Submission by PSBN Consulting to the Broadcasting and Telecommunications Legislative Review Panel – January 11, 2019

Reference: The Telecommunications Legislative Review established by the Ministry of Innovation, Science and Economic Development (ISED) has invited written submissions from interested parties in response to a Call for Comments related to modifications to areas of proposed amendments to the *Telecommunications Act, Radiocommunication Act,* and the *Broadcasting Act.*

PSBN Consulting specializes in management consulting and advisory services in public safety communications domain for Land Mobile Radio (LMR), Broadband, NG911, Smart Cities and Internet of Things (IoT). Our associates have held leadership positions in the public and the private sector in business and technical roles. Our solution centric, vendor agnostic approach and recommendations prioritize our clients' interests. Our core competencies include our thought leadership, 360° perspective of the challenges for transformative solutions.

- Stakeholder Engagement – Coaching & Understand Vision, Challenges & Objectives
- Current and Future Needs Assessment
- Holistic Gap Analysis – People, Technology and Processes
- Market Analysis – Research, Case Studies, Trends
- Solution Options – Holistic Analysis, Business Case and Architecture
- Develop Strategy - Define Requirements & Roadmap
- Support in Execution of Strategy - RFP Creation, Proof of Concepts, Procurement Support, Solution Architecture, Program Management & Solution Acceptance

Background:

For many decades Public Safety Agencies (PSA) have relied on mission critical voice services based on two-way radio technology using Land Mobile Radio (LMR) systems that operate on federal government issued dedicated frequencies, thus keeping commercial traffic separated from spectrum used by first responders. Unfortunately, these systems operate in various frequency bands (VHF, UHF, 700 MHz, 800 MHz etc.) which has hindered interoperability between agencies.

There is a current as well as an evolving need by PSAs for reliable and interoperable broadband services in addition to mission critical voice services delivered through LMR based communication systems. Broadband data services are intended to enable data-rich multi-media applications that will further enhance response effectiveness for major disasters, emergencies, as well as day-to-day operations. For these data applications to be functionally effective, reliable, seamlessly interoperable, integrated voice and data communications capabilities are necessary that span across jurisdictions where emergency responders operate.

Currently, the first responder community in Canada lacks consistent and guaranteed access to broadband data capabilities and often relies on commercial wireless data facilities that offer "best effort" services under the rules for "net neutrality". During emergencies or disaster situations, when networks become congested, first responders do not have assured access thus compromising their primary responsibility of ensuring safety and security of citizens while mitigating property loss. In the last ten years, with increasing affordability of mobile computing and the advent of the smart phone, PSAs have begun to use wireless broadband services (4G/LTE) mainly to provide wireless connections to mobile work stations in patrol vehicles, and in some cases, agencies have issued smart phones to staff members as well.

There is an ongoing initiative in many countries, including the USA, Australia, the UK, and South Korea, to enable the creation of national Public Safety Broadband Networks (PSBN) to address these needs and provide emergency responders with priority access to reliable, secure, high-speed wireless data communications networks. Because public safety agencies increasingly rely on broadband wireless connections to operate efficiently, the plan allows priority and pre-emption for first responders to be applied in times of network congestion.

In the USA, FirstNet was created by the US Congress in response to the terrorist attacks on September 11, 2001 to address lack of interoperability of the first responders' legacy LMR communications networks. By allocating 20 MHz of wireless spectrum available across the USA and Territories, and creating a federal funding model, Congress sought to ensure such lack of "inter-operability" would be a thing of the past. Canada soon followed the USA by reserving the same spectrum (Band 14) across Canada. AT&T, the builder of FirstNet, has enabled public safety users with priority and pre-emptive rights on ALL COMMERCIAL wireless broadband spectrum operated by AT&T wireless - not just Band 14.

Verizon Wireless, an AT&T competitor, has made the same capability for priority and pre-emption available to first responders that choose to stay on the Verizon network using Verizon's commercial spectrum assets.

In Canada, ISED defined its approach in document SMSE-014-17 published in June 2017 which identified 20 MHz of 700 MHz spectrum (known as Band 14) should be reserved for use by PSAs across Canada under the following conditions:

- Commercial use of unused capacity will be allowed provided that public safety users will have priority and pre-emptive rights over any form of commercial usage.
- ISED will not mandate specific technology, though any technology employed on the 700 MHz public safety broadband spectrum must ensure national and cross-border interoperability and ensure priority and pre-emption capability for public safety services and must be consistent with the interoperability solution "sharing standards-based systems."

With the release of this decision, ISED considered that discussions and activities among stakeholders, including, but not limited to, members of the Federal/Provincial/Territorial (F/P/T), Interoperability Working Group (IWG), Radio Advisory Board of Canada (RABC) service providers and manufacturers, will gain further momentum to establish recommendations based on a consolidated view related to issues such as:

- technical requirements to ensure nationwide interoperability,
- priority and pre-emption criteria for accessing the 700 MHz public safety broadband spectrum,
- single and multiple Public Safety Network Entity (PSNE) licensing structures, and
- allowing commercial usage of excess capacity.

Currently, Public Safety Canada (PSC) is engaging stakeholders for their inputs to the questions posed by ISED with an estimated completion date of summer 2020. PSC will also address governance and business models applicable to the PSNEs in their report.

Although this ruling will bring Canada into line with the United States, where Band 14 was also reserved under similar conditions, it will come much later than expected since FirstNet has been in operation since 2017.

With this background discussion in place, we offer the following submissions with respect to the Telecommunications Legislative Review Panel questions - our responses are *in italics*.

PSBN Consulting responses to the questions as set out in the Terms of Reference

Telecommunications Act and Radiocommunication Act

1. Universal Access and Deployment

1.1 Are the right legislative tools in place to further the objective of affordable high quality access for all Canadians, including those in rural, remote and Indigenous communities?

***Answer**:*

PSBN Consulting believes that the framework is in place. The broadband universal service objective released by the Canadian Radio Telecommunications Commission (CRTC) in Policy 2016-496 and the creation of the (new) National Broadband Fund further supports our view. Statistics compiled by the CRTC have established that 4G-LTE services are available to approximately 98% of the Canadian population. This, however, accounts for only 17% land mass coverage. In contrast to carrier networks that target population coverage, public safety and emergency management operations target geographical coverage based on defined jurisdiction which is often much larger than the related populated areas. The need for public safety and emergency management coverage coincides with the needs of rural Canadians. By

stimulating innovation and providing support funding, government agencies have the opportunity to significantly bridge the population vs. geographic coverage gap.

1.2 Given the importance of passive infrastructure for network deployment and the expected growth of 5G wireless, are the right provisions in place for governance of these assets?

***Answer**:*

3GPP Release 14 defines three broad "use-cases" for 5G – eMBB (Enhanced Mobile Broadband), URLCC (Ultra-Reliable and Low Latency Communications) and mMTC(Massive Machine-type Communications). While these use-cases have widespread potential applications in rural as well as urban environments, we believe the business cases driving deployment of 5G networks will likely prioritize deployment of 5G in urban areas, particularly in large Canadian cities.

With the high performance/ high bandwidth expectation from 5G for the three use-cases defined above, as well as operation in sub 6GHz and mmWave spectrum (30GHz to 300GHz), density of sites will increase manifold. Wireless access, defined as the Radio Access Network (RAN), is the largest capital cost associated with building a 5G network. The RAN implementation not only requires radios equipment itself, but also physical infrastructure (sites, power, etc.) as well as high performance/ high bandwidth transport to connect this radio equipment to the core control network and to carry aggregated data back and forth. Access to roof-top sites, towers, as well as municipal controlled assets such as utility poles, other street furniture, etc., and rights-of-ways is essential to the deployment of 5G networks.

Policies for Municipal Access Agreements and governance are currently unclear and will need to be in place for the large numbers of public small cells including in-building coverage needed for 5G. We believe that ISED, the CRTC and the Federation of Canadian Municipalities (FCM) needs to take a leadership role in creating such a national framework to enable 5G deployment in an expeditious manner.

2. Competition, Innovation, and Affordability

2.1 Are legislative changes warranted to better promote competition, innovation, and affordability?

***Answer**:*

It is anticipated that the cost of transmitting a unit of data will be much lower in 5G as compared to 4G which will benefit all stakeholders. Data needs, driven by new and innovative applications for public safety agencies (especially video), will likely continue to increase bandwidth demands by first responders. Our view is that spectral efficiency should be an important consideration in 5G deployments. This objective should be balanced with first responder requirements for resiliency, reliability and end-to-end security. Fragmentation of spectrum assets (between public carriers and private networks) would increase the cost of data delivery. Maximum spectral efficiency is more likely to be achieved by pooling of spectrum resources and utilizing advanced technological methods such as carrier aggregation, utilizing

HetNets (licensed and unlicensed spectrum bands) and other similar approaches, along with priority and pre-emption for PSA's in times of congestion.

3. Net Neutrality

3.1 Are current legislative provisions well-positioned to protect net neutrality principles in the future?

Answer:

While net neutrality principles are essential, protection of lives and ensuring the safety of citizens are of highest priority especially during a disaster/ emergency situation

Priority access and pre-emption for public safety and emergency management broadband traffic should be provided (when necessary) by all broadband wireless carriers (4G/LTE and future 5G) through the proper configuration of their congestion management algorithms such as those described in 3GPP Specifications TS 36.331, 3GPP TS 23.203 and 3GPP 23.401.

It is important that these features be considered part of standard broadband wireless internet traffic management practices, and not be considered as a negative with respect to net neutrality standards. After all, public safety and emergency management officials will rely on these features to protect the public and mitigate the effects of major events.

4. Consumer Protection, Rights and Accessibility

No submission.

5. Safety, Security and Privacy

5.1 Keeping in mind the broader legislative framework, to what extent should the concepts of safety and security be included in the *Telecommunications Act/Radiocommunication Act*?

***Answer**:*

A single set of standardized policies, perhaps "one national standard" should be in place, to enable interoperability and homogenous policies across jurisdictions to ensure ease of operations in disaster situations.

We recommend that Part I (General) Section 7 (Objectives) of the Telecommunications Act be amended to include specifically the needs for public safety and emergency management in addition to the protection of privacy in bullet (i).

6. Effective Spectrum Regulation

6.1 Are the right legislative tools in place to balance the need for flexibility to rapidly introduce new wireless technologies with the need to ensure devices can be used safely, securely, and free of interference?

***Answer**:*

With respect to the allocation of Band 14 (700 MHz) for public safety purposes, we recommend that all mobile broadband wireless devices procured for the purpose of public safety and emergency management beginning in 2019 should include the capability for accessing that spectrum, without regard to whether Band 14 is deployed locally. This will ensure that the devices can be used with deployable systems wherever they are needed without the need to "warehouse" special devices with such deployable systems. The result is the potential to reduce overall costs while providing readily available communications systems that can be deployed when and as required nationally.

In addition, when public funds are used to construct new wireless towers (and backhaul), there should be a requirement to deploy Band 14 spectrum base stations at the time of construction. Thus the (new) National Broadband Fund can contribute to rural/remote wireless broadband and include PSAs at the same time.

7. Governance and Effective Administration

7.1 Is the current allocation of responsibilities among the CRTC and other government departments appropriate in the modern context and able to support competition in the telecommunications market?

***Answer**:*

PSBN Consulting believes that the CRTC (as a Regulator) has demonstrated leadership in enabling efficient management of telecommunications and radiocommunications as per the current objectives Part I (General) Section 7 (Objectives) of the Telecommunications Act. As an example, we commend CRTC's leadership role in the driving the proposed roadmap for NG9-1-1.

7.2 Does the legislation strike the right balance between enabling government to set overall policy direction while maintaining regulatory independence in an efficient and effective way?

***Answer**:*

We believe that there is room for improvement. While the CRTC mandates for target dates for implementation of NG9-1-1 is a positive example, the establishment of a Public Safety Broadband Network (PSBN) in Canada is lacking any timeline for deployment which has the potential to cause Canada to fall behind in the North American public safety space.

The USA and Canada share a 9000 km terrestrial undefended, open border and 90% of the Canadian population live within 160 km of the US border. That itself, we believe, is reason enough to ensure Canadian public safety communication systems are enabled to interoperate with the USA agencies during cross-border emergencies. A lack of enablement and strong leadership will likely create a fragmented North American strategy which is detrimental to the safety and security of Canadians.