



**National Telecommunications & Information Administration  
and Rural Utilities Service  
Joint Request for Information  
Docket No. 09039298-9299-0**

**COMMENTS OF LEMKO CORPORATION**

**Background**

*Pulling the IP Cloud Out to Rural Communities:* As part of the American Recovery and Reinvestment Act (ARRA), the Broadband Technology Opportunities Program (BTOP) provides an unparalleled opportunity for the Federal Government to support the deployment of a cost-effective, IP-based mobile broadband 4<sup>th</sup> generation/backward-compatible network architecture in unserved, underserved, and rural areas. The build-out of a mobile broadband communications network that will pull the IP cloud out to rural communities will provide the immediate job growth and the long term economic multiplier envisioned in the stimulus legislation.

*LEMKO's IP-Based Mobile Platform Brings the Network Intelligence to the Edge (Cell Site):* LEMKO Corporation, a privately held company based in Schaumburg, Illinois, has developed a unique IP-based mobile network architecture that meets the next generation industry standard (System Architecture Evolution (SAE) Phase as defined by the 3<sup>rd</sup> Generation Partnership Project (3GPP) and endorsed by the International Telecommunications Union (ITU). Moreover, LEMKO's mobile platform is RF technology-neutral, supporting all versions of the radio access network (including 2G, 3G, and 4G standards as well as CDMA, GSM, UMTA, LTE, and WiMax technologies) (*see Attachment 1*).

- LEMKO'S Node1™ units are a complete mobile broadband switching and routing platform co-located with the base station at the cell site, interconnected with each other in a peering fashion via the IP cloud. The Node1™ units support all versions of the radio access network, including LTE and WiMax.
- LEMKO'S Node2™ units are a gateway platform™ that provide interconnection into the legacy network and support roaming traffic, signaling and billing functions.

*LEMKO's 4<sup>th</sup> Generation-Ready Platform is Changing the Communications Landscape in Rural America:*

- **Sustainable Economics:** The cost of operating a wireless broadband network using LEMKO's IP-based flat network architecture will be reduced by over 65%. The break-even end user density is one user per two square miles.
- **Interoperable as Fill-In or Overlay Network:** LEMKO's unique platform can be used with any existing mobile network or RF technologies, allowing carriers to expand service to remote areas or fill in coverage holes in their existing networks.
- **Portable:** LEMKO's light-weight, portable Node1™ units permit fast and flexible deployment, indoors or outdoors, in a wide variety of environments (*see Attachment 2*).
- **Shovel-Ready:** Within the last six months, LEMKO systems have been deployed in Alaska, Iowa, Texas, Wisconsin, Michigan, and Montana. A Node1™ unit can be installed and operational within 30 days. Node2™ units are currently operational in Illinois, Texas, Florida and Ohio and can interconnect with a range of large and small carriers.
- **Public Safety:** LEMKO's mobile platform will support single-site Phase II E911, emergency cell broadcast, cell site priority calling and other critical public safety features.



Sample Deployments in Remote Areas or for Disaster Relief: LEMKO's solution has been deployed in several unique and remote locations.

- China's version of FEMA has several hundred vehicle-mounted LEMKO units that provide moveable coverage for use on China's western frontier. Immediately after the devastating earthquake last spring, the government airlifted over 100 systems into the region to provide service after 2,000 sites were knocked out. Within 36 hours over 50,000 calls per day were being supported. A smaller, three site prototype system was used by the 82<sup>nd</sup> Airborne in New Orleans after Hurricane Katrina.
- In Canada, LEMKO is deploying systems in several First Nation villages to provide mobile broadband services where none was previously available. Additional systems are being deployed in the Canadian Cascade mountain range to provide coverage along the remote stretches of the Alaska Highway and the remote sound waters of British Columbia.
- These deployments demonstrate that LEMKO's technology would be an appropriate choice for the type of "test-bed or proof of concept" application leading to "sustainable, viable, and scalable projects," that NTIA is seeking, based on the April 2, 2009 Congressional testimony of NTIA's Mark Seifert.

Mobile Broadband is Critical for Today's Consumer Needs: Mobile broadband should be given primary consideration for BTOP funding. Although fixed broadband has a place, the U.S. experience over the last twenty years with personal communications services has proven that end users desire to take their communications services with them. Mobile service is now the primary means for voice communications, and broadband services will follow the same path:

- 75% of wireless users will subscribe to mobile broadband services by 2013. (Informa Research)
- Mobile broadband is growing 3x faster than fixed broadband. (Pyramid Research)

Rural communities are particularly mobile given the greater distances travelled for business, education and social activities. Agricultural production covers large areas and will benefit greatly from access to applications through mobile broadband services. Therefore, it is important to expand the conventional concept of "homes passed" to square miles covered. In rural areas, "homes passed" only tells part of the story.

### Responses to NTIA Questions

- *NTIA should adopt definitions of "Broadband," "Unserved" and "Underserved" that are specific to **mobile** broadband services, separate from any definitions developed for fixed broadband.*
  - **Broadband:** In mobile systems, there are two elements necessary to provide mobile broadband service. The element most commonly discussed is the speed of the radio or air interface. LTE and WiMAX are the 4G air interfaces that are most commonly considered. The second – and most important – element of broadband service is the network architecture. Fourth generation network architecture is IP-based and is known as System Architecture Evolution ("SAE"), as defined by the international industry standard organization 3GPP. Deploying an IP-based 4<sup>th</sup> generation network technology (i.e., SAE) should qualify as broadband, regardless of the radio speed initially deployed. The commercial availability of 4G radios will quickly follow the network deployments.



- **Unserved Area:** Define as an area where mobile broadband service covers less than 20% of the defined geographic area. As noted above, it is important to expand the conventional concept of “homes passed” to square miles covered.
- **Underserved Area:** Define as an area where fewer than 3 mobile broadband providers deliver service in at least 80% of a defined geographic area.
- *Selection Criteria for Grant Awards*
  - The primary consideration when evaluating BTOP grant applications should be the applicant’s ability to provide broadband access to the greatest number of citizens as possible, at the lowest possible cost, particularly in unserved and underserved areas.
    - To achieve the above objective, cost-effective and wide-area coverage solutions should receive priority. The more broadly a specific solution is deployed, the more likely the wide range of the ARRA’s goals will be met.
    - Differences in technologies should be considered – without violating the principle of technological neutrality – to the extent that one technology can deliver a better broadband experience to the greatest number of customers at the lowest cost per customer and area covered.
  - The second consideration should be the long-term sustainability of the project, without the need for on-going government support.
    - Sustainable adoption of broadband will be driven by a combination of desired services, the effective utility of these services, and the operator’s ability to economically deliver such services. Evidence of market acceptance and demand along with the economic business case should be examined for each grant application. Solutions with a proven track record should be prioritized.
    - Specific to rural areas, the economics provided by legacy system architectures has held back the delivery of services in many rural areas, but LEMKO’s platform radically changes the economics of deploying mobile broadband in rural areas. NTIA and RUS should be very cautious about funding projects based on a municipal service provider model, given the lack of success of municipal WiFi projects launched in major cities. The lack of success of these projects is due to two fundamental factors: 1) WiFi is designed to be a short range (<100 feet) extension of a wireless router. It was not designed to provide wide area service. 2) Municipalities learned that operating and billing functions are extremely complex. Such services are better left to commercial entities with the business infrastructure and experience in operating networks. These challenges will be magnified in rural areas. Though WiFi coverage may be beneficial for deployments with specific key anchor institutions (*e.g.*, schools and hospitals), providing broader coverage in a rural area is not sustainable.
  - Other factors are less important in achieving the BTOP goals:
    - Speed should be a lower priority evaluation factor, as long as the project can be upgraded as new technologies become available.
    - Retail price should not be directly considered in the grant program. Enabling competition will provide for the best overall price experience for consumers.



- Priority should be given to projects that leverage other Recovery Act projects, or that address several purposes, but only if they can qualify as “shovel ready” and can be timely delivered.
- *Selection Criteria for Grants Issued under the Special Allocation for “Innovative Programs to Encourage Sustainable Adoption of Broadband Services”*
  - Sustainable adoption occurs when service providers can deliver services that customers desire at a price that customers are willing to pay. For rural areas, the operating economics is the most critical element. Solutions that can significantly reduce the operating costs in rural markets should be given selection priority.
    - Customer take-up rates and operating profitability are measures that can be used to determine whether a program has succeeded.
- *NTIA should determine that it is in the public interest for private sector entities, including equipment and network vendors, to be eligible for grant awards.*
  - There is no reason to believe that government and non-profit entities are best equipped to provide broadband services. Indeed, in most cases it is private sector entities that have the expertise, proven track record and nimbleness to deploy new systems on a tight timeframe.
  - Moreover, eligibility should not be limited to service providers. Because most network build-out work will be undertaken by network and equipment vendors, they should be eligible to receive grant funds directly (recognizing that most will likely partner with service providers in submitting applications). With vendors as direct recipients of grant funds, it will make it easier to enforce deployment deadlines and other grant program rules against the parties in the best position to ensure conformance.

### **Responses to RUS Questions**

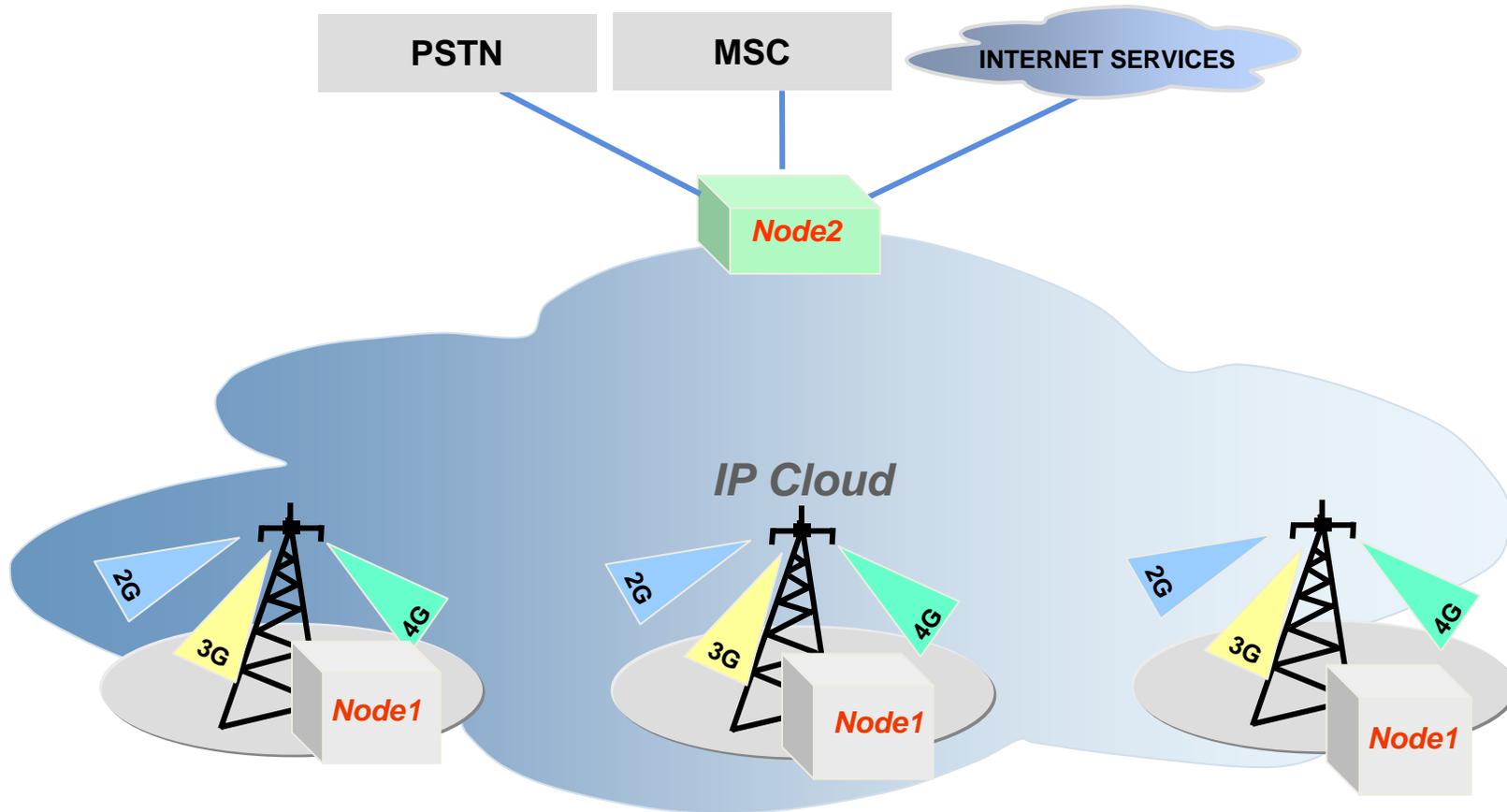
- *Specific broadband speeds do not lead to economic development.* Economic development is best facilitated by the availability of services from multiple providers. These services may have different speeds and pricing. End users will receive the most benefit from being able to choose services that best fit their technical requirements and ability or desire pay. Focusing primarily on speeds will continue to perpetuate the unserved or underserved conditions in rural America.
- *The top priority for the RUS program should be to fund projects that will serve the highest proportion of rural residents and areas that lack access to broadband.* Other criteria should be ranked in the following order of priority:
  - Giving end users a choice of internet service providers;
  - Applicants who are fully funded and ready to start;
  - Applicants involving projects of current and former RUS borrowers;



### **Conclusion**

In evaluating grant applications, NTIA should consider which projects would provide broadband access to the greatest number of persons, particularly in unserved and underserved areas, at the lowest possible cost and with a good likelihood of long-term sustainability without on-going government subsidies. This objective can best be achieved by deploying a 4<sup>th</sup> generation IP-based mobile network architecture, which can pull the IP cloud out to rural and other unserved and underserved communities. For this reason, such 4<sup>th</sup> generation mobile networks should qualify as “broadband” under the definition to be developed by NTIA. LEMKO's specific network platform is shovel-ready, can be deployed quickly in a wide range of environments, is compatible with any RF technology, and can lower network operating expenses by over 65%, thereby enabling viable and sustainable businesses in areas where they were not previously possible.

# Lemko's Rural Solution System Architecture Evolution (SAE) – FLAT IP Architecture



**Pulls the IP Cloud Out to Rural Communities**



# What Does It Look Like?

Fully Functional Core Network Platform in Software



Lemko Software



Lemko Server

Standard BTS



A "Complete" Mobile Broadband Network





## Attachment #2 Fast & Flexible Deployment

### Fast Delivery

- Light, hand carry

### Flexible Indoor Installation

- On the wall
- On the pole
- On the floor

### Flexible Outdoor Installation

- **Rooftop**, no need for shelter & low pole requirement
- **On the tower**, security guaranteed
- **On the concrete pole**, easy site acquisition & civil works

### Fast Commissioning

- Half person day

### Automatic Configuring

- “Plug-in & Play”



### Recommended “All on Pole” Scenario

- Low Environmental Impact
- Zero Footprint
- Easy and Fast Installation
- Reduces site cost by up to 70%

