entities, allowable costs, intellectual property, awarding agency contact information, and other information. *NOTE: The requirements and prohibitions in this section apply to ALL submitted applications, regardless of SRFA.*

⁴ See 87 Fed. Reg. 76182, [Public Wireless Supply Chain Innovation Fund Implementation Notice and Request for Comment \(December 13, 2022\)](#); RFC responses are available on the [NTIA website](#).

⁵ See 47 U.S.C. § 906(a)(1)(F). NTIA is required to establish a federal advisory committee to help inform (i) the strategic direction of the Innovation Fund, and (ii) efforts of the Federal Government to promote a more secure, diverse, sustainable, and competitive supply chain. Creation of the advisory committee is forthcoming as of the publication date of this NOFO.

1.3.2. NOFO Background

This NOFO aims to advance open RU commercialization (SRFA 1) and innovation (SRFA 2). The RU is the largest part of the carrier network and can prove an easy entry point to the network, offering a low-risk deployment option to Mobile Network Operators (MNOs) interested in Open RAN. Investing in the commercialization and innovation of these components in the Innovation Fund’s second funding opportunity can spur MNO adoption of open RUs during upcoming equipment buying cycles, generating momentum toward greater MNO adoption of Open RAN. The transition to open and interoperable wireless networks becomes a more feasible and attractive proposition when there is broad deployment of open RUs that meet or exceed MNO requirements, and components are available from suppliers at scale. However, the production, testing, and deployment of market-ready open RUs requires close collaboration between MNOs and RU suppliers. For this reason, SRFA 1 requires that RU suppliers partner with MNOs on commercialization projects.

Advancing open RU commercialization and innovation will also help achieve the following statutory objectives of the Innovation Fund:

- **Enhance Market Competitiveness:** SRFA 1 aims to accelerate MNO adoption of open RUs, which will help break vendor lock-in and create opportunities for new market entrants. Open RU innovation under SRFA 2 will improve the competitiveness of future commercial products.
- **Accelerate Commercial Deployments:** SRFA 1 applicants must demonstrate a plan to commercialize and scale their open RUs.
- **Promote Forward Compatibility of Equipment:** Open RUs developed under this NOFO will be compatible with MNO 5G equipment. Open RU innovation (SRFA 2) will help improve interoperability of future commercial products.
- **Manage Network Integration:** Successful SRFA 1 projects will address network integration.
- **Enhance Security:** SRFA 1 applicants must incorporate certain security specifications and tests when developing their open RU products.
- **Promote Network Virtualization:** SRFA 2 aims to advance software defined radio technology, among other innovations, to virtualize open RU functionality.

NTIA’s Innovation Fund RFC highlighted the need to invest in the open RU, specifically, to help advance adoption and address technical and market challenges inhibiting commercial deployments.⁶ Moreover, over 80 percent of companies that responded highlighted Open RAN integration and performance parity as key challenges hindering carrier adoption, while from a market perspective, over 85 percent of companies noted that uncertainty related to the total cost of ownership (TCO) inhibits carrier adoption.

⁶ See 87 Fed. Reg. 76182, [Public Wireless Supply Chain Innovation Fund Implementation Notice and Request for Comment \(December 13, 2022\)](#); RFC responses are available on the [NTIA website](#).

Widespread adoption of open and interoperable RUs is necessary to enhance market competitiveness and accelerate commercial deployments of open and interoperable equipment in line with the statutory objectives of the Innovation Fund, as outlined above. For open RUs to achieve widespread adoption, they must not only be cost-competitive at scale, but also meet or surpass the technical performance of traditional RUs. NTIA intends to fund projects that tackle both priorities. SRFA 1 will incentivize open RU suppliers and MNOs to collaborate on the development of market-ready open RUs, while SRFA 2 will drive open RU innovation that results in advanced performance and technical features for later 5G standards and future 6th generation (6G) technologies.

Applicant eligibility criteria for each SRFA is specific to that SRFA. SRFA 1 eligibility is limited to entities capable of production and commercial sale of open RUs (referred to throughout this document as “RU suppliers”). Additionally, in their application, every SRFA 1 applicant must partner with an MNO to assist with defining requirements and testing. By pairing qualified RU suppliers with MNOs who serve as potential future customers, NTIA intends to maximize the likelihood that SRFA 1 projects will be commercially adopted and deployed, in support of statutory objective (ii).⁷ The partnership requirement also helps minimize the risk of funding projects with no clear commercial customer or otherwise speculative proposals (see [Section 2.4.4](#) for additional information regarding the SRFA 1 partnership requirement). SRFA 2 eligibility is broader: eligibility is generally open to any for-profit company, non-profit company, institution of higher education, industry group, or partnership of such entities that can demonstrate they are qualified to conduct the research proposed under SRFA 2. This broader eligibility was implemented to leverage the creativity and expertise found across the private, non-profit, and academic sectors (see [Section 3.2.1](#) for additional information regarding SRFA 2 eligibility requirements).

In developing this NOFO, NTIA elected to use Technology Readiness Levels (TRLs) and Manufacturing Readiness Levels (MRLs)⁸ as tools to better define the level of maturity desired for projects under each SRFA and improve the understanding of applicants, reviewers, and other stakeholders. These TRL and MRL criteria enable NTIA to better tailor NOFO requirements to facilitate wise investments that advance the goals of each SRFA. For SRFA 1, these criteria will facilitate investments that support the promotion and commercial deployment of open RU technology, in alignment with statutory objectives (i) and (ii).⁹ Per the SRFA 1 eligibility requirement outlined above, it is crucial

⁷ See 47 U.S.C. § 906, statutory objective (ii): Accelerating commercial deployments of open interface standards-based compatible, interoperable equipment, such as equipment developed pursuant to the standards set forth by organizations such as the O-RAN Alliance, the Telecom Infra Project, 3GPP, the Open-RAN Software Community, or any successor organizations.

⁸ More information on TRLs and MRLs can be found in [Appendix B](#) of this document.

⁹ See 47 U.S.C. § 906. Statutory objectives (i) and (ii) are the following: (i) Promoting and deploying technology, including software, hardware, and microprocessing technology, that will enhance competitiveness in the fifth-generation (commonly known as “5G”) and successor wireless technology supply chains that use open and interoperable interface radio access networks; (ii) Accelerating commercial deployments of open interface standards-based compatible, interoperable equipment, such as equipment developed pursuant to the standards set forth by organizations such as the O-RAN Alliance, the Telecom Infra Project, 3GPP, the Open-RAN Software Community, or any successor organizations.

that RU suppliers partner with MNOs for their products developed under this NOFO to reach TRLs 6 and 7, as these TRLs require the MNO customer to validate that the product is successfully performing in relevant and operational environments. For SRFA 2, these criteria will facilitate investments that advance the maturity of early-stage inventions to improve the competitiveness and interoperability of future commercial products, in alignment with statutory objectives (i) and (iii).¹⁰ Leveraging TRLs and MRLs also allows NTIA to avoid focusing on projects that do not meet the desired maturity requirements (*e.g.*, products that are already widely deployed, projects too speculative to be commercially feasible, and basic research that is outside the scope of this statutory authority).

NTIA also sets specific parameters regarding the place of performance under this NOFO. Most work performed under this NOFO is expected to take place in the United States. The U.S. is one of the largest telecommunications markets in the world and a global leader by volume of RAN R&D facilities. It is also a global leader in technological innovation. Therefore, a strong U.S. RAN ecosystem is essential to advancing 5G supply chain security, competition, and innovation in line with the program’s authorizing statute. A domestic performance requirement will strengthen the U.S. RAN ecosystem, enabling U.S.-based companies, including small and medium enterprises, to enter the market and compete, while allowing global RU suppliers to participate and leverage U.S. resources and infrastructure.

However, NTIA recognizes that for the Innovation Fund to be successful in meeting its statutory objectives, global promotion and commercial adoption are necessary. This is why SRFA 1 allows for applicants or their MNO partner(s) to be based outside of the United States and allows for funding to be used for certain overseas activities. Either the applicant, an MNO partner, or both must hold Ultimate Beneficial Ownership (UBO) in the United States, its territories, and possessions. NTIA allows applicants to leverage overseas capabilities, but federal funds requested and any eligible cost match must be used for activities in the United States, except where expressly authorized in this NOFO. (see [Section 2.2.5](#))

For each SRFA, NTIA is limiting the number of applications allowed per applicant. Each SRFA 1 applicant is limited to one (1) application, and each SRFA 2 applicant is limited to three (3) applications. Each application may only contain one proposed project. This helps NTIA efficiently use the limited resources available to review applications and prevents exploitation by entities that may try to submit multiple, low-quality applications in hopes of one being successful.

¹⁰ See 47 U.S.C. § 906. Statutory objectives (i) and (iii) are the following: (i) Promoting and deploying technology, including software, hardware, and microprocessing technology, that will enhance competitiveness in the fifth-generation (commonly known as “5G”) and successor wireless technology supply chains that use open and interoperable interface radio access networks; (iii) Promoting and deploying compatibility of new 5G equipment with future open standards-based, interoperable equipment.

The Period of Performance (POP) also varies by SRFA. The POP for SRFA 1 is expected to be 18-24 months. It may be fewer than 18 months and shall not exceed 24 months. Since many MNOs are approaching refresh cycles for their 5G investments, and many operators globally are still considering their initial 5G rollouts, NTIA expects SRFA 1 projects to have potential for near-term commercial success. The SRFA 2 POP is expected to be 3-5 years, as is customary for many federal grants investing in technology of similar maturity. It may be fewer than 3 years and shall not exceed 5 years.

1.3.3. Available Funding

NTIA may award up to \$420,000,000 under this NOFO.

1.3.3.1. Anticipated Award Amounts

The amount of funding anticipated for each award varies by SRFA, as follows:

SRFA	Federal Funding Range (per award)
1 – Open RU Commercialization	\$25,000,000-\$45,000,000
2 – Open RU Innovation	\$5,000,000-\$10,000,000

The ranges of award amounts for each SRFA are not mandatory minimums or maximums. However, eligible entities requesting amounts for projects outside the ranges of the anticipated SRFA award amounts must provide a reasonable explanation for the variance. Relative cost effectiveness will be considered in the Selecting Official criteria (see [Section 5.1.4\(e\)](#)).

1.3.3.2. Statutory Limitation on Award Amounts

In accordance with 47 U.S.C. 906(a)(1)(B)(ii), the cumulative amount of federal funding awarded to a single awardee for a single SRFA may not exceed \$50,000,000. Applications requesting more than \$50,000,000 in federal funding for a single SRFA ***will be disqualified.***

There is no statutory limitation on the amount of cost share provided by an applicant. Applications with a total project cost of more than \$50,000,000 but that request less than \$50,000,000 in federal funding remain eligible.

1.3.3.3. Cost Share

Cost sharing is mandatory for SRFA 1.¹¹ Applicants must include a minimum cost share of 10% of the total project cost (*i.e.*, the combined total of the federal share and

¹¹ While the Innovation Fund’s authorizing and appropriations statutes do not mandate a specific cost share, NTIA is including cost share requirements in this NOFO to ensure SRFA 1 applicants are invested in the success of their projects and taxpayer dollars are used efficiently. Successful development of commercial-grade open RUs will help

non-federal share of costs). SRFA 1 applicants who provide a cost share of 16% or more will receive extra weighting of their project proposal during Programmatic Review, as described in [*Section 5.1.3*](#).

Cost sharing is not required for SRFA 2.

enhance market competitiveness and accelerate the commercial deployment of open and interoperable equipment in line with the statutory objectives of the program.

Section 2 – SRFA 1 – Open RU Commercialization

2.1. OVERVIEW

The Innovation Fund aims to facilitate the adoption of open and interoperable wireless networks, including through the acceleration of commercial deployments. Given limited Open RAN adoption by commercial carriers, perceived integration challenges, and the need to better align open RU performance capabilities with MNO requirements, NTIA’s second NOFO invests in open RU commercialization. Under SRFA 1, NTIA seeks to accelerate MNO adoption by requiring suppliers and MNOs to partner to collaborate on the development of open RU products that meet operators’ performance and feature requirements.

2.1.1. Requirements Summary

Description	Requirement
Eligible Entities	Entities capable of production and commercial sale of open RUs, partnered with an MNO. These entities may include for-profit companies, non-profit companies, institutions of higher education, industry groups, and partnerships consisting of two or more such entities.
Anticipated Award Range	\$25,000,000-\$45,000,000
Cost Share	Minimum 10% of total project cost. Incentives available for higher cost share, beginning at 16%.
Place of Performance	United States, territories, and possessions. MNO-related overseas activities eligible.
Period of Performance	Not to exceed 24 months
Minimum Entrance TRL	TRL 5
Maximum Exit TRL	TRL 7
Minimum Entrance MRL	MRL 4
Maximum Exit MRL	MRL 8

2.2. ELIGIBILITY REQUIREMENTS

2.2.1. Eligible Entities

Eligible entities include for-profit companies, non-profit companies, institutions of higher education, industry groups, and partnerships consisting of two or more such entities. In addition, applicants must meet the following requirements:

- a) They must be capable of production and commercial sale of open RUs. This capability must be demonstrated in application materials.

- b) They must partner with at least one (1) Mobile Network Operator (MNO). This partnership must be demonstrated through a Letter of Partnership Intent that is on the MNO's letterhead and signed by a senior representative of the entity (see [Section 2.4.4](#)). This letter by itself is sufficient to demonstrate that a partnership exists. Although an MNO may also be a subrecipient or contractor of the applicant, neither of these relationships is a requirement for a partnership to exist.
- c) Applicants must demonstrate their intent and ability to deploy open RU(s) developed under this NOFO in one or more commercial networks at scale after the period of performance, as demonstrated in the Commercial Transition Plan (see [Section 2.4.3](#)).
- d) The applicant and MNO partner(s) can be based in the United States or abroad. However, either the applicant, an MNO partner, or both must hold Ultimate Beneficial Ownership (UBO) in the United States, its territories, and possessions. UBO will be validated by the SAM Registration or SF-328 of each party. If neither the applicant nor any MNO partners meet the UBO requirement, the application **will be disqualified**.

Eligible entities may submit no more than one (1) application under this SRFA proposing no more than one (1) project.

2.2.2. Anticipated Award Range

NTIA anticipates awards under SRFA 1 will range between \$25,000,000 and \$45,000,000.

Federal funding requests below \$25,000,000 or between \$45,000,000 and \$50,000,000 may be considered, but the application must explain why the request falls below or above the anticipated award range and provide a justification for that difference. Applications with requests over \$50,000,000 will be disqualified, as there is a \$50,000,000 statutory limit on federal funding under each SRFA.

2.2.3. Cost Share

The Innovation Fund is a crucial and significant investment in the Open RAN ecosystem, but it does not provide enough funding on its own to meet the program's economic and national security objectives. SRFA 1 applicants should therefore structure the finances of their projects in a way that maximizes private sector contributions and minimizes the need for government incentives. NTIA will evaluate the degree to which an applicant, through its funding request, leverages private investment, cash and in-kind contributions, and other sources of funding as a means of demonstrating its commitment to project success. A project with the potential for commercial viability will be grounded on a sound business case that is sufficient to maintain continued future investment in the relevant open RU technology.

To ensure the efficient use of taxpayer dollars, SRFA 1 applicants must provide 10% of the total project cost as cost share. This can include cash or in-kind contributions. All contributions to cost share must meet the requirements in [2 CFR § 200.306](#) and other allowable cost requirements of this NOFO.

Cost share percentage will be calculated based on information provided in the SF-424, Section 18, as follows:

- All non-federal sources of funding will be summed (18b through 18e)
- Cost share percentage will be calculated by dividing the nonfederal funding by the total project cost (18g)
- Calculated cost share percentage will be *rounded down* to the nearest integer value.

SRFA 1 applications that do not include the minimum 10% cost share, as calculated above, ***will be disqualified***. NTIA expects that it will primarily fund SRFA 1 applicants who contribute more than the minimum required amount, as an applicant's financial commitment to project success is an essential component of any successful application. Applications with a cost share of 16% or more will receive favorable weighting during Programmatic Review (see [Section 5.1.3](#)) to ensure applicants have the capability to make sustaining investments that strengthen the security of the wireless supply chain. Applicants should not rely on funding from this NOFO to displace private capital or enable outsized returns relative to commercially reasonable expectations for similar projects.

2.2.4. Period of Performance

The period of performance of SRFA 1 awards is expected to be 18-24 months. The period of performance may be fewer than 18 months and shall not exceed 24 months from the date of award.

While extensions are possible under this NOFO (see [Section 6.2.1](#)), the application will be assessed for risk of exceeding the mandated period of performance. Per Department of Commerce policy, the period of performance, inclusive of all extensions, shall not exceed five (5) years.¹²

2.2.5. Place of Performance

SRFA 1 activities for RU supplier product development work shall be done in the United States, its territories, and possessions. This includes but is not limited to design, development, prototyping, and initial testing.

Work performed by the MNO or by the RU supplier in support of MNO lab or field testing for verification, validation, and demonstration (*e.g.*, testing hosted at MNO

¹² See U.S. Department of Commerce, [Grants and Cooperative Agreements Manual \(April 20, 2021\)](#), Section 9.I.2.a.1.

facilities) of open RU performance and interoperability requirements may be performed outside of the United States, except in covered nations or when the work involves an entity described in [Section 6.1.3](#).

Changes in location for work conducted outside of the United States ***not included*** in the application must be approved by NTIA in advance.

RU supplier product development activities conducted outside of the United States and its territories and possessions in support of the project are permissible but are not eligible for federal funds or cost share. For example, if a supplier already has an overseas team supporting product development, the supplier is not required to transition the overseas workstream to the United States, but the supplier cannot use federal funds from this NOFO to pay for those activities, nor can they count those activities towards cost share.

Activities taking place in covered nations or involving an entity described in [Section 6.1.3](#) are ***not permissible under any circumstances***.

2.3. TECHNICAL SCOPE REQUIREMENTS

2.3.1. Technology Readiness Level

RU Technology Readiness for SRFA 1 targets existing 5G New Radio (NR) RU inventions that are ready to enter, or already in, the product development stage with the goal of bringing them to the commercial market, ready for MNO trial and deployment. As such, only projects at Technology Readiness Levels 5, 6, and 7 are eligible for funding under this NOFO (see [Appendix B](#) for additional guidance on TRLs).

Project development activities shall already be at a minimum of TRL 5, meaning there is a “high fidelity” proof of concept, such as integration with commercially-adopted components in a developer environment. Proposed activities shall bring the open RU solution through completion of TRL 6, meaning there is a “high fidelity” proof of concept/prototype in a complex lab or simulated field environment.

Applicants may also include field trial activities (TRL 7) in the scope of their project. As noted above in [Section 2.2.4](#), awards will not be made for activities that extend beyond the 24-month period of performance.

Given the limited government funding available, activities for first office application (TRL 8) and full-scale deployment (TRL 9) ***are not eligible for funding under this NOFO***. NTIA has determined that the amount of government funding required to effectively support TRL 8 and 9 activities would be cost-prohibitive for the program. Activities below TRL 5 are not eligible for funding because there is a greater risk that they will not result in commercialization due to their earlier stage in the product development lifecycle. NTIA can more efficiently achieve the program’s statutory objectives by funding activities in the TRL 5-7 range that promote market competitiveness and accelerate commercial deployment.

2.3.2. Manufacturing Readiness Level

Applicants shall demonstrate that they have considered the manufacturing implications of their projects. Project development activities shall already be at a minimum of Manufacturing Readiness Level 4 (MRL 4), meaning prototype systems are developed internally in a lab. NTIA is particularly interested in supporting activities associated with development, preparation, and manufacturing of the open RU up to MRL 8, including manufacturing of prototype and sample open RUs. Costs related to the stand-up of new production capacity at contract manufacturing facilities or an applicant's existing production facilities are allowable, except for construction costs.¹³

Given the limited government funding available, NTIA will not fund low-rate initial production (MRL 9) and full-rate production (MRL 10). See [Appendix B](#) for additional guidance on MRLs. As with the TRLs described above, NTIA has determined that the amount of government funding required to effectively support MRL 9 and 10 activities would be cost-prohibitive for the program. Activities below MRL 4 are not eligible for funding because there is a greater risk that the project will not result in commercialization due to the earlier stage in the product development lifecycle. There is also a greater risk that the project will not achieve the required manufacturing capability within the period of performance. NTIA can more efficiently achieve the program's statutory objectives by funding activities in the MRL 4-8 range that promote market competitiveness and accelerate commercial deployment.

2.3.3. Performance and Interoperability Requirements

The application shall include all performance and operational requirements, including minimum and target key performance indicators (KPIs), cost targets, field performance specifications under which the MNO will commit to deploying the open RU, and any other success criteria. Project activities shall be structured to build an open RU product to meet these requirements in order to meet MNO laboratory testing requirements in preparation for large scale field trials/deployments.

Note: Comprehensive performance requirements must be either provided to the RU supplier by the MNO partner or developed collaboratively by the RU supplier and MNO partner. Both parties have a joint responsibility to resolve any inconsistencies or inaccuracies. Relying solely on the minimum specifications and test cases identified later in this section is not allowable.

All projects shall be based on, as a minimum, 3GPP 5G NR Release 16 specifications. If an applicant chooses to use a later 3GPP 5G NR release, it shall be documented in the technical proposal.

¹³ Construction costs are not allowed under this NOFO as the focus of SRFA 1 is commercialization and the focus of SRFA 2 is R&D. Construction of highways, buildings, or other real property is not necessary for the successful completion of SRFA 1 or SRFA 2 projects and would not be an efficient use of funds.

Performance requirements shall include at a minimum the following 3GPP specifications:

Table 1: 3GPP Specification Requirements

Specification	Description
TS 38.104	NR; Base Station (BS) radio transmission and reception
TS 38.113	NR; Base Station (BS) Electromagnetic Compatibility (EMC)
TS 38.141-1	NR; Base Station (BS) conformance testing Part 1: Conducted conformance testing
TS 38.141-2	NR; Base Station (BS) conformance testing Part 2: Radiated conformance testing

The following O-RAN Alliance specifications shall be included:

Table 2: O-RAN Alliance Conformance Requirements

Specification	Description
O-RAN.WG4.CONF.0-R003-v09.00	O-RAN Conformance Test Specification

The following O-RAN Alliance interoperability specifications shall be tested against:

Table 3: O-RAN Alliance Interoperability Requirements

Specification	Description
O-RAN.WG4.IOT.0-R003-v10.00	O-RAN Fronthaul Interoperability Test Specification (IOT)

Project activities must include RU interoperability verification, validation, and demonstration of successful multi-supplier interoperability—that is, that the RU under development meets the pre-determined requirements when connected to the distributed unit (DU) of a different supplier. The document shall identify how the following testing criteria will be demonstrated:

Table 4: Operation Validation Requirements

Test Type	Description
Project RU with 3 rd Party Product (3PP) DU	Interoperability Verification
Project RU with 3PP DU	MNO Performance/Feature Requirement Validation
Project RU with 3PP DU	MNO Security Requirement Validation
Project RU with 3PP Service Management and Orchestration (SMO)/Operational Support System (OSS)	Interoperability Verification
Project RU with 3PP SMO/OSS	MNO Performance/Feature Requirement Validation
Project RU with 3PP SMO/OSS	MNO Security Requirement Validation

2.3.4. Security Requirements

In addition to the base requirements of the Security Management Plan (see [Section 4.1.1\(m\)](#)), all SRFA 1 applicants shall incorporate the following O-RAN Alliance and 3GPP security specifications and tests:

Specification	Description
O-RAN.WG11.Security-Requirements-Specification.O-R003-v07.00	O-RAN Security Requirements and Controls Specification
O-RAN.WG11.Security-Protocols-Specification.O-R003-v07.00	O-RAN Security Protocols Specifications
O-RAN.WG11.Security-Test-Specifications.O-R003-v05.00	O-RAN Security Test Specifications
3GPP TS 33.501	3GPP Security architecture and procedures for 5G system

2.4. SPECIFIC APPLICATION REQUIREMENTS

This section describes the application document requirements unique to SRFA 1. A comprehensive list of required application material can be found in [Section 4.1](#).

2.4.1. Technical Proposal

Note: Technical Proposals must not exceed 20 pages in length (excluding cover page and references).

This section describes the specific content that applicants must include in their technical proposals for SRFA 1. Proposals that do not include each of the elements listed below will not move forward to Merit Review and will not be considered for award.

The technical proposal shall include the following content:

a) Executive Summary (max 1 page)

Provide a short executive summary of the proposed project. It is important that the executive summary focus only on salient aspects of the broader technical proposal, as the executive summary will be used during initial scope review of proposals received.

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 technical objective of the project, including application/use case of the radio(s) to be produced. This shall include the technical specifications of the radio, including, but not limited to frequency range(s), power output, form factor, etc. Applicants should note if they elect to use a later release than 3GPP Release 16.

The technical objectives shall explain in detail the requirements developed in collaboration with the MNO partner and how the technical specifications required by this NOFO (see [Section 2.3.3](#) and [Section 2.3.4](#)) will be addressed.

c) Work Plan Summary

While a separate, detailed work plan is required (see [Section 2.4.2](#)), a work plan summary included in the technical proposal shall sufficiently describe the activities such that reviewers can understand the scope of work proposed by the applicant, including major milestones and deliverables.

d) Qualification of Applicant and Unique Aspects of Proposal

Explain the qualifications of the applicant to develop and market open and interoperable RU solutions for 5G radio access networks. Provide examples of past successes of relevant products.

The applicant shall also describe the unique aspects of the work proposed and how it differs from other RU products currently on the market. The unique aspects described shall also be reflected in the Commercial Transition Plan and MNO Letter of Partnership Intent.

e) Facilities and Equipment

Provide a description of, and information regarding the availability and location of, instrumentation and physical facilities used for the proposed open RU development activity, including manufacturing. Any new facility or equipment costs, including software and services, should be itemized, and justified.

2.4.2. Work Plan

Note: Work Plans must not exceed 20 pages in length (excluding cover page).

Provide a detailed work plan on how the open RU product development will be conducted. The work plan shall include a detailed milestone and deliverable schedule covering the period of performance of the proposed project.

The work plan shall also include all applicable testing phases, decision points, and points where technology readiness and/or manufacturing readiness is expected to improve.

2.4.3. Commercial Transition Plan

Note: Commercial Transition Plans must not exceed 10 pages in length (excluding cover page).

Applicants shall provide details about their plan to commercialize and scale their product after the period of performance. A strong Commercial Transition Plan will provide specifics on the following:

- Customer and end-market demand, such as an agreement with the MNO strategic partner indicating that the product (if it meets specifications agreed upon at the outset of the award) can or will be integrated into the MNO's network.
- An assessment of market position and key competitors, including an analysis of the cost of the applicant's open RU relative to competitor RUs, market dynamics, supply and demand dynamics over time, and estimated pricing, as well as any plans to expand the customer base for the product beyond the initial customer/carrier. This should include details on target MNOs, sales capabilities in target geographies, field support, and integration.
- Program plan specifying possible timing to move from advanced prototype to mass production, including further work to achieve break-even at full rate production.
- An awareness of a project's commercial risks, and the applicant's strategies for mitigating them.

2.4.4. MNO Letter(s) of Partnership Intent

SRFA 1 applications require eligible applicants to have one or more MNO partners. Each MNO partnership should be demonstrated through a Letter of Partnership Intent, as described below. This letter by itself is sufficient to demonstrate that a partnership exists, however, please note that a more formal demonstration of the partnership will be requested post-award. Although an MNO may also be a subrecipient or contractor of the applicant, neither of these relationships is a requirement for a partnership to exist.

In a successful SRFA 1 application, an applicant will demonstrate their MNO partnership(s) through a Letter of Partnership Intent with each MNO describing:

- **A brief explanation of the form of the partnership.** Why have the partners chosen to work together? NTIA is interested in partnerships that will continue after the end of the period of performance and support supply chain diversity, security, and

competition. What benefits will each partner bring to the partnership and for how long? How has the partnership been formalized?

- **A demonstrable commercial need for the technology from both the MNO and open RU supplier perspective.** The application should provide a basic explanation of the MNO’s desire for the radio units. Post-award, where might the MNO deploy this technology? How does this product fill a critical gap?
- **Resources invested by both parties.** NTIA expects that both the MNO and RU supplier are committing resources to the project. How is the MNO partner supporting development of the open RU? How will the open RU supplier and MNO work together to create a market-ready product?
- **A post-award commitment to deploying the open RU in a commercial setting.** Does the MNO plan to purchase, test, or otherwise support open RUs and base stations following completion of the grant? If so, up to how many? How does the MNO partner anticipate deploying the technology long term?
- A statement that the MNO has read the application, including the technical proposal, and is committed to executing its roles, responsibilities, and/or commitments related to the project.
- The proportion of federal funding that would be utilized by the MNO (if applicable).
- Voluntary committed resources (if applicable), including what specific services and/or products will be provided for any in-kind match. Voluntary committed resources provided by the MNO may contribute to the applicant’s cost share for the purpose of demonstrating a commitment to project success in Programmatic Review (see [Section 5.1.3](#))
- The MNO’s System for Award Management (SAM) Unique Entity Identifier (UEI), OR a completed SF-328 for the MNO.¹⁴
- Point of Contact at the entity for any inquiries regarding the partnership and/or the Letter of Partnership Intent

Each MNO Letter of Partnership Intent must be on the MNO’s letterhead and signed by a senior representative of the entity. Note that material discrepancies and omissions between a Letter of Partnership Intent and the associated technical proposal (*e.g.*, incomplete or missing cost information, missing point of contact information) may result in additional curing requirements. Failure to respond to requests for curing within seven (7) business days, or failure to appropriately cure deficiencies within that timeframe,

¹⁴ The SAM UEI and/or SF-328 will be used to determine Ultimate Beneficial Ownership (UBO) of the MNO partner. NTIA may request additional information during the application review process to confirm information and conformance to other applicable NOFO provisions.

could lead to de-prioritization in the review process and/or disqualification of the application.

If there is a change in the status of an MNO partner’s proposed participation for any reason after the award is made, the applicant must notify NTIA immediately and explain the reason for the change. If there are no MNO partners by the time the period of performance begins or at any point during the period of performance, the award will be subject to the remedies for noncompliance specified in 2 CFR § 200.339, up to and including award termination. If an MNO partner included in the technical proposal is replaced with a different MNO at any point after the award is made, the applicant must present a Letter of Partnership Intent signed by the new MNO and the new partnership must be approved by NTIA before work resumes.

2.4.5. Domestic Content

Non-Federal entity recipients and subrecipients must comply with the *Build America, Buy America Act (BABA)*, if applicable to their project, which was enacted as part of the *Infrastructure Investment and Jobs Act §§ 70901-70927, Pub. L. No. 117-58 (2021)*; and *Executive Order 14005, Ensuring the Future is Made in All of America by All of America’s Workers*.

The term “non-Federal entity” for purposes of *BABA* includes States, local governments, territories, Indian tribes, Institutions of Higher Education (IHE), and nonprofit organizations. It does not include for-profit organizations. It is NTIA’s expectation that *BABA* requirements will not apply to most applicants. Nevertheless, applicants for SRFA 1 who are non-Federal entities or who include non-Federal entities in their application as subrecipients, contractors or partners must describe how they plan to meet any applicable legal requirements to utilize iron, steel, manufactured products and construction materials produced in the United States pursuant to *BABA §§ 70901-27*, or explain why such requirements do not apply. For applications where the aforementioned criteria apply, the statement of how *BABA* requirements will be met or explanation of why such requirements do not apply shall be included with the application as “Other Materials” as described in [Section 4.1.1\(q\)](#).

2.5. MERIT REVIEW CRITERIA

This section describes the Merit Review process and criteria for SRFA 1. Applications submitted under SRFA 2 are subject to a separate Merit Review process with their own distinct criteria ([see Section 3.5](#)). The Merit Review process and criteria described in this section do not affect the scoring or selection of SRFA 2 applications.

During SRFA 1 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 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.

a) Project Purpose and Benefits (65 points)

1. The applicant demonstrates a clear understanding of how to develop their open RU for the commercial market, ready for MNO trial and deployment. The scope of work meets RU Technology Readiness and Manufacturing Readiness Levels discussed in [Section 2.3.1](#) and [Section 2.3.2](#), respectively. (27 points)
2. The applicant clearly and credibly describes how their project advances development of feature-rich, interoperable RU product(s) by meeting the performance and interoperability requirements discussed in [Section 2.3.3](#). The project clearly addresses a commercial need. (27 points)
3. The applicant clearly and credibly describes how their project advances security of open and interoperable architecture and meets the security requirements outlined in [Section 2.3.4](#) and [Section 4.1.1\(m\)](#). (11 points)

b) Competence, Budget, and Transition Plan (35 points)

1. Project's ability to transition to the commercial market beyond the award period. (17 points)
2. Applicant's competence (skill, expertise, experience) and organizational capability (personnel, facilities, partnerships) to complete the specific project proposed. (12 points)
3. Reasonableness of the applicant's proposed budget. (6 points)

Section 3 – SRFA 2 – Open RU Innovation

3.1. OVERVIEW

This SRFA focuses on advancing radio design in key radio innovation research priorities. The Innovation Fund aims to drive open RU innovation that results in advanced performance and features – in turn accelerating the adoption of open and interoperable networks. These research priorities also align with the National Spectrum Strategy, ensuring a unified approach to radio innovation.

NTIA seeks to advance promising research projects beyond the proof-of-concept phase. Successful projects under this focus area will be able to interoperate with commercial-grade products and will be sufficiently scaled for applications beyond research and development. Particularly, this SRFA targets developments for later 5G standards (3GPP Release 19 and 20) and future 6th generation (6G) technologies (3GPP Release 21).

3.1.1. Requirements Summary

Description	Requirement
Eligible Entities	For-profit companies, non-profit companies, institutions of higher education, industry groups, and partnerships consisting of two or more such entities.
Anticipated Award Range	\$5,000,000-\$10,000,000
Place of Performance	United States, territories, and possessions.
Period of Performance	Not to exceed 5 years
Minimum Entrance TRL	TRL 3
Maximum Exit TRL	TRL 5
Minimum Entrance MRL	MRL 1
Maximum Exit MRL	MRL 4

3.2. ELIGIBILITY REQUIREMENTS

3.2.1. Eligible Entities

Eligible entities include for-profit companies, non-profit companies, institutions of higher education, industry groups, and partnerships consisting of two or more such entities.

Applicants may be based in the United States or abroad and are not required to hold UBO in the United States, but place of performance requirements still apply (see [Section 3.2.5](#)).

3.2.2. Anticipated Award Range

Anticipated federal funding is \$5,000,000-\$10,000,000 per award.

Applications requesting federal funding outside of this range must provide a reasonable explanation for the variance.

3.2.3. Cost Share

Cost share for SRFA 2 applicants is neither expected nor required, and it will not be considered during the scoring process.

3.2.4. Period of Performance

The period of performance (POP) of SRFA 2 awards is expected to be 3-5 years. The POP may be fewer than 3 years and shall not exceed 5 years from the date of award (see [Section 6.2.1](#)).

While extensions are possible under this NOFO (see [Section 6.2.1](#)), the application will be assessed for risk of exceeding the mandated period of performance. Per Department of Commerce policy, the period of performance, inclusive of all extensions, shall not exceed five (5) years.¹⁵

3.2.5. Place of Performance

All awards under this SRFA must be performed in the United States, its territories, and possessions. Costs for work performed outside of the United States are not allowable.

3.3. TECHNICAL SCOPE REQUIREMENTS

3.3.1. Radio Innovation Topic Areas

NTIA has identified several key topic areas to advance radio innovation. An applicant is allowed to submit no more than three (3) applications under this SRFA, inclusive of all topic areas listed below. The submission of more than three (3) applications may result in disqualification of all applications submitted by the applicant. Each application may only include one project.

Note: While the primary focus of this SRFA is on radio technology development, applications must consider relevant impacts on user equipment (UEs) and baseband processing.

Applications must clearly address at least one of the following topic areas:

¹⁵ See U.S. Department of Commerce, [Grants and Cooperative Agreements Manual \(April 20, 2021\)](#), Section 9.I.2.a.1.

3.3.1.1. Software Defined Radio (SDR)

Primary Objective: Advance software defined radio technology enabling development of carrier grade, cost-effective SDR solutions for commercial mobile cellular networks. This also includes, but is not limited to, development of the following features for such SDR technology:

- Ease-of-programmability with modular access to all functional subsystems within the SDR
- Energy-efficient, spectrum-agile, wideband SDR (including potential new spectrum support. *e.g.*, FR3 band)¹⁶
- Single-radio SDR carrier aggregation
- High-powered multi-band plug-and-play daughterboards
- Spectrum Sharing-enhancing SDR, including SDR-based spectrum sensing technology that, among other things, could protect incumbent spectrum users such as government operations

Advancing SDR will improve performance indicators of open RUs, such as energy efficiency, making this equipment more attractive for potential MNO customers. This will promote MNO adoption of open RUs, thereby enhancing market competitiveness. In addition, advancing SDR is a step toward further virtualization of the network. As such, projects that address this topic area will advance market competitiveness and network virtualization in line with the statutory objectives.

3.3.1.2. Antenna & Beamforming (ABF)

Primary Objective: Improve antenna design and beamforming technology for commercial mobile cellular networks. Example areas of research include, but are not limited to:

- Adapting advance beamforming technology from other technologies (*e.g.*, radar) to cellular networks
- Distributed beamforming technology
- Advanced antenna system design

Projects in this topic area will improve the transmit and receive capabilities of open RUs, enabling suppliers to take advantage of these capabilities when deploying RUs in open and interoperable networks. This will enhance market competitiveness in line with the statutory objectives.

¹⁶ Projects targeting new spectrum bands must include why and how the new band will be commercially relevant. New spectrum bands such as those considered for FR3 could be considered commercially relevant, however relatively unexplored spectrum without clear commercial viability, such as THz frequencies, are too speculative for the scope of this program.

3.3.1.3. Radio Component Advancement (RCA)

Primary objective: Advance novel components and architectures for commercial radio units used in open and interoperable networks. Example areas of research include, but are not limited to:

- Modular radio component architecture development
- Radio manufacturing process improvement
- Software-controlled high-fidelity tunable radio filter technology
- Open, modular Radio Frequency System on Chip (RFSoc) architecture development

Projects in this topic area will make it easier for new suppliers to enter the open RU market. They will also make it easier for MNOs to deploy open RUs in their networks, adjust functionality of their deployed RUs, and switch RU suppliers. Thus, advances in this area will promote the deployment of open and interoperable equipment in line with the statutory objectives.

3.3.1.4. Advanced Modulation and Digital Signal Processing (DSP)

Primary Objective: Development of cost-effective advanced modulation techniques and digital signal processing methodologies to improve spectral efficiency, computing efficiency, power efficiency, and resilience to link loss and interference, and to support emerging technologies such as full duplex operation and integrated sensing, computing and communications.

By improving various aspects of open RU performance, projects in this topic area will create opportunities for new suppliers to enter the market, thereby enhancing market competitiveness in line with the statutory objectives.

3.3.1.5. Advanced Fronthaul Technology (AFT)

Primary Objective: Develop novel fronthaul transport techniques to reduce costs, improve ease of deployment of radio units, improve flexibility to enable centralized RAN, and create additional options available for deployment methodologies.

Example areas of research include, but are not limited to:

- Multi-hop, mesh-based Integrated Access and Backhaul
- Link resiliency—increasing physical distance between radio and baseband processing without sacrificing performance

Projects in this topic area will promote the deployment of open and interoperable RU equipment that enhances market competitiveness in line with the statutory objectives.

If a single application addresses more than one of the aforementioned topic areas, the application should clearly state which of the topic areas is the primary focus of the research.

3.3.2. Technology Readiness Level

At time of application, projects under this category must have, at a minimum, a practical application in mind, including potential end-use applications and anticipated customer base (TRL 3) (see [Appendix B](#) for additional guidance on TRLs). Basic research studies (TRL 1) and concept formulation (TRL 2) will not be funded under this NOFO, as they are more speculative in nature and there is a greater risk that activities in these early stages of research may not achieve future commercialization in line with the statutory objectives.

Successful applicants under SRFA 2 will propose a project to bring a novel radio innovation from TRL 3 or TRL 4 to TRL 5, with a plan to move beyond R&D towards post-award commercial application and prototyping.

The goal of SRFA 2 is to develop novel radio innovations that, if successful, are equipped to be commercialized by private industry. As such, activities up through TRL 5 are allowed. Product development activities and commercialization (TRL 6+) are not allowed, as those activities are the focus of SRFA 1.

3.3.3. Manufacturing Readiness Level

Hardware development projects must have already identified basic manufacturing/production implications (MRL 1) at time of application. This is not exclusive to hardware-based research (*e.g.*, antenna design), but also to research that may be used to develop software capabilities or radio algorithms that ultimately impact hardware resource usage or hardware design. Projects shall consider impacts to future manufacturing and production requirements throughout the period of performance and are expected to produce the technology in a laboratory environment (MRL 4) as a late-stage success criterion (see [Appendix B](#) for additional guidance on MRLs).

Successful applicants under SRFA 2 will propose a project to bring a novel radio innovation from MRLs 1 through 3 to MRL 4, with a plan to move beyond R&D towards post-award commercialization.

Manufacturing/production beyond the lab environment (MRL 5+) is not allowed. NTIA has determined that supporting activities below MRL 5 is a more efficient method of achieving statutory objectives by advancing market competitiveness, accelerating commercialization, and promoting forward compatibility of equipment.

3.4. SPECIFIC APPLICATION REQUIREMENTS

This section describes the application document requirements unique to SRFA 2. A comprehensive list of required application material can be found in [Section 4.1](#).

3.4.1. Technical Proposal

Note: Technical Proposals must not exceed 20 pages in length (excluding cover page and references).

This section describes the specific content that applicants must include in their technical proposals for this SRFA. Proposals that do not include one or more of the elements listed below will not move forward to merit review and will not be considered for award.

The technical proposal shall include the following content:

a) Executive Summary (max 1 page)

Provide a short executive summary of the proposed project. It is important that the executive summary focus only on salient aspects of the broader technical proposal, as the executive summary will be used during initial scope review of proposals received.

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) Rationale for Research Need

Proposals shall describe the rationale for the research to be conducted and how this will benefit radio technology development while enhancing competitiveness and supporting open and interoperable radio technology. This must include how the research could be used to develop commercially available open radio solutions for advanced 5G and/or 6th Generation mobile wireless networks.

The rationale shall clearly describe how the proposal addresses one or more of the research topic areas identified for this SRFA and why current or nearly developed technologies are insufficient to achieve the goals set out in the project. If the proposal addresses more than one SRFA 2 topic area, the proposal should clearly state which of the topic areas is the primary focus of the research.

c) Technical Objectives

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

d) Work Plan Summary

The applicant must develop a detailed work plan in a separate document (see [Section 3.4.2](#)), but the technical proposal must include a work plan summary that describes the extent of work to be conducted and all major milestones and deliverables.

e) Related Research/Research & Development and Unique Aspects of Proposal

Describe significant related 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 R&D conducted by others for the topic covered by the proposed project.

Applicants must demonstrate a clear understanding of existing and private research projects to ensure that their proposal does not replicate that work. The applicant must provide a detailed explanation of how the proposed project will avoid duplication of other federally or privately funded research.

f) Key Individuals and Bibliography of Related Work

Identify key individuals involved, including their related education, experience, and publications. These qualifications can be provided as an attachment, separate from the technical proposal (see [Section 4.1.1\(q\)](#)). In this case, the technical proposal should provide an overview of the key individuals and related work, referencing any additional documentation submitted.

g) Qualification of Applicant

Explain the qualifications of the applicant to develop new radio technologies that are likely to lead to broad adoption. Please provide examples of success with transferring technology to commercial products, including industry collaborations.

h) Facilities and Equipment

Provide a description of, and information regarding the availability and location of, instrumentation and physical facilities used for the proposed research. Any new facility or equipment costs, including software and services, should be itemized and justified. (see [Section 6.3.2.4](#) for more information regarding restrictions on the use of certain equipment and services from untrusted vendors.)

3.4.2. Work Plan

Note: Work Plans must not exceed 20 pages in length (excluding cover page).

The plan must 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. The work plan shall also include a detailed milestone and deliverable schedule, covering the period of performance of the proposed project. It must also include any major decision points or points where technology readiness level and/or manufacturing readiness level may improve.

3.4.3. Commercial Transition Plan

Note: Commercial Transition Plans must not exceed 10 pages in length (excluding cover page).

Applicants shall provide details about their plan for investment and scaling post the period of performance. The plan should provide specifics on the following at a minimum:

- Funding for the next round of research and development/product development, including potential sources of investment and any partnerships that will enable commercialization
- The applicant's past success in commercializing R&D
- Characterizing the demand from potential customers (*e.g.*, Radio OEMs, MNOs) for applicants' proposed technology advances and benefits to the customer (*e.g.*, cost reduction, power savings, quality of service, reliability)

3.4.4. Current and Pending Support Attachment

For SRFA 2, any application that includes investigators, researchers, and key personnel must identify all sources of current and potential funding, including this application, as well as internal projects in a Current and Pending Support Attachment. Any current project support (*e.g.*, Federal, state, local, public or private foundations, own funds) 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 shall 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 devoted to the project, regardless of the source of support. Similar information must be provided for all applications already submitted or that are being submitted concurrently to other potential funders.

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

- a) Name of investigator
- b) List of all current and planned projects
- c) Brief project description for each project (1-2 sentences maximum)
- d) Status of project (*e.g.*, current, pending, submission planned in near future)
- e) Source of support for each project

- f) Total award amount
- g) Total award period covered
- h) Location of project
- i) Time committed to the project per year

3.5. MERIT REVIEW CRITERIA

This section describes the Merit Review process and criteria for SRFA 2. Applications submitted under SRFA 1 are subject to a separate Merit Review process with their own distinct criteria. The Merit Review process and criteria described in this section do not affect the scoring or selection of SRFA 1 applications.

During SRFA 2 Merit Review, applications will be evaluated by a panel of at least three (3) reviewers composed of relevant government staff or non-federal experts in accordance with the following 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.

a) Project Purpose and Benefits (70 points)

1. The applicant's proposed technical approach is comprehensive and feasible and demonstrates a clear understanding of the research area selected in [Section 3.3.1](#). The scope of work is within the Technology and Manufacturing maturity guidelines in [Section 3.3.2](#) and [Section 3.3.3](#), respectively. (35 points)
2. The applicant demonstrates that the proposed research leads to a practical, commercial application that is not currently addressed by the current market or would substantially improve current best practices. (25 points)
3. The applicant clearly and credibly describes how their project meets the security requirements outlined in [Section 4.1.1\(m\)](#). (10 points)

b) Competence, Budget, and Commercial Transition (30 points)

1. Applicant's competence (skill, expertise, experience) and organizational capability (personnel, facilities, partnerships) to complete the specific project proposed. (15 points)
2. Reasonableness of the applicant's proposed budget. (10 points)
3. Project's potential to transition to the commercial market beyond the award period. (5 points)

Section 4 – Application and Submission Information

This section describes the application submission process that all applicants must follow, for both SRFAs, and information required for the application package.

NOTE: Applicants proposing multiple projects must submit a separate application for each proposed project, regardless of SRFA. Applications containing multiple proposed projects **will be disqualified.**

4.1. CONTENT AND FORM OF APPLICATIONS

Each application requires the following documentation: for each application:

- a) [SF-424, Application for Federal Assistance](#)
- b) [SF-424A, Budget Information for Non-Construction Programs](#)
- c) [Project/Performance Site Locations Form](#)
- d) [CD-511, Certification Regarding Lobbying](#)
- e) [SF-LLL, Disclosure of Lobbying Activities](#) (if applicable)
- f) [SF-328, Certification Pertaining to Foreign Interests](#)
- g) Budget Narrative and Justification
- h) Indirect Cost Rate Agreement (if applicable)
- i) Technical Proposal
- j) Work Plan
- k) Commercial Transition Plan
- l) Intellectual Property Plan (if applicable)
- m) Product Security and Cybersecurity Management Plan
- n) Letter(s) of Commitment for Consultants, Contracts, and Subawards
- o) MNO Letter(s) of Partnership Intent (Required only for SRFA 1)
- p) Current and Pending Support (Required only for SRFA 2)
- q) Other Materials (Optional)

Items ‘a’ through ‘d’ listed above 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 ‘e’ through ‘q’ above, must be uploaded to Grants.gov as attachments to field 15 of the SF-424 form by clicking on “Add Attachment.”

4.1.1. Instructions for Application Documentation

This section contains additional details and instructions for each of the application components listed above.

a) SF-424, Application for Federal Assistance

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

- Item 8.d. Zip/Postal Code field, shall reflect the Zip code + 4 (#####- ####) format.
- Item 12 shall list the NOFO number NTIA-PWSCIF-24-01.
- Item 13 shall list the SRFA number.
 - For SRFA 2 applications, Item 13 shall also list the primary topic addressed by the proposed project (see [Section 3.3.1](#)).¹⁷
- Item 15 shall list the title of the proposed project.
- Item 18 shall list the total budget information for the duration of the project.
- 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 shall reflect anticipated Federal and non-Federal expenses for the entire project, considering all potential cost increases and including cost of living adjustments.

- The applicant shall reflect each year of the project on the SF-424A form that appears as part of the mandatory forms in the Grants.gov application package.
 - For SRFA 2, if a fifth year is being proposed, a second SF-424A form should be submitted to cover year five (5) of the project. The form should be submitted as an attachment to field 15 of the SF-424 form by clicking on “Add Attachment.”
 - A link to a fillable SF-424A can be found above at 4.1(b).
- Section A:
 - Line 1, Column (a) shall be entered as Public Wireless Supply Chain. Innovation Fund – Open Radio Commercialization and Innovation, CFDA 11.038, or an abbreviation thereof.
 - Line 1, Column (b) shall enter the CFDA number of “11.038.”
 - Line 1, Column (e) shall list the total federal budget amount requested for the term of the award.
- Section B:
 - Column (1) shall reflect the Federal and Non-Federal costs for each object class category, to include indirect charges, for the first year of the award.
 - Column (2) shall reflect the costs for each object class category, to include indirect charges, for the second year of the award.
 - Column (3) shall reflect costs for each object class category, to include indirect charges, for the third year of the award.
 - Column (4) shall reflect costs for each object class category, to include indirect charges, for the fourth year of the award.

¹⁷ For example, a SRFA 2 project with the primary research objective of Advance Fronthaul Technology would enter “SRFA 2 – Advanced Fronthaul Technology” in Item 13

- If a fifth year is being proposed, an additional SF-424A must be attached for the final year.
- Section C shall list the sources and amount of non-Federal cost sharing, if proposed.
- Section D requires a breakdown of the first year’s federal share and non-federal share of the budget by quarter.
- Section E, Line 16 requires the budget estimate of federal funds needed for each year of the project.
 - Column (b) shall be the budget estimate for the first year.
 - Column (c) shall be the budget estimate for the second year.
 - Column (d) shall be the budget estimate for the third year.
 - Column (e) shall be the budget estimate for the fourth year.
 - If a fifth year is being proposed, the applicant shall enter the fifth year budget estimates in a separate SF-424A in Section E, Line 16, Column (b).

c) Project/Performance Site Locations Form

Applications shall include the location of all places of performance for both the applicant and any subgrantees. This does not include contractor work locations, unless a contractor facility is used to complete work specified in the work plan. A link to the fillable form can be found above in 4.1(c). *Note: JavaScript may need to be enabled for the document for the form to function correctly.*

- For U.S. locations, the following is required:
 - ZIP + 4 code format (#####-####)
 - 6-character congressional district format (AA-###)
- For non-U.S. locations, select the country first to update the required fields
- Additional locations must be added using the “Next Site” button, which will generate additional site fields/locations. Location information added using the “Add Attachment” feature is not allowed.

d) CD-511, Certification Regarding Lobbying

Enter “NTIA-PWSCIF-24-01” in the Award Number field. Enter the title of the application, or an abbreviation of that title, in the Project Name field.

e) SF-LLL, Disclosure of Lobbying Activities (if applicable)

Click the hyperlink to access instructions from Grants.gov.

f) SF-328, Certification Pertaining to Foreign Interests

Click the hyperlink to access instructions. Additional instructions will be provided for academic institutions.

g) Budget Narrative and Justification

Each applicant must submit a Budget Narrative and Justification spreadsheet through the Application Portal. The spreadsheet is available in the Package section of the Application Portal. All information included in the budget narrative and justification must support the dollar amounts identified in the SF-424 and SF-424A and demonstrate that the project or activity meets the eligible use requirements as per this NOFO.

The budget narrative and justification shall 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. Federal project funding should not substitute private capital or enable outsized returns relative to commercially reasonable expectations for similar projects. NTIA will evaluate whether project costs align with relevant market benchmarks to ensure that taxpayer dollars are efficiently spent. Information on cost allowability is available in the *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards*,¹⁸ which apply to awards in this program.

The budget narrative and justification must explain the rationale for the applicant's proposed cost share, as applicable. As part of this explanation, the applicant should directly show how the funding requested will incentivize the applicant to make investments in radio research, development, and/or production that would not occur in the absence of the incentives. The application should also explain why their funding request is appropriate based on expected risks and returns of the project, historical projects of similar nature, or other relevant market benchmarks.

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 narrative and justification for all personnel shall 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. The budget narrative and justification should include a description of the applicant's investments in employee training and education, as well as other efforts to build a skilled and diverse workforce, if the applicant makes such investments in their proposed project.¹⁹

¹⁸ See [2 C.F.R. § 200](#)

¹⁹ The Departments of Commerce and Labor have identified eight principles, known as the "[Good Jobs Principles](#)", that create a framework for workers, businesses, labor unions, advocates, researchers, state and local governments, and federal agencies for a shared vision of job quality.

- 2) **Fringe Benefits** – Fringe benefits for each position shall 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.) shall be charged under another cost category.
- 3) **Travel** – For all travel costs, the budget narrative and justification for travel shall 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.
- 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 narrative and justification shall 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 located 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 shall 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. A contract is 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. Training and education for employees that are clearly relevant to the project are direct, allowable costs per 2 C.F.R. § 200.473, and must be itemized.
- 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 shall 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 and justification under this category.

- h) **Indirect Cost Rate Agreement (if applicable)** - 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 C.F.R. § 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\(f\)](#), shall note this election as part of the Budget Narrative and Justification and an Indirect Cost Rate Agreement is not required.

i) Technical Proposal

(See [Section 2.4.1](#) for SRFA 1 and [Section 3.4.1](#) for SRFA 2)

j) Work Plan

(See [Section 2.4.2](#) for SRFA 1 and [Section 3.4.2](#) for SRFA 2)

k) Commercial Transition Plan

(See [Section 2.4.3](#) for SRFA 1 and [Section 3.4.3](#) for SRFA 2)

l) Intellectual Property Plan (if applicable)

Note: The Intellectual Property Plan must not exceed 10 pages

If the applicant contemplates retaining intellectual property (IP) rights related to work conducted under the SRFA, or anticipates using federal or matching funds to pay IP royalties, IP filing fees, and/or costs related to counsel for patent and copyright matters, the applicant shall provide an IP plan describing any IP considerations anticipated during the period of performance. This includes, but is not limited to:

- Anticipated patent filings from the federally funded work.
- Rationale for any anticipated royalty expenses using federal funds during the period of performance, including to which entities royalties will be paid.
- Rationale for any other IP-related costs (e.g., filing costs, IP attorney fees) included in the project budget.
- Any standards-related activities contemplated in the technical proposal and rationale for how such activities further the goals of the technical proposal and this program.

See [Section 6.4.11](#) for more details.

m) Product Security and Cybersecurity Management Plan

Note: The Product Security and Cybersecurity Management Plan must not exceed 10 pages

It is the policy of the United States to strengthen the security and resilience of its critical infrastructure against all hazards, including physical and cyber risks. Entities receiving funds through this program must ensure that cybersecurity is integrated into the design, development, operation, and maintenance of solutions developed through this program given the impact on future critical infrastructure information technology (IT) and operational technology (OT).

- 1) All projects shall incorporate “security-by-design” principles in their scope, following industry best practices, as well as hardware security principles where appropriate.
- 2) Software security development and management best practices shall be used in projects, such as a development, security, and operations (DevSecOps) approach to software design, implementation, and maintenance. Software products developed under this NOFO shall also develop a Software Bill of Materials (SBOM) in accordance with NTIA minimum requirements.²⁰
- 3) All hardware deliverables under this NOFO shall develop a Hardware Bill of Materials (HBOM). Both the SBOM and HBOM shall include a corresponding Vulnerability Exploitability eXchange (VEX) for any known vulnerabilities.
- 4) Additionally, all projects must ensure that practices are consistent with current industry best practices for cybersecurity, such as the NIST Cybersecurity Framework 2.0 and Cybersecurity and Infrastructure Security Agency (CISA) Cybersecurity Performance Goals (CPGs).^{21,22} These performance goals provide a baseline set of cybersecurity practices broadly applicable across critical infrastructure with known risk-reduction value, a benchmark for critical

²⁰ See U.S. Department of Commerce, [The Minimum Elements For a Software Bill of Materials \(SBOM\)](#)

²¹ See [NIST Cybersecurity Framework 2.0](#)

²² See [Cybersecurity and Infrastructure Security Agency \(CISA\) Cybersecurity Performance Goals \(CPGs\)](#)

infrastructure operators to measure and improve their cybersecurity maturity, and a combination of recommended practices for IT and OT owners, including a prioritized set of security practices.

The Product Security and Cybersecurity Management Plan shall address the objectives outlined above, in addition to describing any efforts the applicant will take to assess security of work performed during the course of the grant. This includes, but is not limited to, vulnerability scans, 3rd party security assessments, etc.

At the government's discretion, complex projects may be required to develop a detailed Project Cybersecurity Plan outlining how the recipient will ensure security throughout all project activities, not just the product. This requirement will be identified through a Special Award Condition (SAC) at time of award and is not required to apply to this funding opportunity. Such a plan will require detailed information on topics including (but not limited to):

- High-level description of the plan for overall management of cybersecurity for the project
- Inventory of project IT/OT assets
- Cybersecurity risk assessment
- List of cybersecurity risk mitigation actions with a target implementation date for each mitigation activity

n) Letters of Commitment for Consultants, Contracts, and Subawards

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 following:

- Entity's role in the project and overall level of participation
- Qualifications of personnel actively involved
- Federal share of funding for the entity (if applicable)
- Voluntary committed cost-share (if applicable), including what specific services and/or products will be provided for any in-kind match
- Point of Contact at the entity for any inquiries regarding the partnership and/or the Letter of Commitment
- If the applicant seeks additional weighting in Programmatic Review for facilitating market access and competition (see [Section 5.1.3](#)), the entity should demonstrate that it meets the definition of an SME as defined in Appendix A of this NOFO and indicate the SME's share of federal funding as a percentage of total federal funding requested

Letters of Commitment must be signed on the participating entity's letterhead, by a senior representative of the entity.

o) MNO Letter(s) of Partnership Intent (SRFA 1)

(See [Section 2.4.4](#) for details)

p) Current and Pending Support (SRFA 2)

(See [Section 3.4.4](#) for details)

q) Other Materials (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 this NOFO can be included in the application.

4.2. APPLICATION DOCUMENT FORMAT

All application documents, except those using prescribed forms, must meet the formatting and length requirements described in this section.

4.2.1. Document Format

Application documents must meet the following formatting requirements:

- 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.²³
- i) Typed Document – All applications, including forms, must be typed.
- j) Document Format – Documents must be submitted in a DOCX or PDF format.

4.2.2. Page Limits

The following documents are subject to page limits, excluding the cover page:

- a) Technical Proposal – 20 pages
- b) Work Plan – 20 pages

²³ See [2 C.F.R. § 200.111\(a\)](#)

- c) Commercial Transition Plan – 10 pages
- d) Intellectual Property Plan – 10 pages
- e) Security Management Plan – 10 pages

4.3. APPLICATION SUBMISSION

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

4.3.1. 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. **Application period extensions will not be provided due to delayed SAM registration.**

- 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.
- 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.

- 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.
- 5) *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.

4.3.2. 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.

Applicants should be aware that the process of completing the Workspace can take some time. Therefore, applicants should budget 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

- b. *Mandatory Fields in Forms:* In the forms, some fields are 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’s 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:
grants.gov/applicants/applicant-training

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 and understanding background information on the issue.

4.3.3. Submission Dates and Times

Complete applications must be received through Grants.gov no later than 11:59 p.m. Eastern Daylight Time (EDT) on July 17, 2024. 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. **Application period extensions will not be provided due to delayed SAM registration.**

4.3.4. Timely Receipt Requirements and Proof of Timely Submission

All applications must be received by 11:59 p.m. Eastern Daylight Time (EDT) on July 17, 2024. 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.

4.3.5. 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 at the Assistant Secretary's sole discretion whether a revision is material or not.

4.3.6. 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.

4.3.7. Material Representations and False Statements

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.

It is a crime to knowingly make false statements to a Federal agency. 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.

4.3.8. Public Disclosure of Applications

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 6.4.10](#) of this NOFO for additional information concerning the confidentiality of information contained in an application).

Section 5 – Application Review Process

5.1. REVIEW PROCESS FOR INNOVATION FUND PROGRAM

All applications will be evaluated on a competitive basis. Applications will initially be 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 application, including the merits of the technical proposal, and will individually score applications in accordance with the evaluation criteria. Each application will be judged on its own merit.

Once the Merit Review phase is completed, NTIA staff will conduct a Programmatic Review for applications meeting the minimum score threshold 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.

NTIA reserves the right at any time during the Merit and Programmatic Review processes to negotiate with the applicant relative to specific modifications to the application, including but not limited to, the resolution of any differences that may exist between the applicant's original request and NTIA's determination of eligible costs and Innovation Fund Program funding priorities. Upon completion of the Programmatic Review, NTIA program staff will summarize their analysis for each application reviewed.

5.1.1. 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 second 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 the requirements set forth in [Section 4](#). NTIA may elect to continue the initial administrative review process for an application that is submitted in a timely manner 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.

A high-level scope review of technical proposals will be conducted. Technical proposals determined to not meet the technology maturity, scope, and requirements outlined in [Sections 2.3](#) and [2.4.1](#) for SRFA 1 and [Sections 3.3](#) and [3.4.1](#) for SRFA 2 will be excluded from further review and will not receive awards. Applications that satisfy the

Initial Administrative and Eligibility Review will enter Merit Review. Program staff will sort applications by like-focused project type.

5.1.2. Merit Review

During Merit Review, applications will be evaluated by a panel of at least three (3) reviewers composed of government staff or non-federal experts with relevant experience in accordance with the criteria discussed in [Section 2.5](#) (SRFA 1) and [Section 3.5](#) (SRFA 2). Reviewers may discuss the applications with each other but will assign scores on an individual basis.

Applications that receive a mean score of 80 points or higher during the Merit Review will move to Programmatic Review. In the event the list of proposed projects does not account for the entirety of the funding available, applications that attained a mean score of between 70 and 79 during Merit review may move to Programmatic Review.

5.1.3. Programmatic Review

a. Prioritization

Applications will be prioritized for Programmatic Review as follows:

1. **First**, NTIA will review any application receiving a mean score of 80 or higher during the Merit Review;
2. **Next**, in the event the list of proposed projects does not account for the entirety of the funding available, the NTIA program team may review, in rank order, applications that attained a mean score of between 70 and 79 during Merit review.

b. Process

Programmatic Review will involve four steps:

First, for all applications under SRFA 1 and SRFA 2, NTIA may ask applicants to submit additional information, as appropriate, to clarify or to further substantiate the representations made in their applications. NTIA program staff will review the supplemental information, along with all information submitted with the application, to confirm eligibility and completeness of the application. Applicants whose supporting documents are not complete, accurate, and submitted in a timely manner or that do not adequately substantiate the representations in their applications, may be denied. NTIA will request supplemental documentation before deciding to deny such applications and will reevaluate the application package based on all of the information presented. Applicants will have seven (7) calendar days to submit information responsive to the feedback provided by NTIA, unless this time period is extended by NTIA.

Second, for all applications under SRFA 1 and SRFA 2, NTIA will conduct a detailed review to verify that all proposed activities align with objectives of this NOFO, overall Innovation Fund Program goals, and statutory requirements as outlined in the *FY21 NDAA*. NTIA will also conduct a detailed budget review to verify that the proposed budget, including any cost share, appears allowable, allocable, and reasonable. NTIA will review transition plans and security plans for completeness, accuracy, and risk.

Third, for all applications under SRFA 1 and SRFA 2, NTIA will evaluate which applications facilitate increased market access and competition by supporting Small and Medium Enterprises (SMEs). An application will receive a 5% bonus during Programmatic Review if it demonstrates that 40% or more of the requested federal funding will be granted or sub-granted to a business concern that meets the definition of a SME (as described in Appendix A of this NOFO). Specifically, NTIA will multiply the application's mean Merit Review Score by 1.05 to generate a weighted score.

Applicants that expect to receive a market access and competition bonus must provide evidence in their application that supports its position with respect to the above criterion. Programmatic reviewers will consider the evidence presented on its own merit and will not seek out or consider material not included in the application except insofar as they request additional information to clarify or to further substantiate representations made in an application.

Fourth, for SRFA 1 applications only, NTIA will consider the extent to which applicants demonstrate a commitment to project success by sharing 16% or more of the total estimated project cost through cash and/or in-kind contributions. Specifically, NTIA will multiply a project's mean Merit Review Score by a value between 1.0 (for projects that do not include a voluntary cost share contribution of 16% or more) and 1.10 (for projects that share 34% or more of the total project cost). More specifically, a project's weighted score will increase by 1% for every 2% of additional cost share provided above 15%. A project's weighted score will not increase for cost share contributions between 10-15%. NTIA will use the table below to calculate weighted scores reflecting the amount of voluntary cost share proposed.

For example, a mean Merit Review Score of 90 for a project with 19% cost share would be multiplied by 1.02, generating a weighted score of 91.8 (multiplier increases by 0.01 for meeting 16-17% cost share threshold and increases by an additional 0.01 for meeting 18-19% threshold).

Cost Share (%)	Weight (%)
10 % (minimum to be eligible)	0%
10-15 %	0%
16-17 %	1%
18-19 %	2%
20-21 %	3%
22-23 %	4%
24-25 %	5%
26-27 %	6%
28-29 %	7%
30-31 %	8%
32-33 %	9%
34+%	10%

For SRFA 1 applications that receive both a market access and competition bonus and a cost share bonus, the weighted score will be calculated after adding the individual bonuses together. For example, if an SRFA 1 application has 35% cost share and 50% of the requested federal funding is granted to a SME, the total bonus is calculated first (10% cost share bonus + 5% market access and competition bonus = 15% total bonus). Then, the mean Merit Review Score is multiplied by 1.15.

NTIA reserves the right at any time during the Programmatic Review process to negotiate with the applicant relative to specific modifications to the application, including, but not limited to, the resolution of any differences that may exist between the applicant’s original request and NTIA’s determination of Innovation Fund Program funding priorities. NTIA may also ask the applicant to modify its proposal (e.g., in the event certain costs under cost share are found to be ineligible).

Upon completion of the Programmatic Review, NTIA program staff will summarize their analysis for each application reviewed and will provide a ranked list of proposed projects, based on each project’s weighted score in their like-focused project lists, to the Innovation Fund Director. In the event the list of proposed projects does not account for the entirety of the funding available, NTIA program staff may conduct a Programmatic Review for any application that attained a score of between 70 and 79 during Merit Review and will add the projects with the highest weighted scores to the list it provides to the Innovation Fund Director.

5.1.4. Selecting Official Approval

The Innovation Fund Director will provide a package of recommended awards, based on Merit Review and Programmatic Review weighted scores, to the Selecting Official, the Assistant Secretary of Commerce for Communications 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 retains discretion to select and recommend an application for funding that was not recommended by the Innovation Fund Director and/or not to select an application that was recommended for funding by the Innovation Fund Director, based upon the following selection factors:

- a) **The availability of funding.**
- b) **Market Access and Competition.** The Selecting Official may consider the diversity of type of awardees (university, non-profit, private enterprise) to ensure that grant funding is spread across the telecommunications ecosystem.
- c) **Geographic Diversity.** NTIA may give preference to applications from different geographic areas to support geographic diversity. Therefore, the Selecting Official may select a lower scoring application from a different region before selecting a second applicant within the same region.
- d) **Diversity in Scope.** The Selecting Official may select lower scoring applications with diverse project focuses to allow for varied approaches and a broader range of projects.
- e) **Relative Cost Effectiveness.** To maximize impact of grant funds and ensure that prudent investments are made, NTIA may prefer projects that exercise cost reasonableness. The Selecting Official may:
 - Select a lower scoring application that requests less federal funding than a similarly scoped project that requests greater funding.
 - Pass over applications that the Selecting Official determines do not provide sufficient public benefit, in accordance with the goals and objectives of this NOFO, relative to the costs incurred.

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 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.

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

NTIA has partnered with the NIST Grants Management Division (GMD) to be the servicing grants office for this program. After applications are proposed for funding by

the Selecting Official, the NIST 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),²⁴ 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 shall 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 5.2.1](#)).

5.2. FEDERAL AWARD NOTICES

A grants officer from the NIST GMD 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.

5.2.1. 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.

²⁴ See [FAR 2.101](#)

5.2.2. Retention of Unsuccessful Applications

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

Section 6 – General Requirements, Prohibitions, and Other Information

6.1. GENERAL ELIGIBILITY

6.1.1. Past Innovation Fund Award Recipients

Entities that have received funding from past Innovation Fund grants are eligible to receive funds under this NOFO, if the entity otherwise meets the appropriate eligibility requirements defined in the NOFO.

6.1.2. Future Eligibility

Awards made under this NOFO will not impact a recipient's ability to apply for grants in future Innovation Fund NOFOs, if the recipient otherwise meets the NOFO- or SRFA-specific eligibility criteria in the future NOFO.

6.1.3. 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. 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:

- a) A foreign entity of concern;²⁵
- b) Identified on the [People's Republic of China \(PRC\) Military Companies List](#) established in accordance with Section 1260H of the *FY21 NDAA*;
- c) Included on the [System for Award Management \(SAM\) Exclusion List](#);
- d) Included on the International Trade Administration's [Consolidated Screening List \(CSL\)](#),²⁶ or

²⁵ As defined in 15 U.S.C. § 4651(8) and [15 C.F.R. § 231.104](#), subject to any further rulemaking promulgated by the Department of Commerce.

²⁶ The Consolidated Screening List (CSL) is a consolidation of multiple export screening lists of the Departments of Commerce, State, and the Treasury. The CSL may be used as an aid in conducting electronic screens of potential parties to regulated transactions; however, applicants should be aware that the underlying lists, not the CSL, provide the authoritative information for determining eligibility under this NOFO. Ineligible entities for this NOFO include any applicant, sub-applicant, participant, or other entity that is owned or controlled by an organization included in any of the lists that comprise the CSL, including but not limited to the Bureau of Industry and Security's Entity List ([15 CFR part 744](#), supplement no. 4) and the Department of the Treasury's list of Non-SDN Chinese Military-Industrial Complex Companies (NS-CMIC List). In the event that a company, entity, or person on the list appears to match a party potentially involved in an export transaction, additional due diligence should be conducted before proceeding. Prior to taking further action, to ensure full compliance with all of the terms and conditions of the restrictions placed on the parties on this list, the applicant must check the official publication of restricted parties in the Federal Register. They should also check the official lists of restricted parties maintained on the websites of the Departments of Commerce, State, and the Treasury.

- e) Identified as a provider of covered equipment and services in the Federal Communications Commission’s list of [Equipment and Services Covered by Section 2\(a\) of the Secure and Trusted Networks Act of 2019](#).

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, 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 during Programmatic Review, 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 records about participants in Innovation Fund awards, in the course of monitoring and/or audit activities to ensure compliance with this requirement in accordance with [Section 6.4.18](#). Awardees shall be prepared to provide records demonstrating ownership and control and shall obtain sufficient information from participants for NTIA to understand the ownership and control of participants in grant-funded activities.

6.2. GENERAL PERIOD OF PERFORMANCE REQUIREMENTS

6.2.1. POP 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 technical 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 policy, the period of performance, inclusive of all extensions, shall not exceed five (5) years.²⁷

6.2.2. 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 future funding opportunities.

6.3. FUNDING RESTRICTIONS

6.3.1. 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.

6.3.2. 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:

6.3.2.1. Construction

Construction costs are not allowed under this NOFO.

6.3.2.2. 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.

6.3.2.3. 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.

6.3.2.4. 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

²⁷ See U.S. Department of Commerce, [Grants and Cooperative Agreements Manual \(April 20, 2021\)](#), Section 9.I.2.a.1.

with 2 C.F.R. § 200.216. Additionally, ineligible costs include costs from vendors (for example, for equipment, supplies, and services from vendors) found in registries listed in [Section 6.1.3](#).

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

6.3.2.5. Activities Providing Direct Benefit to the United States Government

In accordance with 31 U.S.C. § 6304, federal grants are generally required to carry out a public purpose of support or stimulation and are not to be used to perform work for the direct benefit of the United States Government. As such, any costs for work where the principal beneficiary is one or more U.S. Government agencies are unallowable. For example, work to develop an open RU that only meets requirements of a U.S. Government agency would be unallowable.

However, costs related to work where the U.S. Government is an indirect beneficiary are allowable. For example, an open RU developed for the commercial market that also may be used by U.S. Government customers would be allowable. Any determination of principal beneficiary is at the sole discretion of NTIA.

6.3.2.6. 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; and
- c) For any other activity listed in this NOFO as ineligible or unallowable.

6.4. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

6.4.1. 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.

6.4.2. Federal-Wide Research Terms and Conditions as Adopted by the Department of Commerce

Projects funded under [SRFA 2](#) will involve research, development, or related activities. The Department of Commerce will therefore designate these awards 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.

6.4.3. 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](#).

6.4.4. 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](#).

6.4.5. 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) with respect to grant-acquired property. NTIA may provide information regarding the useful life schedules associated with assets acquired with grant funds.

6.4.6. 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. 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.

6.4.7. Recipient Integrity and Performance Matters

In accordance with 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 (FAPIIS) about certain civil, criminal, or administrative proceedings involving the recipient.

6.4.8. 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:

- a) A financial audit of each DOC award or subaward in accordance with Generally Accepted Government Auditing Standards,²⁸ or
- b) 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.

6.4.9. 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.

²⁸ See U.S. Government Accountability Office, [GAO-21-368G, Government Auditing Standards](#) (April, 2021)

6.4.10. 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, due diligence, and other reports submitted by the applicant (together, “applicant information and data”), may be used by the Department of Commerce in conducting reviews and evaluations of its financial assistance programs and for statistical purposes. Applicant information and data may also be used for the purposes of this NOFO and carrying out the government’s responsibilities in connection with the Innovation Fund, or as otherwise required by law. For these purposes, applicant 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. By submitting applicant information and data, the applicant, potential applicant, or an entity submitting the information consents to the disclosure of such applicant information and data to consultants and contractors for these purposes, consistent with Federal law.

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 shall not be publicly disclosed, that information shall 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.

6.4.11. Intellectual Property Rights, Royalties, and Restrictions

In accordance with the Bayh-Dole Act (35 U.S.C. § 200 et. seq.), 37 C.F.R. § 401, and 2 C.F.R § 200.315, recipients of federal grant funds can retain rights to any intellectual property developed during the grant. NTIA encourages Innovation Fund grantees to leverage this ability to the maximum extent practical.

Costs relating to royalties for patents and copyrights necessary for the performance of the Federal award²⁹ and costs related to counsel for patent and copyright matters³⁰ are allowable costs as long as they meet the requirements of the applicable provisions related to the allocation of costs under federal awards (see [Section 4.1.1. \(g\)](#)). However, grantees under this award are not authorized to use federal funds for royalty costs paid to ineligible entities listed in [Section 6.1.3](#).

NTIA recognizes that voluntary consensus standards are important to economic growth and furtherance of the Innovation Fund objectives.³¹ As such, costs related to participation in relevant standards activities to further the objectives of this NOFO are allowable.

Additionally, informational sharing, licensing, or other knowledge transfer of intellectual property developed under this grant to an ineligible entity is prohibited, except when required for a standards-related activity, as defined in 15 C.F.R § 772.1 (*e.g.*, as a standards-essential patent). This does not apply to publicly published open-source intellectual property.

6.4.12. 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 the 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.

6.4.13. Third Party Beneficiaries

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

6.4.14. 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).³² Application submittals shall 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.

²⁹ See [2 C.F.R. § 200.448\(b\)](#)

³⁰ See [2 C.F.R. § 200.448\(a\)\(1\)\(iii\)](#)

³¹ See 47 U.S.C. § 906(a)(1)(C). Standards activities are particularly conducive to advancing objectives (ii) and (iii).

³² 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.)

It is the 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. 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.

Applications 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 assess any impacts that a project may have on the environment.

6.4.15. 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 27.³³ 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-exempt, the expected institution(s) where the research activities involving human subjects may be conducted, and the institution(s) expected to be

³³ NTIA uses the Common Rule definitions for research and human subjects research contained in 15 C.F.R. § 27.102.

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: [NIST Notice of Funding Opportunity Requirements Human Subjects and Live Vertebrate Animal | NIST](#)

6.4.16. 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.

6.4.17. 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), Current and Pending Support Attachment, Budget Narrative and Justification, Project/Performance Site Location(s), 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, 3145-0279, 0660-0053, 4040-0010, 4040-0014, 0704-0579, and 4040-0013.

6.4.18. 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 6.4.6](#); 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.

6.4.19. Contracting With Small and Minority Businesses, Women’s Business Enterprises, and Labor Surplus Area Firms

Minority Businesses Enterprises (MBEs) and Women’s Business Enterprises (WBEs) are major catalysts for economic growth and job creation. However, data shows that MBEs and WBEs historically face significant contracting disparities compared to other businesses. Pursuant to 2 C.F.R. § 200.321, applicants that are non-federal entities should take affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible.

Affirmative steps include, but are not limited to:

- a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- b) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and

women's business enterprises;

- d) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;
- e) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and
- f) Requiring subgrantees to take the affirmative steps listed above as it relates to its subcontractors.

6.4.20. 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.

6.4.20.1. 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:

- a) 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
- b) A violation of the civil False Claims Act (31 U.S.C. §§ 3729-3733).

6.4.20.2. 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.

6.4.21. 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>.

6.4.22. 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).

6.4.23. Unauthorized Use of Funds

To the extent that the Assistant Secretary 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.

6.4.24. Federal Awarding Agency Contact(s)

Questions should be directed to:

Subject Area	Point of Contact
Programmatic and Technical Questions	Tim Moyer Director, Program Management Office (PMO) InnovationFund@ntia.gov
Technical Assistance with Submission	Grants.gov Help Desk 1-800-518-4726 support@grants.gov
Grants Rules and Regulations	Darren Olson Grants Office Team Lead darren.olson@nist.gov
Media Inquiries	Virginia Bring NTIA Press Secretary press@ntia.gov

Appendix A – Glossary of Terms

3PP – The term “3PP” means 3rd Party Product.

5G New Radio (NR) – The term “5G New Radio (NR)” means specifications developed by the 3rd Generation Partnership Project (3GPP) for 5G technology. For the purposes of this NOFO, this is 3GPP Release 16 and later 5G NR specifications.

Assistant Secretary – The term “Assistant Secretary” means 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 term “central unit”, or “CU”, means the logical element of a radio access network that provides higher-layer processing for radio signals and coordinates traffic handover with other base stations.

Construction – The term “construction” means construction, rehabilitation, alteration, conversion, extension, repair, or improvement of buildings, highways, or other real property.

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

Covered Nation – The term “covered nation” as defined in 10 U.S.C. § 4872(d)(2) means 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 term “distributed unit”, or “DU”, means the logical element of a radio access network that provides lower-layer processing for radio signals.

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

Key Performance Indicator (KPI) – The term “key performance indicator”, or “KPI”, means a quantifiable measure of performance over time for a specific objective, typically a Key Performance Parameter (KPP).

Key Performance Parameter (KPP) – The term “key performance parameter”, or “KPP”, means a vital characteristic, function, requirement or design basis that, if changed, would have a major impact on the system performance, scope, schedule, cost and/or risk, or the ability of an interfacing project to meet its mission requirements. A parameter may be a performance, design, or interface requirement.

Manufacturing Readiness Level (MRL) – The term “manufacturing readiness level”, or “MRL”, is a metric used in identifying, managing, and mitigating manufacturing risk for the timely

development, production, modification, fielding, and sustainment of affordable products. MRLs are assessed on a scale of 1 to 10. See Appendix B.

Mobile Network Operator (MNO) – The term “Mobile Network Operator”, or “MNO”, means an entity that operates a 5G NR network (this includes 4G network operators with 5G NR upgrade plans), offering network services to the public, and owns the RAN infrastructure used by the network using radio spectrum for which it holds a license or lease providing for exclusive use by the operator.

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

NTIA – The term “NTIA” means the United States Department of Commerce, National Telecommunications and Information Administration.

NTIA Administrator – The term “NTIA Administrator” means 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) – The term “open radio access network”, or “Open RAN”, means an approach to radio access network design that leverages open, interoperable, and standards-based RAN elements to form a virtualized and disaggregated RAN.

Open Radio Unit (Open RU) – The term “open radio unit”, or “open RU”, means a standards-based radio unit capable of interoperating with third party RAN components in an open radio access network.

Radio Access Network (RAN) – The term “radio access network”, or “RAN”, means 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 term “radio unit”, or “RU”, means the physical element of a radio access network that provides over-the-air radio access to a 5G system.

RU Supplier – The term “RU supplier” means an entity capable of production and commercial sale of open radio units (RUs).

Specific Research Focus Area (SRFA) – The term “specific research focus area”, or “SRFA”, means a topic area funded by the Innovation Fund to a recipient, each of which is subject to a maximum award amount of \$50,000,000, as required by 47 U.S.C. § 906(a)(1)(B)(ii).

Small or Medium Enterprise (SME) – The term “small or medium enterprise”, or “SME”, means a private firm that makes less than \$250 million in annual revenue and/or has fewer than 10,000 employees.

Technology Readiness Level (TRL) – The term “technology readiness level”, or “TRL”, is a metric used for describing the maturity of evolving technologies. TRLs are assessed on a scale of 1 (least mature) to 9 (most mature). See Appendix B.

Ultimate Beneficial Owner (UBO) – The term “Ultimate Beneficial Owner”, or “UBO”, means the person, or entity, that ultimately owns or controls a company and that derives the benefits associated with ownership or control. The UBO is that person, or entity, proceeding up a chain of majority-ownership (where the entity above owns more than 50 percent of the entity below) that is not owned more than 50 percent by another person, or entity.

Vulnerability Scans – The term “vulnerability scans” means 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.

Appendix B – TRL/MRL Crosswalks

Technology Readiness Level Crosswalk:

TRL	Definition	PWSCIF Application
1	Basic principles observed and reported	Basic physical research, not necessarily applicable to telecom
2	Technology concept and/or application formulation	Practical applications relevant to telecom are invented, but are speculative and limited to analytic studies
3	Analytical and experimental critical function and/or characteristic proof of concept	Active R&D initiated—studies are commenced to physically validate analytical predictions (see TRL 2)
4	Component and/or breadboard validation in a laboratory environment	“Low fidelity” proof of concept of solution, <i>e.g.</i> modification of reference design or basic software demonstration; Software is in “pre-alpha” stage
5	Component and/or breadboard validation in a relevant environment	“High fidelity” proof of concept, <i>e.g.</i> , integration with commercially-adopted components in developer environment; Software is in “alpha” stage
6	System/subsystem model or prototype demonstration in a relevant environment	“High fidelity” proof of concept/prototype in complex lab or simulated field environment; Software is in “beta” stage
7	System prototype demonstration in an operational environment	Prototype successfully demonstrated in an MNO lab and/or field environment; Software is in a “release candidate” stage
8	Actual system qualified through test and demonstration	Commercial solution qualified through MNO first office application
9	Actual system proven through successful mission operations	Commercial solution adopted and deployed widescale in production networks; Software is at a production release stage

For additional information on Technology Readiness Levels, please see Table 4 of the Government Accountability Office’s Technology Readiness Assessment Guide ([GAO-20-48G](#)).

Manufacturing Readiness Level Crosswalk:

MRL	Definition	PWSCIF Application	Relevant TRL
1	Basic manufacturing implications identified	Key subcomponents identified (e.g. controller chip, antenna terminal type, etc.)	4
2	Manufacturing concepts identified	Desired form factor and unit cost identified; Production break-even point determined	4
3	Manufacturing proof of concept developed	Proof-of-concept systems developed internally	4/5
4	Capability to produce the technology prototype in a laboratory environment	Prototype systems developed internally in a lab	5
5	Capability to produce prototype components in a production-relevant environment	Contract manufacturers produce “board-level” subsystems for laboratory testing and integration	6
6	Capability to produce a prototype system or subsystem in a production-relevant environment	Contract manufacturers able to produce “prototype” equipment for internal T&E	6
7	Capability to produce prototype systems, subsystems, or components in a production-representative environment	Complete “Engineering Sample” production at contract manufacturer for MNO lab testing or 3 rd party integration	7
8	Pilot line capability demonstrated; ready to begin LRIP	Production capacity available to support MNO field trials	7
9	LRIP demonstrated; capability in-place to begin FRP	MNO field trials supported; Production capacity available for full-scale deployments	8
10	FRP demonstrated and lean production practices in-place	Active production in support of full-scale commercial deployment(s)	9

LRIP – Low-Rate Initial Production

FRP – Full-Rate Production

For additional information on Manufacturing Readiness Levels, please see Table 13 of the Government Accountability Office’s Technology Readiness Assessment Guide ([GAO-20-48G](#)) and the Department of Defense [Manufacturing Readiness Level Deskbook](#).