PUBLIC-INTEREST FINDING FOR PROPRIETARY-MATERIAL USE

ROUTE: VAR DES NO: VAR
PROJECT NO: VAR COUNTY: VAR
PROJECT DESCRIPTION: Programmatic approval.
FHWA OVERSIGHT: ☒YES ☐ NO
PROPRIETARY MATERIAL:
5 GHz Unlicensed Frequency Band Radios:

Tsunami MP.11 Model 5054 Base Unit (BSU)/Subscriber Unit (SU)/ 5012 Subscriber Unit,

Tsunami MP8100 Model MP-8100 BSU/SU/ 8150 CPE Subscriber Unit,

Tsunami GX Model GX-Series.

Manufactured by Proxim Wireless Corporation.

1. Description of Need:

The ITS Technology Deployment Division of the Indiana Department of Transportation is seeking approval for the equipment essential to the creation and maintenance of the INDOT ITS network.

Wireless communication devices are an integral part of the INDOT ITS network. Along with fiber optic cables they guaranty data flow between the field components and TMC. Radios are the preferred wireless communication devices because of the wide band, absence of the monthly usage fees (unlicensed frequencies), and low cost installation. Selection of Proxim radios out of multiple models, available on the market, is based on the fact, that only desired radios are meeting all requirements. Multitude of configurations allows designer select model guarantying required functionalities.

Required functionalities include:

- Provide stable reliable radio link.
- Provide radio link, capable of carrying multiple multicast and data streams.
- Provide separation of multiple networks in one physical location.
- Provide cost flexibility in one link (combination of high cost and low cost units).
- Provide ability of point-to-point and point-to-multipoint communication.
- Provide wide range of the bandwidth.

2. Product History: These devices have been introduced for testing in 2005 and were excepted and used ever since. Approximately 800 of Proxim radios are currently being used in Indiana. They demonstrate very high reliability (over 96% uptime) and maintainability. Desired product is currently listed on INDOT Approved Materials List for Traffic Signal and ITS Control Equipment under ITS Wireless Communication Equipment. Testing was conducted according the **ITM No. 948-10P**

3. Product Availability: Google search for 5GHz radios returns multiple devices, meeting some of the requirements, but not all. Testing results for various make radios are presented in the following matrix:

	Manufacturers / Specifications	Systech Telecom (Libra 5800)	Firetide	Encom Radio Services, Inc.	SmartBridges	Proxim	Novaroam
Frequency range	Non- Licensed, 5 GHz	Yes	Yes	Yes	Yes	Yes	N/A
Throughput – max	54 Mbps	Yes	Yes	Yes	Yes	Yes	No
Throughput – min	12 Mbps	No	N/A	Yes-900Mhz	No	Yes	Yes
Maximum data rate	1.5 Mbps	N/A	N/A	N/A	N/A	Yes	Yes
TCP/IP compatible		Yes	Yes	Yes	Yes	Yes	Yes
Communication mode	Point-to-Point	Yes	No - Mesh	Yes	Yes	Yes	Yes
	Point-to-Multipoint	Yes	No - Mesh	Yes	No	Yes	No
Power-over-Ethernet	120 VAC	Yes	Yes	Yes/No for 900MHz	Yes	Yes	Yes
	48 VDC	No	N/A	Yes	Yes	Yes	Yes
Management	Ethernet/Serial	Yes	Requires	Yes	Yes	Yes	Yes
	Web Based	No	purchase of	Yes-High End only	Yes	Yes	No
	Telnet	Yes	proprietary S/W	No	No	Yes	Yes
Mode of operation	Bridge	Yes	No	Yes	Yes	Yes	Yes
	Router	No	Yes	Yes	Yes	Yes	Yes
Availability		Available through distributor	Available through distributor	Available through distributor	Available through distributor	Available through distributor	Available through distributor
Performance record		High failure rate	In 6 month of testing had never worked properly	High failure rate and complicated management. Low end and high end radios are not compatible.	Low data rate and high failure rate.	Very reliable, easy to manage locally and remotely, high end and low end radios are compatible.	Do not have high end radios, require big antennas, inadequate tech support
Comments		Not acceptable	Not acceptable	Not acceptable	Not acceptable	Accepted, entered in approved materials list.	Not acceptable

4. Product Cost: Equipment available on the market does not provide required functionality and reliability as it shown in the table in paragraph 3. There is no equipment on the market to make cost comparison. The next closest product is the HD26342 priced at $975.00. However, this product does not meet broadband and reliability requirements.

5. Project Compatibility: Desired product is compatible with existing ITS hardware. Application matrix below describes which model can be used for which application. The lowest cost Proxim radio model is being selected for any particular project based on the technology needs.

Function \ Model	5054-BSU-R	5054-BSU-R-LR	5054-SU-R	5054-SU-R-LR	5012-SUA	MP-8100	QB-8100	MP-8150-CPE	GX - Series	5054-PA50-23, 29	P, PL, PX, PLX
Base Station Unit, Regular Range (2 Mile)	X										
Base Station Unit, Extended Range (20 Miles)		X				X	X				
Subscriber Unit, Regular Range (2 Miles)			X								
Subscriber Unit, Extended Range (20 Miles)				X		X	X				
Subscriber Unit, Regular Range (2 Miles)					X			X			
Multicast capable	X	X	X	X		X	X	X	X		
Point – to - Point	X	X	X	X	X		X	X			
Point – to - Multipoint	X	X	X	X		X			X		
Broad Band , MHz	20	20	20	20	20	40	40	20	50		
Throughput, Mbps	54	54	54	54	12	300	300	100	204/102		
Type										Flat	Parabolic
Gain, db										23, 29	32
Cost	$1,736	$2001	$865	$959	$350	$1,800	$1,800	$400	$8,999-$23,000	$144	$350
Application	Nodes of Spur links, Relay	Nodes of Spur links, Relay	CCTV at the end of Spur	CCTV at the end of Spur	Detecti on sites	CCTV links, Relay	CCTV links, Relay	CCTV at the end of Spur	Relay sites		

6. Maintenance: Desired equipment is designed such a way, that most of maintenance functions: monitoring up/down time, restoring functionality, updating/upgrading – can be done remotely, which drives down maintenance cost. Training is available by manufacturer (as needed) and on line in Wiki Notes, accessible for

tech personnel from any location in Indiana. Low failure rate (less than 5%), compact design, and short order turn around time results in the minimal storage requirement.

7. Engineering Analysis: This application is programmatic by nature and unique not to a specific ITS project, but to the ITS architecture that is already in place. Proxim radios provide the best functionality of known similar products and are the most reliable.

8. Expanded Economic Analysis: There are over 800 units of various models of Proxim radio installed in Indiana to support ITS Network. Annual replacement rate, including damage done by lightning, is no more than 20 units a year, majority are the low cost 5012 units. While testing other models ITS Technicians were replacing 10% of installed radios at least once a year. Replacement of Proxim radios is predominantly driven by technology progress, rather than wear.

9. Contractual or Performance Implications: Use of desired items does not impose any restrictions on the use of other items on the contracts.

10. Length of Time that Approval is Effective: 10/2013 until 10/2016

Prepared By: Konstantin Veygman

Field Engineer

INDOT-ITS Technology Deployment Division

Date:

Based upon the above finding, the use of the proprietary material listed is in the public interest and is hereby approved.

APPROVED: Jason S. Wasson 2013.09.15 22:37:22 -04'00'

Deputy Commissioner, Engineering

& Asset Management, INDOT

Date: _____

APPROVED: Louis J Haasis Digitally signed by Louis J Haasis DN: cn=Louis J Haasis, o=Ind Div, ou, email=Lou.haasis@dot.gov, c=US Date: 2013.10.07 09:19:36 -04'00' For

Division Administrator, FHWA

Date: 10/7/2013