



December 1, 2016

Mr. Martin Proulx
Director General, Planning and Standards Branch
Spectrum, Information Technologies and Telecommunications Sector,
Innovation, Science and Economic Development Canada
(Submitted by email: ic.spectrumengineering-genieduspectre.ic@canada.ca)

Dear Mr. Proulx,

Re: Notice of Engagement Regarding the 600 MHz Transition Plan Objectives and Methodology

The Radio Advisory Board of Canada is pleased to respond the Notice of Engagement Regarding the 600 MHz Transition Plan Objectives and Methodology. At the request of ISED officials, the Board established the creation of an ad hoc working group that included participation from RABC members, non-members and ISED staff, to facilitate discussions of technical factors regarding the transition of OTA TV stations. Further, the Board has undertaken a review of the Department's proposals that were presented to the RABC 600 MHz ad hoc working group on September 30, 2016.

The attached response was balloted to Board members. Sixteen of the RABC's twenty-one members responded as follows: 9 approved, 3 approved with comment and 4 abstained.

The Sponsor Member's comments (which form an integral part of the RABC's response) are as follows:

Canadian Association of Broadcasters

The CAB approves the RABC response to ISED's Notice of Engagement Regarding the 600 MHz Transition Plan Objectives and Methodology. Some CAB members provided comments to underscore the urgency and importance of reimbursement of costs to Canadian TV stations to address the economic impacts and aggressive time schedule of the proposed joint Canada/US transition plan.

Defence Canada

DND systems are not affected by this plan.

RCMP

The RCMP is not impacted by the 600 MHz proposed "TV Transition Objectives and Methodology transition plan". That said, we do support RABC's positions, conclusions and proposed response to ISEDC's Notice of Engagement Regarding the 600 MHz Transition Plan.

The Board appreciates the opportunity to respond to this important notice.

Sincerely,

A handwritten signature in black ink, appearing to read "J. D. Farnes".

J. David Farnes
General Manager

Attachment

RABC Response to ISED

RE: “Notice of Engagement Regarding the 600 MHz Transition Plan Objectives and Methodology, Published October 31, 2016”

Introduction

The RABC is pleased to provide its comments in regard to the above Notice and the ISED Presentation, “600 MHz – Proposed TV Transition Objectives and Methodology”.

The objectives and methodology proposed by ISED include many elements to develop a transition plan that is complementary to the US transition plan while incorporating some of the factors which are unique to Canada. The RABC acknowledges the efforts made by ISED to address the needs of Canadian TV stations to transition to newly assigned channels upon conclusion of the US Incentive Auction. The RABC recommends that the following input be incorporated to ensure a smooth and successful repacking of the 600 MHz band:

- The “Station Transition Activities” and other elements of the methodology should include additional detail to determine the duration of scheduled phases in the transition plan to account for the application and approval process, the site specific complexity of work required, as well as related construction work for other site upgrades.
- A single set of rules is needed to ensure that interference analysis and coordination is uniform and consistent. The Canadian objectives should be incorporated into the Phase Assignment Tool used to assign stations to phases.
- Canadian stations should be given the maximum amount of time possible when determining the number of phases and duration of phases. Broadcasters will require sufficient time after they are notified of channel changes to determine site complexity and explore cooperative solutions with other TV stations.
- Broadcasters should not have more than four stations scheduled for transition in the same or overlapping phases.
- Maximum flexibility should be afforded to stations to account for delays in implementing the transition to new channels. Unforeseen delays in one scheduled phase may create delays in subsequent phases.
- Canadian stations should not be forced to shut down operation and the distribution by BDU’s must remain unchanged.
- The transition plan should allow for the use of future transmission standards such as ATSC 3.0.
- Reimburse affected Canadian broadcasters for the cost to change channels as a result of repurposing the 600 MHz Band for mobile services in the US and Canada to facilitate the joint US / Canadian transition. Without reimbursement, Canadian broadcasters suffer a disadvantage compared to US broadcasters. There will be tremendous competition across Canada and the US

for timely delivery from antenna and equipment vendors and access to tower companies that have the specialized crews and equipment to install broadcast TV antennas. The current currency exchange rate only exacerbates the current funding disparity between Canadian and US broadcasters.

Specific Comments Regarding the ISED Presentation:

1. Overarching Objectives

1.1. The RABC supports the overarching objectives listed in the ISED Presentation and in particular, the flexibility needed to account for both foreseen and unforeseen issues such as TV and radio ratings periods, inclement weather, equipment manufacturing delays, construction delays and technological change.

1.2. The RABC Broadcasting Committee notes that in the absence of funding to reimburse Canadian broadcasters for the costs associated with repurposing the 600 MHz Band, Canadian TV stations would be at a disadvantage to US TV stations and it would be harder to complete the transition on time and in step with the US.

1.2.1. The primary overarching objective of affected TV stations is to be reimbursed for the cost to change channels (at the government's behest) as a result of repurposing the 600 MHz Band for mobile services. In the US, \$1.75B has been set aside to reimburse TV stations that are forced to change facilities and switch channels as a result of the US Incentive Auction. A similar mechanism to that being used in the US could be used to identify eligible costs for reimbursement in Canada. Having a predictable and timely source of funds available to reimburse Canadian stations will be important to ensure that the Joint Transition Plan can be completed successfully at the same time as US stations.

1.2.2. Canadian broadcasters will not find out which of their stations will be given new channel assignments until the schedule for the Joint Transition Plan has already started. Further, broadcasters can only determine the complexity and costs associated with switching channels for each of their affected stations once the new channel assignments are known. Without a funded transition, Canadian broadcasters will need extra time to perform the additional step after the conclusion of the US Incentive Auction of estimating costs and attempting to have them included in the annual budgets of their respective companies for the upcoming three to five fiscal years.

1.2.3. The Decision by ISED to jointly reduce and repack the television spectrum in order to repurpose the 600 MHz Band for mobile services will create unprecedented challenges to complete the transition at the same time as US broadcasters. In particular, the short time span to complete such a large undertaking will create enormous time pressure to develop engineering solutions and compete for limited technical resources. Canadian broadcasters may be forced to compromise quality and equipment choices to meet the deadlines.

1.2.4. In contrast, US TV stations will have an advantage because they will be reimbursed US\$1.75B to change channels of operation. This secure funding in the US will allow US TV stations to select the designs and products best suited to their needs allow them to procure

the technical resources best qualified to perform the work, and facilitate options that minimize disruption to viewers.

- 1.3. Once the new Joint Allotment Plan is known, the main objective for broadcasters will be to retain their ability to serve their audiences with the best choice of technology at that moment in order to pursue their business or mandate. Therefore, recognizing that the Joint Transition Plan will take more than three years to complete, it has to be technically possible to continue broadcasting using the current standard for digital television (ATSC 1.0) and any other new voluntary or experimental standard such as ATSC 3.0.

2. Proposed Transition Approach

- 2.1. The RABC supports the proposed phase-based and regional/market-based approach to scheduling the order in which stations change channel. This will have the benefit of reducing the impact on viewers and presumably shortening the duration of temporary interference during transition.
- 2.2. The RABC does not oppose the proposed station priority to schedule channel changes. However, it is important to note that the station priority is different than what the FCC has proposed in the US where stations in the 600 MHz Band will be scheduled to earlier phases. This may result in a longer than necessary period of temporary interference to Canadian stations close to the US border. The RABC encourages the Department to ensure that the station priority and scheduled phases are complementary between the two countries so that the duration of temporary interference is taken into account.
- 2.3. It is acknowledged that temporary technical rules and temporary interference are unavoidable during the transition. It must be emphasized that the duration of temporary interference is as important a factor as the extent of interference. Unlike analog television where a viewer may experience degraded picture and sound quality, some DTV viewers will not be able to receive some of their channels for an extended period of time. This may impact the ratings, hence revenue, of conventional TV stations who are competing for advertising with specialty channels unaffected by this transition.
- 2.4. The RABC agrees with the Department that the use of temporary channels will generally not be used except where justified, necessary and not prohibited by cost and by resource availability. There may be special cases where the use of a temporary channel may improve the continuity of on air operations or provide greater efficiency to complete the transition for some stations. However, it is recognized that the use of temporary channels will increase the costs, resources and time necessary to complete the transition.
- 2.5. The RABC agrees and emphasizes that a timely application process is essential to the success of the Joint Transition Plan. Broadcasters will need as much advance notice as possible of their new channel assignments, operating parameters and schedule so that applications and engineering briefs are prioritized. Similarly, the CRTC and ISED will need to prioritize the review and approval of applications to align with the schedule, not in the order in which they are received. It also must be clear at the outset what the rules and process will be if a station proposes to modify or

increase its operating parameters from those initially assigned by the Joint Allotment Plan. Undue processing time or delay in the approval of applications will delay the schedule of each phase and each subsequent phase of the Joint Transition Plan. Typically, the antenna and equipment needed for a channel change cannot be ordered until the application by a broadcaster has been approved by both the CRTC and ISED.

- 2.6. A standardized model should be used for all cases, i.e. the interference analysis should be based on a terrain-sensitive method, such as the Longley-Rice propagation model, using the appropriate time and location statistics. This analysis should use one model for both Canada-Canada and Canada-USA coordination, and should take into consideration the usage of the front to back ratio of the receive antenna. Note: Current comparisons are made after applying the antenna discrimination effect for both BPR-10 and OET69, which should remain consistent.

3. Station Dependencies & Daisy Chains

- 3.1. As stated in Section 2 above, the RABC agrees that the use of temporary channels will generally not be used except where justified, necessary and not prohibited by cost and/or resource availability.

4. Transition Plan: Phases

4.1. Assigning each station to a phase:

4.1.1. The ISED Presentation proposes that stations will be assigned to a phase in the Joint Transition Plan through optimization techniques based on rules and objectives. However, the Department has not specifically stated what the rules and objectives are, or how they will be applied. In the US, the FCC has proposed nine *constraints* (rules) and four *goals* (objectives). The FCC Phase Assignment Tool must satisfy all nine *constraints*, then best fit of four prioritized objectives when assigning stations to a phase. The Department should formally incorporate the Canadian objectives into the Phase Assignment Tool so that the Joint Transition Plan will reflect the priorities of Canadian broadcasters and viewers.

4.1.2. The RABC suggests that ISED incorporate a constraint that limits the maximum duration of temporary interference to a specific period of time and modify the FCC Constraint #9 which prevents use of temporary channels where justified. Further, the RABC suggests that ISED modify the FCC Objective #1 to restrict the duration of temporary interference to Canadian stations from US stations which move to new channels to vacate the 600 MHz Band.

4.2. Scheduling of phases:

4.2.1. The RABC supports the Department's proposal that total time estimates for stations within a phase to complete their transition should be based on modelling transition activities and accounting for limited resources. It is not clear how ISED proposes to model the complexity of station channel changes because the details can only be fully determined when TV stations are informed of their new channel assignments. Further, the scheduling of phases should incorporate flexibility to account for television and radio ratings periods as well as

unforeseen delays. A delay in the completion of any one phase will require a time extension to be added to complete subsequent phases of the Joint Transition Plan.

- 4.2.2. In no case should a station be forced to shut down operation of its transmitter for reasons beyond its control. During transition, the distribution of conventional TV stations by BDU's must remain unchanged and based upon the existing station coverage and contours.
- 4.2.3. Television broadcasters with multiple stations to transition within the same or overlapping phases must have sufficient time to manage completion of multiple projects at the same time while taking into account limited technical resources (both internal and external).
- 4.2.4. Finally, the total time estimate for each phase must include sufficient time for the preparation of applications and approvals by both the CRTC and ISED. There must be a clear process for stations to propose modifications to the operating parameters generated by the Joint Allotment Plan.

5. Number of Phases

- 5.1. The RABC acknowledges that it may be impractical for all stations within a region/market to switch to their new channels at the same time. We support the Department's efforts to minimize the number of times that viewers must rescan their television sets.
- 5.2. We support the Department's proposal to add more transition phases to extend the deadline for Canadian stations to complete changes of channel. We recommend that ISED provide all Canadian stations with as much additional time as possible to complete their transitions beyond the arbitrary 39 month timetable imposed on US stations.

6. Assignment of Stations to Phases

- 6.1. No Canadian stations will be assigned to transition before Phase 3;
 - 6.1.1. The RABC supports the proposal that phase 3 is the earliest phase to which Canadian stations will be assigned.
 - 6.1.2. It is noted that Phase 3 is scheduled to be completed more than 24 months after the conclusion of the US Incentive Auction. This approach gives Canadian TV stations a greater notification period than the 18 months stated in Decision 8 of ISED's "Decision on Repurposing the 600 MHz Band" published August 14, 2015.
 - 6.1.3. Further, this does not change the other aspect of Decision 8 that "Regular power TV undertakings (in either DTV or NTSC mode) currently operating in the to-be-repurposed 600 MHz band will be permitted to continue using their current channels and modes of operation (i.e. analog or digital) until the spectrum is needed for the deployment of mobile broadband services. Industry Canada will issue a displacement notification only if it is determined that the continued operation of these undertakings will prevent the deployment of new mobile services in the 600 MHz band".
- 6.2. All stations within a region will be assigned to no more than two phases

6.2.1. The RABC agrees with the proposal that stations within a region will not be assigned to more than two phases. The RABC recommends that efforts should be made to ensure that the scheduled phases in a region or geographic area should be adjacent or near-adjacent phases to reduce the duration of temporary interference.

6.2.2. If a broadcaster is required to modify more than 4 stations within a region, then the broadcaster at their discretion should be allowed to request and be granted additional phase(s) / time to complete the conversions. The number of additional phase(s) / time granted should be dependent upon the total number of stations the broadcaster has to convert, within the region.

7. Temporary Transition Rules

7.1. It would be beneficial if ISED/FCC would agree on the Longley-Rice terrain-sensitive propagation model so that there is reduced possibility of different parties (be they regulatory bodies, broadcasters, or broadcast engineering consultants) calculating different population service loss values. Additionally, there are myriad parameters within the Longley-Rice model itself and related data inputs such as terrain databases, census databases, geographic datum, cell size and spacing etc. which could cause disagreements over calculated population service loss values. Ideally, ISED would share a standard set of parameters to use without restricting the use of one software package over another. The chosen propagation model should be available in currently available commercial software.

8. Minimizing the Amount of Work

8.1. No use of temporary channels, unless necessary;

8.1.1. There may be special cases where the use of a temporary channel may improve the continuity of on air operations or greater efficiency to complete the transition for some stations. However, the use of temporary channels will increase the costs, resources and time necessary to complete the transition.

9. Station Assignment Objectives

9.1. Maximize time for Canadian broadcasters to transition their stations;

9.1.1. The RABC supports ISED's proposal to maximize the time available for Canadian broadcasters to transition to switch to new channels and, in many cases, convert from analog to either ATSC 1.0 or ATSC 3.0 DTV transmission. As noted above, the proposal to not schedule the transition of any Canadian stations until Phase 3 of the Joint Transition Plan should give about 24 months minimum notice instead of the original Decision by ISED to only provide 18 months of notice. In addition, it should be expected that there will be unforeseen delays for some stations which will extend the completion of a scheduled phase. Hence, an extension in time may be necessary for subsequent phases.

- 9.2. Assign U.S. stations in “mobile” band to earlier phases; clear U.S. “mobile” band first;
 - 9.2.1. This objective appears to be for the benefit of the mobile industry. It is not clear that this objective will minimize the impact on viewers, benefit Canadian broadcasters or create a more efficient Joint Transition Plan. Ideally this objective would not be applied to US stations in the “mobile” band near the Canada/US border. Doing so may have a greater impact on viewers and television ratings, and increase the duration of temporary interference to Canadian stations.
- 9.3. Minimize number of rescans per market/region;
 - 9.3.1. The RABC supports this objective.
- 9.4. Minimize total number of linked stations (daisy chains);
 - 9.4.1. The RABC supports this objective.
- 9.5. Minimize difference between number of stations in the largest and smallest phases;
 - 9.5.1. The RABC supports this objective.

10. Length of Phases

- 10.1. The RABC supports the Department’s comment that sufficient time must be provided to all stations within a phase to complete the work. We support the Department’s proposal to extend the transition period for Canadian stations beyond the 10 phases in the US to maximize the time available for Canadian broadcasters to complete the transition. As noted above, much greater flexibility is needed in the length of the phases to incorporate unforeseen delays into the transition plan. A delay in the completion of any phase may require extension to the completion dates for subsequent phases.

11. Station Transition Activities

- 11.1. The RABC agrees with the Department’s recognition that the duration of each phase must take into account the complexity and scope of work for each station within that phase. The Department has generated the following list of activities;

- 1) Planning
- 2) Engineering design
- 3) Structural tower analysis
- 4) Permits (e.g. lease, zoning, land-use authority)
- 5) Equipment acquisition
- 6) Coordination of broadcasters within same market
- 7) Tower modifications and antenna installation
- 8) Calibration of equipment and testing

- 11.1.1. The Department has categorized the first five activities as “pre-construction” and the last three activities as “construction”. The Department also notes that some, but not all activities can be carried out in parallel.

- 11.1.2. The RABC wishes to comment on the listed activities and add some activities to the list which must be incorporated to address the scope and complexity of each TV station channel change.
- 11.1.3. First, it is essential to note that TV stations cannot initiate Step 1 until notified of their newly assigned channels in the Joint Allotment Plan sometime after the conclusion of the US Incentive Auction. A final Joint Transition Plan cannot be created simultaneously with the Joint Allotment Plan because broadcasters and ISED will not know the complexity of each station transition until after steps 1 to 3 are completed. It may be possible to generate a preliminary Joint Transition Plan to identify the station dependencies and daisy chains, and assign stations to phases. However, the scheduled duration and completion date for each phase will subsequently have to be extended to take complexity into account once steps 1 to 3 are completed for each station. As noted above, the actual completion date for each phase will have to be flexible and further extended to adjust for unforeseen delays or incorrect assumptions during the course of the transition.
- 11.1.4. Steps 1 to 3, Planning, Engineering Design and Tower Analysis, must be performed sequentially, not in parallel. This can sometimes lead to an iterative process to modify the engineering design if the cost or practicality is unacceptable as a result of the tower analysis or other factors.
- 11.1.5. Site constraints may also force a service relocation which may also require a transmission system redesign. This could entail a search for a new site which may include land acquisition or lease and environmental studies involving new 3rd parties and possibly further delays. In normal broadcast applications this step is usually completed before the application is submitted. A relocation would also require a change in facility for the studio to transmitter link and its associated approval timelines. This essentially could represent a build from the ground up and all the steps have to occur in sequence as well.
- 11.1.6. The planning stage requires sufficient time for cooperative solutions between broadcasters to be explored. This may include, but is not limited to the possible relocation of transmitter sites or sharing of antenna systems and other facilities. However, broadcasters will not be able to investigate these opportunities until their new TV station channel assignments are known.
- 11.1.7. It is only when a successful engineering design has been identified that the TV station can make application to the CRTC and ISED for the change in technical facilities.
- 11.1.8. The RABC recommends that ISED include an additional step after Step 3 to account for the time needed for the CRTC and ISED to review and approve applications. It should be noted that this activity may include simultaneous applications for temporary facilities and operating parameters by some stations to maintain continuity of operations where replacement antennas are needed.
- 11.1.9. Step 4, Permits, and Step 5, Equipment Acquisition, cannot begin until after Step 3 to apply for permits, identify suitable products and solicit quotes. However, TV stations generally cannot place purchase orders for equipment until their application has been approved by the CRTC and ISED. It is at this point that the clock would start to account for manufacturing time and delivery time of the equipment required. It is also important to

note that not all equipment suppliers will necessarily fulfill orders in the order they are received or in the order to meet the transition schedule because there may be conflicting contractual agreements or other preferred customer arrangements. In Canada, there are over 300 regular power and over 400 LPTV stations. In the US, it is estimated that over 1200 TV stations may be changing channel of operation. Never before has there been so much competition for equipment deliveries and limited technical resources in both countries at the same time and in such a short time span. Further, US manufacturers and contractors may be incentivized to fulfill domestic commitments first.

11.1.10. It is assumed that Step 6, Broadcaster Coordination, will be a parallel activity throughout a scheduled phase. As noted, broadcasters will need time in the Planning stage to explore common solutions. ISED will need to provide effective oversight, project management, monitoring and communication on a frequent basis to all affected broadcasters to avoid delays. ISED should ensure that it has sufficient manpower, expertise and financial resources allocated to fulfill these tasks.

11.1.11. Step 7, Tower Modification and Antenna installation, are two sequential sub-tasks within this Step. The installation of transmission line on the tower and replacement combiner systems would also be part of this Step where required.

11.1.12. The RABC recommends that a Step be added after Step 7 to account for “All Other Construction Work”. Depending on complexity, some stations will have to modify or replace buildings, electrical systems and ventilation systems. The scope of this “Other Construction Work” can be substantial. Effectively, it creates a parallel project involving planning, engineering design, tendering for bids, awarding contracts, applying for construction permits, delivery of materials, construction and commissioning.

11.2. Pre-construction;

11.2.1. It will be unprecedented for both Canadian and US TV stations to simultaneously switch channels of operation in such a short period of time. There will be limited technical resources and there will be equipment delivery delays. As well, equipment may not be supplied to broadcasters in the order or priority needed to meet the schedule.

11.3. Construction;

11.3.1. The RABC agrees that the availability of qualified and experienced tower crews may be a limiting factor to complete the transition plan under such an aggressive schedule. It must be noted that not only do tower crews need specialized expertise to install broadcast antenna systems, but also there may be a shortage of specialized tower equipment such as heavy duty winches and gin poles.

11.3.2. It is likely that some Canadian tower companies and crews will provide services and perform work in both Canada and the US. These companies may have incentive to favor US projects if paid more because of the established reimbursement model, high demand for limited resources, and the high value of the US dollar.

11.3.3. Further, many of the same tower companies needed to perform work for television broadcasters during the transition will also be under pressure to complete other tower projects at the same time if these tower companies are service providers to other industry sectors (such as radio and telecommunications)

11.3.4. The RABC requests that ISED share the information that it has available to identify the 22 broadcast tower crews in Canada.

11.4. Other Proposed Considerations;

11.4.1. While the total tower work time may be somewhat reduced for TV stations sharing the same tower, the main efficiency stems from less mobilization time for tower crews to travel between sites and rig towers with installation equipment for work to proceed. It should not be overlooked that some shared tower sites are also used by FM radio stations and other wireless telecommunication services. In some instances, there will be additional work at shared tower sites for these other users if the TV stations need to add or relocate their antenna apertures on the tower.

11.4.2. There will be a wide variance in the amount of time needed to complete work on shared tower sites. Other construction work to address the modification of building, electrical and mechanical systems will equally have a wide variance and introduce the potential for delays in completion of the schedule.

12. Overall Transition Plan Timing;

12.1. One of the most significant challenges to the transition plan proposed by ISED is that the schedule begins immediately after the conclusion of the US Incentive Auction. As currently proposed by ISED, the Joint Allotment Plan and the Joint Transition Plan will be published at the same time.

12.2. Canadian broadcasters must be given sufficient time at the beginning of the transition schedule to determine the complexity of their construction projects, and explore cooperative and common solutions with other TV stations.

12.3. Once the Joint Allotment Plan has been determined, a preliminary schedule could be developed to assign stations to phases. However, the duration of each scheduled phase should not be finalized until broadcasters have had an opportunity to determine complexity and identify preliminary designs.

12.4. The actual completion date of each phase will need to be further extended to account for unforeseen delays, and this will have the effect of extending the deadline on subsequent phases.

12.5. In general, the arbitrary deadline of 39 months to complete the first ten phases of the transition plan appears overly optimistic. Canadian television stations should be afforded as much time and flexibility as possible to properly design their projects and complete construction in an efficient and effective manner.

Conclusion

In summary, the RABC submits that the objectives and methodology proposed by ISED address many of the requirements to develop a transition plan to repack the Canadian TV Band and repurpose the 600

MHz Band. As detailed above, the Canadian transition can be improved by incorporating the following elements:

- Funding to reimburse Canadian broadcasters for the costs associated with changing channels of operation in order to keep step with US broadcasters and the aggressive schedule.
- Additional detail to determine the duration of scheduled phases to account for the application and approval process, the site specific complexity of work required, related construction work for other site upgrades, as well as a specific model for interference analysis.
- Maximize the time available to determine site complexity, explore cooperative solutions, and complete construction projects in an efficient and effective manner.
- Maximize the flexibility to adapt the transition schedule due to delays, and allow for the possible introduction of new DTV transmission standards.

Respectfully submitted by the RABC, December 1, 2016.