

**Maritime Radio Communications Initiative Response to**

**Notice SMSE-018-10**

**Consultation on a Policy and Technical Framework for the**

**700 MHZ Band and Aspects Related to Commercial Mobile Spectrum**

**1.1 Introduction**

The following submission in response to the Industry Canada Consultation on a Policy and Technical Framework for the 700 MHZ Band and Aspects Related to Commercial Mobile Spectrum is provided by the responsible agencies of the provinces partnering to form the Maritime Radio Communications Initiative (MRCI). The collaborating provinces' agencies responsible for both emergency management and infrastructure management have been party to the development of this response, thus it represents a broad scope of expert contribution.

**1.2 MRCI Background**

On August 31, 2008 the responsible Ministers of the governments of New Brunswick, Nova Scotia and Prince Edward Island signed a Memorandum of Understanding to explore feasibility of a single, shared, regional mobile radio communications system. Each of these Maritime Provinces almost concurrently required upgrades to, or replacement of their respective mobile radio systems; this situation presented a rare opportunity for partnering. The effort was termed: 'Maritime Radio Communications Initiative' (MRCI) and the process of writing a specification began. The Regional Office of Industry Canada had previously recommended that each province use the public safety-designated 700MHz band for their go-forward solutions.

In the fall of 2009 the three governments approved a joint procurement approach for a single system which would serve the needs of approximately 15,000 users in the three Provinces, and a Request for Proposals (RFP) was subsequently released through the Nova Scotia Procurement Office on August 12, 2010. The RFP is scheduled to close in 2011, after which proposals will be evaluated and further decisions will be made by the partnering agencies.

### **1.3 Executive Summary**

1.3.1 It is the considered opinion of the MRCI partner agencies that it is imperative that Industry Canada not auction the 10+10 MHz of 700 MHz spectrum equivalent to the 'D' block in the United States but rather hold that entire band for future applications by the public safety/public service community in Canada. In so doing, there is reasonable certainty that the Canadian spectrum allocation will align with the United States allocation allowing for full and essential interoperability both between adjacent Canadian provinces and territories and across the international border as required.

1.3.2 With the realization of the P25 Standard for interoperable radio equipment currently growing in prominence in North America, it is critical that the spectrum on which to implement that standardized equipment also be made available in Canada. The MRCI partners cite numerous specific examples of how the 700 MHz broadband spectrum might eventually be utilized in the text of the responses to the questions posed.

1.3.3 It should also be noted that the MRCI partners have experience with contracting with a commercial infrastructure provider for primary voice communications in the 800 MHz band. While the overall experience has been satisfactory, the initial few years were extremely

challenging as the public safety community was repeatedly required to educate a succession of managers on the meaning of providing a public safety class communications service with a best-commercial-effort mentality. Following that steep learning curve period, operations were relatively static and few issues arose for a number of years, until the commercial provider chose to consolidate key roles, taking them from the local presence to corporate offices entirely outside the region. Once again the challenges have surfaced and are now frequently compounded by the sheer distance between the service provider and the user community, making face-to-face resolution difficult.

1.3.4 In summary, the MRCI partners advise that public safety must be provided the contiguous spectrum resources required in the IC-designated 700 MHz band in order to safely and effectively provide for the safety and protection of the Canadian public in the short term for voice communications and in the longer term for broadband applications that undoubtedly will be made available through research and development by commercial entities. The MRCI partners are fully cognizant that partnership arrangements with commercial carriers may ultimately be required to realize the capital investment required to take advantage of the opportunities provided by the broadband spectrum, however the terms of partnership must be developed with public safety always having first priority for service and capacity.

**Maritime Radio Communications Initiative Response to  
Canada Gazette, Part I, November 30, 2010  
Notice SMSE-018-10  
Consultation on a Policy and Technical Framework for the  
700 MHz Band and Aspects Related to Commercial Mobile Spectrum**

This response references the numbered questions in the Consultation document beginning with **5-1** on page 22 through **10-1** on page 45:

**5-1.1** Although only one of the three MRCI partner provinces shares a direct terrestrial border with the United States (Maine/New Brunswick), it is the position of the MRCI partners that because of the potential for Maritime based 700 MHz radio users from any part of the region to need to operate and interoperate with public safety partners in New Brunswick and the State of Maine it is important that the Department adopt **Option 1 – Harmonization with the US band plan**.

5-1.2 Because the MRCI project is currently in the Request For Proposals stage and equipment acquisition could begin as early as fourth quarter 2011, it is important to the MRCI partners that there be no obstacles encountered in the availability of radio equipment. It is the considered position of the MRCI partners that the US radio equipment market is so large relative to the Canadian market that it would impose unacceptable delays for Canadian users to require different equipment than what is configured and available for the USA.

5-1.3 The MRCI partners are adamantly opposed to **Option 3 – Harmonize with the FDD APT band plan** as this presents too many obstacles to cross-border interoperability and early availability of compatible equipment; it also significantly undermines the ability to utilize the portion of the 700 MHz band already designated for public safety narrowband service. **Options 2a and 2b: US band plan with adjustments** would be acceptable to the MRCI partners, however they both sufficiently misalign with the US plan as to present obstacles to real-time interoperability. Further, the misalignment in Options 2a and 2b requires Canada-specific equipment, which negates the economy of scale of the large USA market. Finally, it is the considered position of the MRCI partners that the US Band plan will ultimately retain the much debated ‘D’ Block in the USA for public safety broadband licensing.

**5-2.1** It is the considered position of the MRCI partners that the Department must not auction, but rather retain the 1 MHz guard bands to ensure sufficient isolation between the proposed unrelated uses. As future technologies and actual usage patterns develop it may be appropriate for the Department to eventually consider licensing these guard band frequencies for compatible applications, but in the interim the isolation must be ensured.

**5-3.1** Currently, the public safety/public service agencies in the Maritime Provinces do not make extensive use of radio spectrum for broadband applications. Several agencies make limited use of the commercial cellular networks for AVL, telemetry applications, and VPN internet connections for email. The demand for broadband radio spectrum is expected to grow dramatically as new applications and user equipment are developed and opportunities are realized by the public safety community. Because of the current limited usage, it is difficult to respond accurately to this question, however through the preliminary outcomes of a recent public safety workshop on broadband usage, the MRCI offers the following best estimates of spectrum requirements:

5-3.2 It is the considered position of the MRCI partners that there will be a clear need for two contiguous 10 Mhz blocks of spectrum (10 MHz uplink and 10 MHz downlink) in the 700 MHz band for broadband applications by primary responders for personnel GPS, AVL, CAD, status keeping, building floor plans, hazardous materials information, live incident video transfer, medical telemetry for remote consultation, etc. The Long Term Evolution (LTE) protocol has been widely adopted by both the public safety and commercial communities for broadband applications and offers the most expeditious approach to getting applications in the field where they can begin to impact the public safety. In order to effectively utilize LTE for the data applications one can reasonably envision within the public safety community, the 10+10 MHz of spectrum for broadband in addition to the 8+8 MHz as described in SRSP 511 Issue 2 for narrow and wide-band voice is essential. We would refer the Department to the chart entitled Call For 20 MHz of Spectrum for Public Safety Broadband developed by CITIG in consultation with the user community and industry subject matter experts, which can be found at:

<http://www.citig.ca/Data/Sites/1/action700/700mhzspectrumneedschart-v2.pdf>

- (a) Because of the current unavailability of any wireless broadband capacity outside of the shared commercial capacity and coverage throughout the Maritime Provinces it is difficult to project an accurate deployment model or schedule. Many agencies have notional ideas about the applications for which the proposed spectrum might be used, and many have been exposed to the myriad opportunities presented at national and international conferences, however without designated spectrum and no infrastructure in place, it has been difficult to accurately predict the rate and depth of uptake of the possibilities. Clearly one of the primary implementation constraints beyond available spectrum and infrastructure is the availability of funding to acquire the hardware,

application software, training, and support required to successfully deploy a broadband network.

- (b) It appears that there is no suitable alternative spectrum available on which to build a broadband public safety network. The Department has intentionally directed new public safety applicants to the 700 MHz band despite the additional infrastructure cost incurred relative to operation in lower bands (IE. 150 MHz or 450 MHz). It is vital that the spectrum available for broadband data applications be contiguous with the spectrum for priority voice usage to ensure compatibility between all equipment expected to be employed, thus it would seem that the recently cleared upper 700 MHz band is the only reasonable spectrum to which this application could be directed. Furthermore, 700 MHz appears to offer the best trade-off between building structure penetration and open space range, which is critical to the public safety community which must operate in the broadest possible scope of situations without any choice. Available bands in the higher (IE. 4.9 GHz) part of the spectrum are far too limited in range to be acceptable for operational public safety purposes.

**5-4.1** Voice communications interoperability is a critical capability which public safety has struggled with for decades both within jurisdictions and agencies and externally.

- (a) Voice and broadband interoperability between various Canadian jurisdictions, across first responder disciplines, and throughout every level of authority is absolutely essential for successful mitigation, response and recovery from incidents that place the safety of the public at risk. SOREM (Senior Officials Responsible for Emergency Management) recently approved the Communications Interoperability Strategy & Action Plan for Canada that provides the framework and direction for going forward with interoperable systems of systems; having spectrum available to include broadband data applications along with voice is absolutely essential.

- (b) Broadband interoperability between Canadian and US public safety agencies is slightly less a concern for the MRCI partners than in other parts of the country because of the limited terrestrial border between the three Maritime Provinces and the State of Maine. That said, there is currently substantial investment being made in technology and training by the International Border Enforcement Team in New Brunswick and the State of Maine, thus the ability to share strategic information over an interoperable broadband network would be of great interest to those partners, primarily RCMP, CBSA and their counterparts in the USA. Whereas there seems to be growing US federal government support for designating several MHz of the 700 band for public safety broadband communications, it only seems reasonable that the

Department would adopt a similar strategy, or at least hold in reserve the equivalent spectrum until a clear plan is decided by the USA.

**5-5.1** The primary challenge faced by public safety agencies today in establishing cross-border interoperability is the inconsistent and insufficient allocation of spectrum in contiguous blocks in bands other than the relatively newly available 700 MHz band. Until relatively recently, there were few applications readily available to utilize broadband wireless spectrum, thus the demand for contiguous spectrum was nonexistent when the lower frequency bands (IE. 150 MHz, 450 MHz) were being licensed by the Department for public safety agency use. The rate of technology development, its deployment in the huge commercial market, and the resultant falling cost of devices and applications means that public safety is now able and ready to adopt these contemporary technologies and the spectrum to enable it must be available.

**5-6.1** It is the considered position of the MRCI partners that in general the broadband communication needs of the public safety/public service community cannot be acceptably met by using commercial systems with priority access rights at commercial rates. Commercial networks are designed and implemented to service a sufficiently high traffic community to realize an acceptable return on investment. Thus in less populated areas, which comprise a significant part of the land mass of Canada, and the Maritime Provinces in particular, commercial wireless systems typically offer neither the coverage nor the capacity required for consistently acceptable service to public safety users who do not have a choice about where they conduct their business.

- (a).i While the MRCI partners recognize that technology may exist to allow commercial carriers to offer priority access to authorized public safety users on commercial networks, we also have firsthand experience with operation of public safety communications systems on commercial infrastructure. There are several circumstances that can be cited to illustrate the disconnect between the needs of public safety communicators and service levels acceptable to commercial carriers.
- .ii One example is the current Nova Scotia situation where the public safety/public service radio communications network is owned and operated by Bell Aliant/Mobility with the province being the anchor tenant. The backhaul provided by Aliant uses their fibre-optic network which for the most part is arranged in ‘self-healing’ ring architecture. Where this is the case, few interruptions of the backhaul have been experienced, however in the more remote, less populated parts of the province the ring architecture is not employed in favour of less costly ‘spurs’ servicing one or more radio repeater sites with aerial cable. There have been numerous cases of motor vehicle collisions, pole fires, and

excavations severing these spur fibre-optic lines and isolating substantial pieces of geography from the trunked radio network.

.iii The commercial carrier standard of service is generally described as ‘best commercial effort’ which is simply not acceptable to the public safety wireless user whose own life and/or those of the public being served is often dependent on reliably available voice and/or data communications.

.iv Finally, the Nova Scotia experience would suggest that the level of understanding and willingness and ability to quickly react to rapidly evolving emergency situations to provide spectrum access for public safety response would never be acceptable. The commercial carriers will, without doubt, purport that they can and will be able to provide the timely access required on their networks, but we do not have a record that reflects that position. Furthermore, in the scenario where a cellular call is preempted in order to provide spectrum to a higher priority user, what is the outcome if the cellular caller was placing a critical call to 911, for example? And how does the commercial carrier differentially allocate spectrum for a police officer doing a vehicle registration query and a para-medical transmitting critical patient information to an ER physician? It seems that the risks outweigh the benefits of spectrum sharing.

- (b).i The main concern of the MRCI partners with commercial system operators meeting public safety technical and operational requirements on commercial systems is the fact that commercial wireless communications systems are built and provisioned to realize the best return on investment for the carrier. This certainly does not align with public safety priorities for service either in terms of capacity, reliability, redundancy or coverage. At the fringes of the commercial broadband network, there certainly will never be capacity equivalent to that available in the metropolitan areas; this has little impact on the routine commercial carrier clientele, however disastrous incidents do not only occur in populated, well serviced areas in this largely rural country. The SwissAir 111 plane crash at Peggy’s Cove, Nova Scotia is an excellent example: although this community is less than 50 km from the largest metropolitan community in the Maritime Provinces (Halifax) the cellular capacity and the public safety radio system capacity of the day were woefully inadequate and remained so for days until additional cellular capacity could be provided by the telephone service provider. The conventional public safety radio system of the day was not capable of any capacity increase and has subsequently been completely replaced.
- (c).i It is the considered position of the MRCI partners that there is no regulatory mechanism that could adequately mitigate the sorts of disconnects possible between the priorities of commercial carriers and those of the public safety community. The only

mechanism that could have any impact on the commercial carrier is a fiscal penalty, but the reality is that a financial penalty does not address the immediate lack of acceptable service which is what public safety requires. The infrequency of high capacity demand by the public safety community would simply allow the commercial carrier to absorb the financial penalty in the rare occasions when it might be assessed, but that offers no redress to the public safety responder who has inadequate service where and when it is most required.

**5-7.1** In many areas of Canada the term ‘regional’ refers to groupings of jurisdictions within a single province, however in the MRCI context, regional refers to the assemblage of the three Maritime Provinces. Whereas the MRCI is itself a region-wide wireless project, it provides an excellent model to illustrate the need for regional (multi-provinces) networks – whether strictly voice or both voice and broadband. In the MRCI case, the partnering provinces recognize the value and benefits of cooperation and coordination and understand that the only feasible way to achieve the scope of interoperability desired by the public safety/public service community is through collaboration. The MRCI partners have already advised Industry Canada that they are prepared to provide the access governance required to successfully manage and operate this regional voice communications system and have requested authority to allow or restrict access and priorities to public safety and public service agencies, as they deem appropriate to ensure public safety in the region. Whereas the three provinces will be making the most investment in the MRCI system, they also have the highest vested interest in ensuring sufficient capacity, coverage, and capability to service both the high priority needs of the first responder community and the less demanding needs of the public service community through establishing access priority levels and user radio programming (fleetmapping). The same concept applies to the broadband aspects of a shared system; there may be differences between voice and data priorities across different agencies, however through cooperation and collaboration these should be resolved successfully. The Department must be prepared to undertake the effort required to ensure the availability of contiguous spectrum on a regional basis and the ability of authorized public agency users to roam indiscriminately throughout the region.

**5-8.1** As with the regional requirement for common spectrum for voice and broadband across the Maritime Provinces realized through the MRCI project, there is an accompanying requirement for the broadband network to extend beyond the Maritime Provinces to include the Province of Quebec and beyond, if feasible. The MRCI partners can speak only from the user perspective and thus cannot comment accurately on the technical possibilities of a national broadband network, however the potential benefits are substantial. The ability to convey high-

quality images of abducted children across the country or to poll databases in head offices of national corporations are but examples of how a national broadband network might be employed. As with previous comments, it is difficult to predict a need for a resource where there has never been a capability, however generally when a capability is created, the public safety community will find valuable applications to take advantage of it.

**5-9.1** In response to **5-1** the MRCI partners indicated their preference for Option 1, **Harmonization with the US band plan**. With that position taken, we would recommend adoption of Option 3 as illustrated and described in **Figure 5.10 – 700 MHz Public Safety Spectrum – Option 3** which harmonizes with the US band plan and includes the ‘D’ Block. In closely following the ongoing debate in the USA and observing the recent licensing of 700 MHz broadband spectrum by the FCC through granting of ‘waivers’ it is the considered opinion of the MRCI partners that the FCC will ultimately allocate the ‘D’ block to the public safety community, for use through partnerships with commercial users if necessary, but maintaining control over its deployment. This aside, having done significant research in preparation for the MRCI project, the partners do not believe that 5+5 MHz of spectrum offers sufficient capacity for the type of broadband applications that are likely to be available to the public safety community in the near future, and it is critical that contiguous spectrum be available for both broadband data and priority voice traffic. A recent workshop commissioned by the DR&DC Centre for Security Science and conducted by Fiorel Inc. through Martello Defence & Security Consultants Inc. provides a comprehensive but conservative estimation of the broadband spectrum required for reasonably anticipated public safety communications. It concludes that 10+10 MHz is the minimum contiguous spectrum allocation that would be acceptable, with the suggestion that even that amount will be insufficient in the foreseeable future.

5-9.2 Finally, we have fully expressed the shortcomings of public safety partnerships with commercial carriers in the response to question 5-6 and need not reiterate them here.

**5-10.1** The MRCI partners have been clear in rejecting the concept of commercial carriers being expected to provide any sort of satisfactory priority broadband service to public safety on shared spectrum. In the event that the Department chooses to move in that direction the MRCI partners believe that the largest Tier 1 model is the most appropriate to meet the needs of the public safety community, with nothing less than a Tier 2 model being acceptable. The mandatory roaming nature of public safety users across jurisdictions and throughout larger regions requires larger and consistent networks in order to successfully carry out their mandates. Using a smaller Tier 3 or Tier 4 model only provides benefit to the smaller commercial carrier allowing them to enter a

market that would otherwise be too costly to access; profitability is not a driver for public safety, thus harmonization of spectrum and universal network access is the priority for public safety.

**5-11.1** The MRCI partners categorically reject the APT band plan as specified in the answer to question 5-1 and offer no further comment on this option.

5-11.2 The MRCI partners would not adamantly oppose the Department delaying a decision on allocation of the 758-763 MHz and 788-793 MHz bands (the USA 'D' Block) until a final decision is reached in the USA, however we would add that regardless of how that spectrum block is finally utilized, it is ultimately intended for use, at least in part, by public safety. If no large commercial partner was willing to step up to the FCC auction in the USA, it seems highly unlikely that a large enough player will step forward in Canada with a much larger geography to cover and a much smaller population to service. There simply is no acceptable business case to encourage commercial carriers to enter into the sort of service model required by public safety.

**5-12** The MRCI partners have no further comment on this question.

**5-13** The MRCI partners have no further comment on this question.

**5-14** The MRCI partners have no comment on this question.

**5-15** The MRCI partners have no objection to the Department permitting low-power licensed devices such as wireless microphones to operate in the 698-764 MHz and 776-794 MHz bands until March 31, 2012. The MRCI partners do however, believe that there are substantial quantities of low-power unlicensed devices operating in this spectrum and that the Department must take an aggressive and proactive approach to notifying those entities potentially infringing on this spectrum in a more public fashion than is typically used (IE. the Canada Gazette). The reality is that these low-power devices will probably not negatively impact the higher-power public safety radio communicator, but that the opposite will be the case and there will be resultant outcry from the performing arts and presentation communities that will be negatively impacted by public safety communications.

**6-1** The MRCI partners have no comment on this question.

**6-2** The MRCI partners have no objection to the spectrum utilization policy proposed by the Department.

**7-1** thru **10-1** The MRCI partners have no comment on these questions.

The foregoing is respectfully submitted on behalf of the Maritimes Radio Communications Initiative partner agencies by:

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