



## **JMA Wireless Comments on The National Strategy to Secure 5G Implementation Plan**

*NTIA Docket No. 200521-0144*

JMA Wireless (JMA) appreciates the opportunity to provide comments on this very important topic. As the nation’s first and only domestic provider of Radio Access Networks (RAN) and 5G solutions, JMA has a firsthand understanding of the deep challenges our country faces in ensuring that the next generation of telecommunications is safe and secure. Thus, JMA believes implementing policies that incorporate the concepts described in its answers to NTIA’s questions is vital to creating a robust domestic industry for 5G and beyond telecommunications systems.

It has never been more important to harness U.S. innovation to win the race to both developing and deploying 5G technologies. This development must be undertaken collectively across a broad technology ecosystem, driving the maximum progress by leveraging the following elements: harnessing innovation from U.S. based entities of all sizes, supporting open standards that drive competition with a focus on next generation network design, maximize robust spectrum availability along with streamlined municipal permitting and realize scale and cost efficiency through a secure, neutral host connectivity approach. While progress has been made toward each of these goals, work remains to ensure continued American 5G technology leadership.

The technology leap that 5G drives requires nothing less than approaching development and deployment with all of the technology at our disposal today. First, we must ensure that innovation is driven across a deep pool of contributors. Far too often are the substantial innovations of smaller companies discounted in favor of a few large incumbents. Second, a revolutionary technology like 5G should not be built with the same approach as its predecessor technologies. The Federal Government must take advantage of the latest in network advancements including open interfaces, software driven design, and the flexibility to support multiple tenants secure on the same network. Significant tides exist to continue multi-generation “old build” models, those that are linear and closed, and work against the true momentum of progress. Finally, the Federal Government must drive maximum availability of spectrum for 5G use, ensuring that spectrum is paired with both emerging and current user needs as well as efficient facilitation of municipal site availability – both indoors and outdoors. This network availability at the local level, paired with a flexible build it once and connect the masses approach will be the fastest path to significant, repeatable scale. With this focus in mind, JMA submits the following comments on areas where the Administration and supporting government agencies can help achieve this common, critical goal.



## **Company Overview**

JMA provides the only 100% U.S. designed, developed, and manufactured 4G and 5G solutions on the market today. Privately owned, JMA's next-generation communication systems deliver software driven wireless technology across public and private networks worldwide. JMA solutions are found everywhere from carrier networks to the most advanced stadiums, covering more than 1,000 high traffic locations. JMA XRAN™ leads the industry with the only 100% software-based RAN platform which combined with CellHub mid band radios create a unique, flexible solution for next generation private wireless deployments. JMA's 5G millimeter wave IOTA platform provides a best in class radio footprint for indoor 5G deployments, critical to round out current outdoor-centric deployments. All JMA systems are fully software upgradable and future ready without the limitations of hardware-based systems.

JMA appreciates the opportunity to provide comments to the NTIA on this important matter. For questions, please contact:

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JMA offers the following comments to the questions in the Request for Information:

### **Line of Effort One: Facilitate Domestic 5G Rollout**

*How can the United States (U.S.) Government best facilitate the domestic rollout of 5G technologies and the development of a robust domestic 5G commercial ecosystem (e.g., equipment manufacturers, chip manufacturers, software developers, cloud providers, system integrators, network providers)?*

JMA's position that in order to speed deployment, mechanisms to foster local level adoption are critical. This starts with streamlining physical access to locations, indoor and outdoor, as well as maximizing the available spectrum to drive value added, end user benefit. Positive efforts have been made over the last number of years, but must be nationalized to the degree where all areas become an on-ramp for 5G services. Many times, the speeds of deployment of wireless technology is not one of delayed technology, but one of the cost and timing to access physical

infrastructure. Paired with streamlined access to municipal infrastructure is one of 5G's most important assets – spectrum. The Federal Government should seek to maximize the amount of available 5G spectrum, particularly in the mid band, facilitating airwaves that support both indoor and outdoor deployments. This spectrum should come in the form of both licensed and unlicensed bands, allowing a mix of revenue generating auctions with quick access options. As with all technology, it must be enabled for the masses, both in terms of locations as well as uses.

One of the key elements of efficient network design is the ability for multiple entities to use a single network build. To that end, a requirement to support multi-use and multi-tenancy should be championed. With today's core technology available, the building of single use, single serving networks is simply not efficient and does not facilitate end user choice. Similar to multi-use importance is the need for network element interoperability. 5G is a massive, collective technology effort and simply does not have the luxury of locking down architectures to a consortium of vendors, or even more limiting, to a single vendor model.

Perhaps most importantly, innovation must be harnessed from U.S. based organizations of all size. 5G provides the opportunity to take advantage of all of our national technology company assets, not just those with the loudest voices or deepest pockets. With the U.S. Government and critical infrastructure dependent on 5G in the future, advocating for U.S. based design, development, and manufacturing has never been more critical. Offshore development and imported hardware and fragmented supply chains, as we have seen in recent global events, are corruptible. To the end, incentives should be provided to firms that meet critical development and manufacturing criteria. In order to ensure all technology advancements are afforded the same chance to impact U.S. based 5G dominance, similar incentives should be made to small / medium business with a 5G development focus. Not only does this widen the net to capture the latest advancements, but also creates a pipeline of critical high paying American jobs. Small businesses with new, advanced technology must not be stifled by large corporations who wish to persist with old build models.

*How can the U.S. Government best foster and promote the research, development, testing, and evaluation of new technologies and architectures?*

In order to best foster and promote the evaluation of new technologies, the Federal Government should award government facing 5G deployments to companies that follow open standards (3GPP and ORAN) and embrace the critical elements of today's best performing networks – software driven design and virtualization. JMA's position is that open networks will be critical to remove the hurdle for smaller companies to compete, allowing a mix and match approach to

support best of breed technology in different parts of the network. The current wireless network architecture in place today and being updated to 5G is an evolved version of the 2G architecture from 30 years ago. Wireless network architecture has yet to go through the “cloud” transformation based on virtualization that provides more efficient use of spectrum, rapid network feature updates, enhanced security and lower operating costs.

In addition to government facing network deployment considerations, funding support mechanisms should be enabled to incubate technology from non-traditional network vendor incumbents, especially those that meeting U.S. designed, developed and manufactured criteria. Supporting development funding to smaller businesses will ultimately allow them to compete on a larger stage, driving support against an inefficient status quo of network design.

*What steps can the U.S. Government take to further motivate the domestic-based 5G commercial ecosystem to increase 5G research, development, and testing?*

In parallel to incentives for government adoption of 5G networks using domestic-based technology and manufacturing, the same incentive should apply to major government suppliers and supply chains. JMA recommendation is to include defense contractors as well as state and local governments who are incented to trial, endorse, and use U.S. made technology.

Providing not only resources, but exposure to small technology companies driving U.S. based technology is also key. JMA sees 5G networks as an avenue for non-incumbent technology companies to showcase capabilities and recommends the Federal Government make it a priority to fund test and trial deployments within its area of influence. These networks will be free to use for qualified end users in the government agency or contractor spaces. Given the hurdle to not only develop, but to build reference networks at scale, small businesses must be given the means to showcase and compete on a larger stage.

JMA is a strong believer that a pipeline of necessary skillsets play a critical role in continuing the pace of 5G. Higher education must make telecommunication-centric research and coursework a priority along with current focus points on Information Technology (IT) and Computer Science. In most cases, educated labor from higher education must undergo significant training to come up to speed on telecommunication standard practices and concepts.

*What areas of research and development should the U.S. Government prioritize to achieve and maintain U.S. leadership in 5G?*

5G, like many other technologies, is a collection on multiple advances that come together to create something truly new. JMA believes with open networking, multi-tenant capabilities and software-based design critical to mass market success, development focus must be on facilitating these concepts through virtualization of all 5G piece parts – known as vRAN (virtualized Radio Access Network). Similar to how advancements in cloud lead to a more streamlined internet experience, driving massive on demand video adoption, vRAN provides the same flexibility on the 5G network. Various vendor technology can seamlessly interoperate and updates are driven by software updates as opposed to hardware swap outs. Providing piece part capability in 5G networks will allow a better on ramp to smaller companies with particularly focused technology that many times are not a focus of larger conglomerate firms.

With U.S. based 5G a part of a global ecosystem, driving these network concepts to allies will ensure secured end to end communication. U.S. based 5G security and advancements can too easily be compromised by ignoring networks connecting overseas. A full end to end ecosystem of security and progress will be critical to driving U.S. technology interest not only domestically, but also abroad.

*How can the U.S. Government create an environment that encourages private sector investment in 5G technologies and beyond?*

With the emergence of unlicensed spectrum like CBRS as well as additional spectrum available to the government in millimeter wave bands, opportunities for 5G deployments, both Enterprise and Service Provider led, will drive tremendous network equipment demands. JMA positions that the Federal Government should continue to pursue incentive programs to drive small business innovations into areas of influence including state and local governments as well as a broad range of government led contracts such as those through defense contractors. Small businesses that have the ability to deliver and trial next generation 5G networks, in full or through providing critical network piece parts, should be given priority and funding consideration. In addition, the government should make such funding vehicles available for private enterprise that make up critical industrial or supply chain application across multiple vertical markets (e.g. manufacturing, utilities, and public safety). Much like the championing of small business in other industries, the Federal Government must work to ensure that all voices are heard and all possible 5G supporting technology advancements are pursued, particularly for those investing back in the U.S. economy through on shore manufacturing and development.

*If possible, identify specific goals that the U.S. Government should pursue as part of its research, development, and testing strategy.*

To drive the fastest path of 5G adoption, the Federal Government must ensure proper network architectures and next generation network build practices are employed. JMA’s experience in the space supports that networks should be driven to support full virtualization and software-centric capabilities versus today’s locked hardware environments. 5G will drive intelligence at the far edge of the network and similar practices, like edge computing standards, must be developed to allow the elasticity of network placement and performance.

A requirement to support open multi-use and multi-tenancy will continue to unlock the potential of 5G for multiple industries as well as the service provider community. The building of single use, single serving networks is simply not efficient and does not facilitate end user choice. Similar to multi-use importance is the need for network element interoperability. 5G is a massive, collective technology effort and simply does not have the luxury of locking down architectures to a consortium of vendors, or even more limiting, to a single vendor model.

Innovation must be harnessed from U.S. based organizations of all size. 5G provides the opportunity to take advantage of all of our national technology company assets, not just those with the loudest voices or deepest pockets. Advocating for U.S. based design, development, and manufacturing has never been more critical. Incentives should be provided to firms that meet critical ‘Made in the USA’ development and manufacturing criteria. In order to ensure all technology advancements are afforded the same chance to impact U.S. based 5G dominance, similar incentives should be made to small / medium business with a 5G development focus. Not only does this widen the net to capture the latest advancements, but also creates a pipeline of critical high paying American jobs. Small businesses with new, advanced technology must not be stifled by large corporations who wish to persist with old build models.

**Line of Effort Two: Assess Risks to and Identify Core Security Principles of 5G Infrastructure**

*What factors should the U.S. Government consider in the development of core security principles for 5G infrastructure?*

JMA believes that ensuring end to end communication, both within internal 5G networks as well as adjacent allied networks overseas should remain a top priority. All elements of these networks must be trusted end to end. A single point of weakness, provided by untrusted hardware or software development origin is a cause for concern and should be safeguarded. Requiring some level of domestic manufacturing and software coding in the most critical elements, those managing user data or transmission, supports a security framework that can be tracked, audited and mitigated more quickly than a highly distributed global supply chain of solutions.

Particularly with software development, large portions are typically offshored to 3<sup>rd</sup> party development houses, creating gaps in the overall solution security fabric. The Federal Government should consider a security certification that takes into account where and how both hardware and software is developed and manufactured.

*What factors should the U.S. Government consider when evaluating the trustworthiness or potential security gaps in U.S. 5G infrastructure, including the 5G infrastructure supply chain?*

JMA has seen with other critical development efforts, the country of origin or percentage of development provided domestically should remain a key consideration. An audit trail on development ‘touches’ should be employed so intellectual property can be considered holistically in the same way that other high value weapon systems are audited and tracked. The more critical the element, the higher the bar should be raised. Systems that are transmitting, housing, or securing user data should be managed with the highest level of development scrutiny.

*What are the gaps?*

The gaps today are a large driver of this document’s request for comment which JMA actively supports. The telecommunications industry is currently deploying the large majority of their active network elements from overseas corporations. This same small pool of international providers also dominates the landscape of our allied country telecommunication networks. While efforts have been raised to remove specific high threat entities, little has been done to go deeper into the supply chains and development practices of those providing today’s infrastructure. An ecosystem of U.S. based development and manufacturing, particularly from emerging vendors smaller in size, must be supported to move the industry forward safely and securely. Supporting multiple, smaller development entities coupled with an open ecosystem and the ability to mix and match network elements through software, not hardware, is the fastest path to broad 5G enablement.

*Are there stakeholder-driven approaches that the U.S. Government should consider to promote adoption of policies, requirements, guidelines, and procurement strategies necessary to establish secure, effective, and reliable 5G infrastructure?*

JMA recommends that while security policies are critical to national security, they should be streamlined to provide the greatest level of overall security without being burdensome such that it blocks out small and mid-sized technology innovators from deploying solutions and competing. Smaller scale businesses with new, advanced technology must not be stifled by large

corporations who wish to persist with old build models or add overall cumbersome requirements that drive little value.

*Is there a need for incentives to address security gaps in 5G infrastructure?*

Yes, JMA firmly believes incentives should be provided to address potential gaps in 5G infrastructure. A single point of weakness, provided by untrusted hardware or software development origin is a cause for concern and should be safeguarded. At a minimum, the Federal Government should seek to audit and approve supported software or hardware development entities that meet a specific bar of security. More effectively, requiring a level of domestic manufacturing and software coding in the most critical elements, those managing user data or transmission, supports a security framework that can be tracked, audited and mitigated more quickly than a highly distributed global supply chain of solutions. Particularly with software development, large portions are typically offshored to 3<sup>rd</sup> party development houses, creating gaps in the overall solution security fabric. These gaps need to be highly tracked or removed through a formal process. The Federal Government should consider a security certification that takes into account where and how both hardware and software is developed and manufactured.

*If so, what types of incentives should the U.S. Government consider in addressing these gaps?*

JMA's view of incentives is that they should be driven in the form of both supported participation as well as financial. On the development enablement front, tax incentives for small 5G centric development companies should be considered, particularly for those with available products that are market ready. Further funded incentives should also be considered to stand up trial networks for those offering unique, forward facing solutions that support the 5G ecosystem. To further drive adoption of small, U.S. based company technology, tax incentives should be provided to enterprises that buy and deploy networks from qualifying U.S. based, small business technology developers. In essence, both ends of the 5G equation, both supply and demand, side should be incented to use and showcase U.S. made technology from entities of all sizes.

**Line of Effort Three: Address Risks to U.S. Economic and National Security during Development and Deployment of 5G Infrastructure Worldwide**

*What opportunities does the deployment of 5G networks worldwide create for U.S. companies?*

JMA's view is that 5G will also usher in a new level of automation and intelligence for both government and private industrial entities. Not only critical for communication, 5G will drive the basis to accelerate the economy and end to end security and administration will be critical and needs to be governed by U.S. based technology from companies of all sizes.

5G will transform business through its ability to connect millions of devices seamlessly and will not be limited to just traditional telecom carriers. It will be used by businesses in multiple market segments including retailers, manufacturers, healthcare, higher education, hospitality and entertainment. As 5G unleashes operational efficiencies and new capabilities, demand for 5G infrastructure equipment will grow exponentially. Like WiFi today, it will become necessary for every business to implement a 5G wireless solution.

By focusing on virtualization, which provides efficient use of spectrum, rapid network feature updates, enhanced security and lower operating costs, American companies will be able to offer a highly competitive and differentiated 5G network solution leading to opportunities to provide systems internationally that effectively compete with any non-U.S. based network deployment. In short, 5G will equate to a Fourth Industrial Revolution, capable of driving all facets of progress across a multitude of industries. Those that harness the openness and next generation build approach will benefit to a much larger degree.

*How can the U.S. Government best address the economic and national security risks presented by the use of 5G worldwide?*

It is clear to JMA that the U.S. must develop a robust 5G wireless infrastructure ecosystem to drive both future economic growth as well as safeguard national security. This ecosystem must champion technology from companies of all size and break free of the mold that govern today's largest network deployment – taking them from a linear, monolithic model to one that is open and diverse. Incentives must be provided to companies of all size to ensure the best and brightest from our technology portfolio is realized in mass market deployments with a keen eye towards enabling truly U.S. based, on shore development. These next generation network best practices and build models must also be adopted across allied networks in order to drive a secured end to end ecosystem of communication.

*How should the U.S. Government best promote 5G vendor diversity and foster market competition?*

JMA recommends the Federal Government look at multiple constructs to support vendor diversity and foster market competition. Incentives to small development companies should be

considered as well as leveraged both by the Federal Government in their own 5G internal networks, state and local governments, and critical infrastructure (defense contractors, utilities, and manufacturing).

In building 5G networks, the Federal Government must foster open design concepts and avoid single threaded vendor solutions that remain locked to outside vendor technology, a common approach to building today's wireless network infrastructure. Supporting virtualization of 5G Radio Elements (vRAN), open edge computing standards, and common interfaces for application support will ensure open network design, foster small business innovation and diversify a U.S. driven partner ecosystem.

*What incentives and other policy options may best close or narrow any security gaps and ensure the economic viability of the United States domestic industrial base, including research and development in critical technologies and workforce development in 5G and beyond?*

JMA's experience building wireless solutions has driven the conclusion that all elements of 5G networks must be trusted end to end. A single point of weakness, provided by untrusted hardware or software development origin is a cause for concern and should be safeguarded. Requiring some level of domestic manufacturing and software coding in the most critical elements, those managing user data or transmission, supports a security framework that can be tracked, audited and mitigated more quickly than a highly distributed global supply chain of solutions. Particularly with software development, large portions are typically offshored to 3<sup>rd</sup> party development houses, creating gaps in the overall solution security fabric. The Federal Government should consider a security certification that takes into account where and how both hardware and software is developed and manufactured.

A pipeline of necessary skillsets play a critical role in continuing the pace of 5G. Higher education must make telecommunication-centric research and coursework a priority along with current focus points on Information Technology (IT) and Computer Science. In most cases, educated labor from higher education must undergo significant training to come up to speed on telecommunication standard practices and concepts.

**Line of Effort Four: Promote Responsible Global Development and Deployment of 5G**

*How can the U.S. Government best lead the responsible international development and deployment of 5G technology and promote the availability of secure and reliable equipment and services in the market?*

JMA positions that the Federal Government should endeavor to socialize all elements of U.S. made technology to allies to support the end to end communication network critical to ensuring a high level of communication security. Allies should be provided with specific reference companies that meet a government standard for network build practices. In turn, allies and other areas that are lagging in adoption should receive funding consideration from the government to support a U.S. driven 5G ecosystem in their home country. In most cases, smaller U.S. based technology companies remain invisible to international service providers or governments and this should be remedied as key 5G technology partners are identified.

*How can the U.S. Government best encourage and support U.S. private sector participation in standards development for 5G technologies?*

JMA asserts the best path to adoption is to support U.S. private sector companies with actual trial deployments or the ability to participate in government funded 5G deployments. With access to the technology, and a pool of trusted providers, the private sector can drive new thought around use cases that drive economic and security advancements as well as put them on a faster path to direct adoption. As with any new technology, the power and promise of that technology is not fully understood until it can be directly accessible to those willing to potential invest and adopt.

*What tools or approaches could be used to mitigate risk from other countries' 5G infrastructure?*

JMA supports the socialization of all elements of U.S. made technology to allies to support the end to end communication network critical to ensuring a high level of communication security. Allies should be provided with specific reference companies that meet a government standard for network build practices. In turn, allies and other areas that are lagging in adoption should receive funding consideration from the government to support a U.S. driven 5G ecosystem in their home country. In most cases, smaller U.S. based technology companies remain invisible to international service providers or governments and this should be remedied as key 5G technology partners are identified.

*How should the U.S. Government measure success in this activity?*

JMA recommends the Federal Government consider an approved schedule of U.S. sanctioned 5G technology providers with a key focus on driving smaller, U.S. development entities in order to foster the best possible advancement of 5G technology. Approved, U.S. sanctioned network providers could then be tracked as they build and manage networks globally. In essence, the more areas that are driven by U.S. sanctioned 5G technology, the less incentive there will be for



other non-U.S. sanctioned network entities to deploy, lessening the risk of end to end network security.

*Are there market or other incentives the U.S. Government should promote or foster to encourage international cooperation around secure and trusted 5G infrastructure deployment?*

The inverse of build incentives, JMA recommends the Federal Government consider an approval mechanism in order to allow connectivity to secure U.S. communication networks. These networks would include networks carrying sensitive government communications as well as those providing connectivity to critical infrastructure – transportation, utilities, and manufacturing.

Respectfully submitted,  
JMA Wireless  
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