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**Subject:** 5G Challenge Notice of Inquiry  
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To whom it may concern,

This comment is in response to [“5G Challenge Notice of Inquiry”](#) dated 1/11/2021 and is written on behalf of the board of the [Open Source Hardware Association](#).

The Open Source Hardware Association (OSHWA) is the oldest and largest non-profit (501c3) advocacy organizations with a mission to promote and support the worldwide development of open source hardware. OSHWA was incorporated as a non-profit in 2012 by a group of software, hardware, and design enthusiasts to advocate for the use of open source approaches to the development of hardware systems of all types. These include gateway (HDL for FPGA or ASIC design), a domain which has historically been considered half-way between hardware and software.

Because of the high bandwidths required, gateway plays a key role in modern 5G solutions. It is therefore very important that it is explicitly made part of any open-sourcing effort. An open-source 5G stack should include both software and gateway, allowing users and developers to modify the different parts and move pieces of functionality back and forth between the software and gateway domains, depending on their context and priorities. Furthermore, because porting gateway to different platforms is not trivial, a reference open hardware platform should be made available so that collaborators have a common hardware base which is not controlled by a single vendor. This accessibility will enhance collaboration and place all contributors in a level playing field. Finally, the lack of high-quality free and open source software tools for gateway design hampers efficient collaboration in this domain. We advocate that this challenge should consider liaising with and supporting existing communities which are engaged in the development of FOSS tools for gateway design, and recommend the use of these tools wherever possible.

Following from the philosophies of open source software our core beliefs are that properly documented open hardware systems:

1. Are more secure due to the ease at which the systems can be audited, reviewed, and amended. In the world of software it is often said, “with enough eyes, all bugs are shallow.” We believe that this also applies to hardware.
- 2.

Open source hardware promotes the rapid development of complex engineering systems. Developers can focus their efforts on building new and innovative systems because open hardware designs have simple and transparent licensing mechanisms. This is to say that engineers can quickly mix and match subsystems out of existing technologies, or quickly build derivative works, while focusing on core customer needs.

3. Open source hardware lowers the long-term costs associated with supporting complex systems. Open hardware products can be cheaply reproduced, modified, and patched by any vendor, preventing vendor lock-in, increasing competition, and lengthening the useful life of hardware components.
4. Open source hardware facilitates the education and training of engineers, developers and end-users. Well documented and licensed open hardware systems can be reviewed and re-used by students to develop a deeper understanding of a specific technical domain.

For these reasons OSHWA believes preference should be given to open source hardware for any DoD sponsored 5G development program. The term “Open” is often mis-used and poorly defined by many developers. For these reasons, after a thorough vetting process with the OSHWA community, OSHWA established the [Open Hardware Definition](#). In order for hardware to be considered open source under the community definition of open source hardware, information about a project must be publicly available with an appropriate open source license for the hardware, software, and documentation of the project.

Given the complex licensing arrangements used by open hardware projects OSHWA further advocates that any “open” hardware project go through the free [OSHWA certification process](#) in order to confirm that it complies with the Open Hardware Definition. The OSHWA certification process uses a simple online form followed by a manual project review to determine if a given project meets our minimum requirements of the Open Hardware Definition. Upon completion of the certification process each project is issued a certification number and is entered into our searchable database of open hardware projects. This open hardware database, website, and API make the process of finding and verifying the licenses of open hardware projects fast and simple. The API also makes it simple for developers to quickly find other open hardware projects. In addition to the broadly applicable Open Hardware Definition, OSHWA and the [Free and Open Source Silicon \(FOSSi\) Foundation](#) are actively developing a standard for applying the Open Hardware Definition to gateware.

Finally, OSHWA advocates that any competition related to open source 5G systems actively engage with the existing open hardware community. OSHWA is more than willing to share any funding opportunities or competitions with our members and our network of supporters.

Respectfully submitted on behalf of the Open Source Hardware Association (OSHWA) board of directors by:

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