File: 3500

2001-02-22

Magalie Roman Salas,
Office of the Secretary
Federal Communications Commission
445 12th Street, S.W.,
Washington, D.C. 20554

Dear Ms. Salas,

COMMENTS OF THE RADIO ADVISORY BOARD OF CANADA

NPRM ET Docket No. 00-258 published January 23, 2001:
Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems.

INTRODUCTION

The Radio Advisory Board of Canada respectfully submits the following comments to the Commission on its *Notice of Proposed Rulemaking (NPRM)* in the above-captioned proceedings.

The Radio Advisory Board of Canada (RABC) is a not-for-profit "association of associations" which represents most sectors of the radiocommunication business in Canada - manufacturers, wireless carriers and service providers, network operators, broadcasters, public safety and national security radio network operators, and users. It provides the Minister of Industry with broadly based advice regarding the management and use of the radio spectrum in Canada.

The RABC believes that it is important to convey its comments on the proposals in the NPRM with a view to assist the FCC in best meeting the long term needs for advanced wireless services of both the U.S. and Canada.

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The RABC commends the Commission for its initiative to explore the use of frequency bands below 3 GHz to support the introduction of new advanced wireless services, including third generation (3G) mobile as well as future generations of wireless systems.

For mobile services involving a high volume of cross-border traffic with the U.S., the generally accepted principle in Canada from service and cost considerations has been to ensure harmonization of spectrum allocations and associated technical standards with the corresponding mobile services in the US. This can be seen from the established spectrum allocations and standards in Canada for PCS, Cellular and SMR mobile radio services, which are fully harmonized with their corresponding mobile services in the U.S.

The spectrum and standards associated with 3G mobile provide the platform for, and represent the genesis of, new wideband and broadband wireless services. The IMT-2000/3G technical standards have been published in several ITU-R M-series Recommendations. ITU-R Study Group 8 has also identified the spectrum requirements for 3G, that being 160 MHz over and above that identified by WARC-92 and this is detailed in the 1999 Conference Preparatory Meeting (CPM-99) Report to WRC-2000. Numerous participants worldwide, including individuals from Canadian and U.S. wireless industries and government, developed these spectrum requirements. We fully anticipate that 3G mobile services will generate significant and increasing cross-border traffic between Canada and the U.S. Consequently, it is important that, in accommodating this spectrum requirement for 3G, every effort be made to ensure that the band plan is efficient, is available in a timely manner and facilitates cost effective roaming in North America and worldwide.

SUMMARY

The RABC supports the recommendation in the CPM Report to WRC-2000, that an additional 160 MHz will be needed by year 2010 if not earlier to support terrestrial 3G services. The RABC believes that the spectrum at 1710-1750 MHz can be paired with 1805-1845 MHz and that 1750-1800 MHz can be paired with 2110-2150 MHz to successfully provide the needed spectrum for 3G. These pairings can support the U.S. marketplace and will also permit subscriber roaming with 3G implementations both within Region 2 and also with other parts of the world.

RABC COMMENTS ON THE COMMISSION'S DOCUMENT NO. FCC 00-455 (BY PARAGRAPH NUMBER)

A. Service Requirements

Para. 18: *Comment on the range of services that may be introduced over time.*

Services may be classified into the following general service types:

- **Speech (circuit switched)**
- **Simple message (packet switched)**
- **Switched data (circuit switched)**
- **Medium speed multimedia (packet switched)**
- **High speed multimedia (packet switched)**
- **High speed interactive multimedia (packet switched).**

Capabilities of current second-generation cellular and PCS systems limit the ability to provide higher speed circuit switched services. Expanded capabilities are being introduced which will provide packet-switched services with bit rates of the order of 40 kbit/s or greater. This will enable data service offerings, such as provision of limited mobile internet access via handheld terminals. However, to achieve the higher bit rates that enable efficient data delivery, full 3rd generation capabilities would have to be introduced.

Comment on technology trends and migration paths to advanced wireless systems? Include cost impacts and other financial effects that the technologies and migration paths will have on manufacturers, operators and consumers?

In North America, there exist three main digital technologies for PCS – GSM-1900, IS-95 (CDMA) and IS-136 (TDMA). Due to the efforts of North American industry and regulators, all have the ability to evolve towards IMT-2000 standards approved by ITU.

Para. 20: *Comment on the types of data services currently being offered and identify projections and growth rates for new service offerings. Are there technical limitations to providing the advanced services? Over what time period(s) do service providers plan to introduce certain new services? Have there been market studies conducted to guide these plans?*

See RABC response to paragraph 18 above.

Para. 21: *Do the IMT-2000 radio interface standards constitute a sufficient set of standards for planning advanced wireless system spectrum requirements? If not, what else needs to be considered? Are the data rates of the IMT-2000 interfaces sufficient to meet projected service offerings? Will service providers offer bandwidth on demand or fixed bandwidth? What data rates need to be accommodated on the upstream and downstream and what is the ratio of bandwidth for upstream and downstream? What are the advantages and disadvantages of various methods to accommodate asymmetric traffic (e.g., TDD, variable modulation, variable block allocation, variable duplex spacing)?*

The IMT-2000 radio interface standards, as described in Recommendation ITU-R M.1457 are considered a sufficient set of standards for planning advanced wireless spectrum requirements. In addition, IMT-2000 spectrum requirements were developed by international experts based on anticipated needs to satisfy the public demand for new high speed data services such as multimedia and Internet at data rates up to approximately 2 Mbit/s (Recommendation ITU-R M.816-1). Development is ongoing in a number of standards fora for data rates in excess of 2 Mbit/s, which are viewed as necessary to respond to future projected service offerings.

The demand for broadband wireless services by the general public will develop at exponential rates once the spectrum has been designated and networks have been implemented. It is paramount therefore, that FCC designate sufficient spectrum for 3G services from the outset.

It is anticipated that service providers would offer bandwidth on demand, rather than fixed bandwidth. Though conventional thinking has traffic on the downlink exceeding that on the uplink by a factor of 3:1, the exact ratio would require additional, detailed study. For FDD implementations, symmetry should be assumed. There is currently insufficient evidence to support a spectrum planning principle that considers asymmetrical spectrum blocks as the norm.

Para. 22: *Comment on the ability of existing 1G and 2G systems to use currently-licensed spectrum to provide advanced services?*

Existing 1G and 2G systems using currently-licensed spectrum can support some advanced services, but cannot provide advanced services at data rates proposed for 3G. It is recognized that if sufficient spectrum exists, a service provider could implement advanced 3G services on a portion of their spectrum. Even *if* spectrum does not exist, it *may* be possible to transition existing subscribers, and upgrade cleared spectrum to provide advanced wireless services. However, where service providers are spectrum-limited, whether from lack of sufficient allocated spectrum or from restrictions of a spectrum cap, it may not be possible to introduce advanced services without seriously degrading the current service level to existing subscribers.

Para. 23: *Do service providers currently have capacity on their networks to provide advanced services? Does the amount of capacity, if any, differ by market size? How are capacity demands changing as service providers offer new data services? Are needs for more capacity being met by introducing new technology (i.e., advances in technology rather than the acquisition of additional spectrum)? Do cellular and PCS service providers have sufficient excess capacity to offer advanced wireless services on their current network? If so, which services can be provided? What migration paths to advanced wireless services are being considered? What can be done to facilitate the evolution of existing systems to advanced wireless systems? How does the type of technoogy currently used by a system provider influence their transition plans?*

In the largest cities in the U.S. and Canada and their surrounding areas capacity does not exist to provide advanced services. Demands for new data services, in particular centered on Internet access, can be met in part by the introduction of new technology. However, as discussed in the response to paragraph 21, the demand for broadband wireless services will develop at exponential rates. This will necessitate a two-pronged approach of introducing new technology and expanding network capacity, which could only be achieved through the availability of sufficient new spectrum.

Para. 24: *What steps should FCC take to facilitate global or regional roaming? What percentage of and what type of U.S. or foreign consumers need access to global or regional roaming? What roaming applications are required? How can these requirements best be met – e.g., common roaming frequency bands within the Americas, common roaming band with Europe and Asia? With respect to multi-band devices, how many different frequency bands can be supported by current equipment? How wide a frequency range can be supported by existing equipment? Would new equipment have to be designed and when would it be available? How are economies of scale and complexities of deployment impacted if two, three, four or more different spectrum plans are adopted in different parts of the world?*

An investigation performed by one of our sponsor members has shown that approximately 75% of a network customer base roamed, and made a mobile call at least once during the last 12 months outside their home serving area. Roaming is becoming increasingly more important to the general public for both business and pleasure. With greater numbers of people on the move, a high commensurate level of roaming outside the customers' home serving area is also being experienced. This study also indicated that 50% of a customer network base roamed, and made a mobile call at least once internationally in the last 12 months outside their home serving area. These numbers would be higher, if technology related restrictions did not prevent mobile roaming in places with incompatible technologies.

Customers show a high desire to have the same type of services and applications available to them when they roam, as they do when they are in their home service area. Customers are also increasingly more concerned about technical limitations that prevent them from roaming.

The RABC considers that, as a minimum, Regional spectrum harmonization should be provided to accommodate roaming. Common frequency bands are recommended as a Regional solution, with provision for common roaming bands or other technical solutions such as common base transmit bands to facilitate global roaming.

In general, the user device can be divided into an RF front-end and a baseband portion. The RF is generally the costlier portion of the device and is directly related to the frequency band for which the device is conceived. Supporting multiple frequency plans would mean

having multiple RF portions which could drive up the cost of the device considerably. Reducing the number of frequency bands supported by the phone is a priority and the best way of doing this is to harmonize frequency plans on a global basis.

B. Spectrum Requirements

1. Amount of Spectrum Needed

Para. 27: *How much additional spectrum should be made available to facilitate the introduction of advanced mobile and fixed services? Comments should take into account wireless system characteristics that need to be accommodated (e.g., Internet etc.); current capacity restraints on providing these services.*

The RABC considers that the extensive work done by the ITU-R as evidenced in the development of Report ITU-R M.2023 can be considered as establishing the additional spectrum required. The following extract from the Conference Preparatory Meeting Report to WRC-2000[1] is considered to be relevant to the issue of the spectrum required.

Extract from CPM-99 Report to WRC-2000 (pages 14 and 15)

Part B.1 - Terrestrial component

Spectrum requirements for the terrestrial component of IMT-2000 were estimated in the CCIR Report to WARC-92, and those calculations are now documented in Recommendation ITU-R M.687-2. The estimation of a minimum requirement of about 230 MHz was the basis for the WARC-92 decision to identify spectrum in No. **S5.388**. At the time, speech services were considered to be the major source of traffic, and only low data rate services were additionally considered. Furthermore, usage of the mobile services has increased substantially since 1992, and has overtaken the estimations of that time.

Since WARC-92, the market for personal communications has expanded significantly, and, as well, it has become apparent that data applications, in particular multimedia applications, would play a major role in mobile radiocommunication services in the 2000-2010 time-frame. This will create a requirement for additional spectrum for IMT-2000 in the latter portion of the decade. Data rates up to 2 Mbit/s are anticipated in IMT-2000 Phase 1. The total spectrum requirement for terrestrial mobile services, calculated according to the methodology in Report ITU-R M.2023, has assumed services with bit rates up to 2 Mbit/s only.

[1] CPM Report On Technical, Operational And Regulatory/Procedural Matters To Be Considered By The 2000 World Radiocommunication Conference.

Report ITU-R M.2023 concludes that there is a forecasted need for 160 MHz of additional spectrum for the terrestrial component of IMT-2000, beyond the spectrum already identified in No. **S5.388** and beyond the spectrum used in the three Regions for first and second generation mobile systems.

In calculating this forecasted spectrum need for geographical areas where the traffic is the highest, Report ITU-R M.2023 applies the detailed methodology provided in Recommendation ITU-R M.1390 to the expected deployment of mobile systems in the three Regions for the year 2010.

The forecast used in Report ITU-R M.2023 is a composite of information submitted in 1998 to ITU-R by several administrations from the three Regions.

Because IMT-2000 will provide high data rate services in addition to those services that are already provided by second generation mobile systems, it was not considered feasible to delineate in the forecasts IMT-2000 usage from existing systems' usage. Report ITU-R M.2023 notes that these new services may have asymmetrical spectrum requirements. To determine the additional IMT-2000 terrestrial component spectrum requirement in the year 2010, it is necessary to subtract not only the spectrum already identified in No. **S5.388** for terrestrial IMT-2000, but also the spectrum used for first and second generation mobile systems from the total forecasted terrestrial mobile spectrum requirement. This is summarized in Table 1-1 below. There are some countries with different amounts of existing spectrum.

TABLE 1-1

Forecasted requirements for terrestrial spectrum

Region	Total forecasted requirement for terrestrial mobile spectrum for the year 2010 (MHz)	Identified total for terrestrial mobile spectrum (including No. S5.388 IMT-2000 spectrum) (MHz)	Forecasted additional requirement for IMT-2000 terrestrial component spectrum for the year 2010 (MHz)
Region 1	555	395	160
Region 2	390	230	160
Region 3	480	320	160

NOTE - The figures in the table above represent the requirement in those geographic areas where the traffic is the highest.

It is apparent that the frequency bands identified in No. **S5.388** are not likely to be used in a harmonized way globally in the short term due to the use of parts of this spectrum by pre-IMT-2000 systems in some countries. This is also the case at some other frequency bands (e.g. 800/900 MHz, and 1 800 MHz) where some countries will not make spectrum available for IMT-2000 before the long term, as it is used for first or second generation cellular systems with high level of investments, considerable amounts of traffic and different frequency plans. This therefore complicates the adoption of harmonized frequency plans (same uplink/downlink bands, duplex separation etc.) in these parts of the spectrum. Due to the need of having some globally harmonized frequency plans to ease roaming, it is particularly important to identify some additional spectrum for IMT-2000 where there is a reasonable chance of achieving a common frequency plan worldwide.

The spectrum forecasts are based on IMT-2000 traffic estimates up to the year 2010. The frequency bands for IMT-2000 would need to be identified for deployment well in advance of the year 2010. This will allow adequate time for administrations to conduct domestic consultations, to license new radio systems, to transition, where required, existing systems from the affected bands and to deploy advanced mobile applications in the context of IMT-2000.

Para. 28: *How much additional spectrum will be needed to satisfy unmet and projected mobile requirements such as toll-quality voice, high speed data including Internet and other multimedia applications, and full-motion video? What size spectrum blocks would be appropriate to implement advanced wireless systems? What is the minimum spectrum block size needed? When will additional spectrum be needed?*

To permit adequate growth capabilities, that is to have the network capacity to offer wideband data services in high density applications at good service quality levels, a minimum of 30 MHz (2 x 15 MHz) needs to be made available to an operator. The UMTS Forum studied the minimum appropriate spectrum blocks[2] and concluded that an FDD allocation of 2 x 15 MHz was the preferred minimum block size.

In specific locations, it is recognized that clear spectrum may not be completely available initially. If spectrum is released in phases, then each phase should include both corresponding portions of an FDD pairing (to avoid pre -judging the FDD/TDD selection process) and should be a minimum of paired blocks of 15 MHz of contiguous spectrum.

Para 29. *What are the relative merits of FDD or TDD systems, or will both types of systems be implemented? Do service providers anticipate both paired and unpaired spectrum is needed in the U.S.? What limitations exist at the boundaries between paired and unpaired spectrum blocks (e.g., guard bands)? What can be done to minimize these limitations? For FDD, how much frequency separation is needed? Can TDD operate in the region between the FDD forward and reverse links?*

With the 3G band plan options highlighted in Paragraph 32 of the Commission's NPRM, 3G upstream transmissions and 3G downstream transmissions may occur in adjacent bands or are adjacent to 2G upstream transmissions, i.e., the band-plans may not be harmonized at the band edges.

At 1850 MHz, the 2G upstream and 3G downstream transmissions are not harmonized and there are two potential interference paths:

[2] UMTS Forum: Report 5 Minimum spectrum demand per public terrestrial UMTS operator in the initial phase (10/98)

- **3G base transmitter below 1850 MHz into a 2G base receiver above 1850 MHz. Analysis of the unwanted emissions versus the blocking specification suggests that a 5 MHz guard band reduces but does not eliminate interference, especially for equipment just meeting specification.**

- **2G mobile transmitter above 1850 MHz into 3G mobile receiver below 1850 MHz. Analysis of the unwanted emissions versus the blocking specification suggests that with a 5 MHz guard band, some handsets may experience interference from nearby sources, but in many cases this will not prevent communication.**

Some band plan proposals suggest that 3G upstream and downstream transmissions may operate in adjacent bands (for different operators) within the 1710-1850 MHz band. This causes similar unharmonized FDD base/base and mobile/mobile scenarios to the above 2G/3G case and an analysis suggests that base/base interference may be a problem due to unwanted emissions from equipment just meeting specification and some planning or filtering may be needed. Mobile/mobile may cause occasional problems when a 5 MHz guard band is utilized.

Most of the specifications are flat beyond a 5 MHz offset, so in most cases, a larger guard band will NOT change the performance for equipment just meeting specification.

2. Frequency Bands

Para. 32: *The FCC proposes to allocate 1710-1755 MHz, 2110-2150 MHz and 2160-2165 MHz for fixed and mobile service use. Comments are sought on providing mobile and fixed service allocations in the band 1755-1850 MHz, if this band is made available from NTIA, with some continued Federal use (per Appendix F). Comments are also sought on various approaches for the 2500-2690 MHz band.*

The RABC supports this initiative. Further, provision for mobile and fixed service allocations in the band 1755-1850 MHz would enable the minimum identified spectrum requirement of 160 MHz to be met through the band 1710-1850 MHz, together with spectrum already identified for advanced communication services above 2110 MHz.

The band 2500-2690 MHz was identified at WRC-2000 as an IMT-2000 band. In addition, Europe plans to utilize this band as an IMT-2000 expansion band after 2008. However, Canada, along with many other countries of the Americas, may have difficulty in reusing this band for advanced mobile services in the near to medium term due to the current incumbents.

In Canada, the 2500-2696 MHz band has been allocated to Multipoint Communications Systems/Multipoint Distribution Systems (MCS/MDS, similar to the ITFS/MMDS services that use the band in the U.S.). The band is subject to constraints that are similar to those noted by the FCC in the Interim Report that states in page ii:

- ***The 2500-2690 MHz band is in a state of rapid evolution by incumbent ITFS and MDS licensees. The MDS industry has invested several billion dollars to develop broadband fixed wireless data systems in this band, including high-speed access to the Internet. These systems offer a significant opportunity for further competition with cable and digital subscriber line (DSL) services in the provision of broadband services in urban and rural areas. … This spectrum is heavily licensed throughout the country and is ramping up for full operational use in the very near term.***

(a) Currently Allocated Spectrum

Para. 36: *The FCC is seeking comment on their tentative conclusion: that any additional reallocation in the band 806-960 MHz for advanced wireless services is not appropriate.*

The RABC supports the Commission's tentative conclusion. In Canada this spectrum range is already quite congested with a variety of services and applications, many of which are similar to those in the U.S. In Canada the Cellular bands at 824-849 MHz and 869-890 MHz and the SMR bands at 806-821 MHz and 851-866 MHz are being considered for an orderly evolution to advanced wireless systems and networks.

(b) Additional Candidate Spectrum

(1) 1710-1755 MHz

Para. 41: *The FCC proposes to allocate the band 1710-1755 MHz for mobile and fixed services on a co-primary basis.*

The RABC fully supports the Commission's proposal. In Canada this spectrum is part of the lower 2 GHz band 1710-1850 MHz which is used for a variety of low capacity, point-to-point fixed radio systems. This entire spectrum range is intended for new advanced wireless services. Transition from this band by the fixed service is expected to take place to permit the introduction of 3G networks in Canada. Many of the existing fixed applications are in less populated areas of the country; thus it is expected that the transition to 3G will be orderly. Use of the band 2025-2110/2200-2285 MHz (reference SRSP-302.0[3]) or spectrum above 3 GHz will accommodate many of the fixed service displacements.

(2) 1755-1850 MHz

Para. 46: If NTIA makes this spectrum available for non-Federal Government use, *the FCC seeks comment on allocating the band for mobile and fixed services on a co-primary basis for new advanced services, including 3G systems*.

The RABC supports the view that this spectrum be made available for new advanced mobile and fixed services. In order for the Commission to plan effectively for 3G introduction, it must have access to this band.

Para. 47: *FCC highlights the NTIA Interim Report and the two possible options: (1) pair two 45 MHz segments 1710-1755 MHz (handsets)/1805-1850 MHz (base stations), and (2) pair approx. 1710-1790 MHz (handsets – available in phases)/spectrum above 2110 MHz. Commenters that address the NTIA Interim Report should specify the specific parts of the study relevant to their*

[3] Industry Canada Standard Radio System Plan (SRSP) 302.0, Issue 1, July 8, 2000: "Technical Requirements for Fixed Line-of-Sight Radio Systems Operating in the Bands 2025-2110 MHz and 2200-2285 MHz." (Available from Industry Canada's web site at: http://strategis.ic.gc.ca/SSG/sf02145e.html)

views. The FCC is also seeking comment on the possibility of implementing protection areas around DoD TT&C sites from IMT-2000 operations.

The RABC comments on the two possible options are detailed under paragraph 68.

Para. 49: *The FCC is requesting comment on the effect of continuing permanent and temporary use of the band 1755-1850 MHz by Federal Government incumbents on potential advanced mobile and fixed use of the band. If incumbent users had to be relocated, how could they be accommodated in other frequency bands. Which bands?*

We understand from the NTIA Interim Report issued November 15, 2000 that the Federal Government uses the band for 4 main functions:

1) space TT&C (space operations)
2) medium capacity fixed microwave
3) tactical radar
4) aeronautical mobile applications.

With regard to the space operation applications, the RABC notes that such use is in accordance with Radio Regulation S5.386, which allocates the space operation service (SOS) (Earth-to-space) and space research service (SRS) (Earth-to-space) in Region 2 and certain countries in Region 3, subject to agreement under No. S9.21. Further, we note that the SRS (E-s) and SOS (E-s) also operate in a portion of the upper 2 GHz band, namely 2025-2110 MHz. Prior to WARC-92 the space research and space operation services had operated under No. S9.21 in this band. At WARC-92 the bands 2025-2110/2200-2290 MHz (upper 2GHz) were made available to these services on a co-primary basis with the fixed service.

The ITU-R has studied the sharing between the space science services and the fixed service in the band 2025-2110/2200-2290 MHz and has concluded that sharing is practical. Recommendation ITU-R F.1247 provides the technical characteristics of fixed stations to facilitate sharing with the space sciences. This upper 2 GHz band is recognized globally as a long-term "home" for the fixed service in the 1-3 GHz range. Furthermore, the ITU-R has stated that sharing between high-density mobile systems, such as 3G, and the space sciences

is not feasible. However, limited applications of low-density mobile systems could be possible (see No. S5.391).

In Canada the upper 2 GHz band has been channelized in accordance with SRSP 302.0 to permit a variety of point-to-point medium and low capacity radio-relay applications. In major urban areas, such as Toronto, Montreal and Vancouver, the lower sub-band, namely 2025-2110 MHz, is made available on a priority basis to electronic news gathering (ENG) systems, licensed within the fixed service. ENG is also permitted in other areas of the country, subject to rules and sound spectrum planning by government and industry. Thus, the fixed service not only shares the lower sub-band between point-to-point microwave systems and ENG, but in this band, and in the upper sub-band 2200-2285 MHz, the fixed service operates in accordance with Rec. F.1247 to facilitate sharing with the space science services.

The RABC strongly recommends that the Commission consider new sharing arrangements of the upper 2 GHz band with NTIA, with a view to accommodating Federal Government space operations applications. Furthermore, we believe that with clear rules set out jointly between the FCC and NTIA on sharing this band, many of the existing Federal Government microwave users could also be accommodated in the upper 2 GHz band. Transitions might take place over time, with medium capacity microwave radio systems possibly the least difficult to accommodate first. The tactical radar and aeronautical mobile applications might be accommodated elsewhere within the 1-3 GHz band, for example in parts of L-band at 1427-1525 MHz or in spectrum in the range 2360-2400 MHz or in spectrum above 3 GHz, for example, the upper 4 GHz band 4400-5000 MHz.

We have noted possible use of the upper 2 GHz band as candidate spectrum for displaced microwave incumbents since it is in close proximity to the band 1755-1850 MHz and will facilitate reuse of towers in the transition process. In the case of fixed microwave, other bands above 3 GHz may also be practical such as in the 7/8 GHz range. The 7 GHz band is recognized internationally as the only band in the 3-10 GHz range available for low capacity fixed service applications. Medium and high capacity radio-relay systems are also standard. Recommendation ITU-R F.385-6 applies. A variety of microwave products and systems is available which facilitates economies of scale. We note also that the FCC has

made available some spectrum in the lower 6 GHz band (5925-6425 MHz) for low capacity applications (47 CFR Part 101.147 (i)) which may accommodate some displacements.

(3) 2110-2150 MHz and 2160-2165 MHz

Para. 52: *The FCC is proposing that incumbent users of these bands be relocated (except the space sciences), if necessary, and that the bands be designated for the provision of advanced mobile and fixed services.*

The RABC supports the Commission's proposal to make the band 2110-2150 MHz available to advanced mobile and fixed services. In Region 2 and in Canada the band 2160-2165 MHz is allocated to the mobile-satellite service (space-to-Earth) on a co-primary basis with the fixed and mobile services. The introduction of the MSS in Canada is subject to a transition policy as stated in the Canadian Table of Frequency Allocations Footnote C36(CAN-00), and in Spectrum Utilization Policy SP 1-3 GHz (October 1999): Amendments to the Microwave Spectrum Utilization Policies in the 1-3 GHz Frequency Range.

Para. 55: *The FCC is seeking comment from MDS/ITFS users on current/planned use of the 2150-2162 MHz band and what effect reallocation or relocation of the 2150-2162 MHz band would have on them.*

In Canada the band 2150-2160 MHz has been licensed to MCS/MDS operators. Reallocation or relocation of the 2150-2160 MHz band would disrupt design and vendor selection activities, and could cause MCS/MDS licensees to make significant unforeseen expenditures.

Para. 56: *Comments on the various relocation options for the 2110-2150 MHz and 2160-2165 MHz incumbents*.

There are several alternative bands available for low capacity radio applications. As we noted in our comments on paragraphs 41 and 49, a candidate band may be the upper 2 GHz band (2025-2110/2200-2285 MHz), shared with the space science services and ENG users. In

addition, the lower 6 GHz band, 7 GHz band (reference Recommendation ITU-R F.385-6 or in Canada SRSP-307.1[4]) or a variety of bands above 10 GHz may also be appropriate.

(5) Pairing Options

Para. 66: *The FCC is seeking comment on several band pairing schemes (to follow). How much spectrum is required? When should the pairing be made available? Whether the separation distance between the paired bands would impair the economical development of duplex equipment? What bands could be used to accommodate incumbent users?*

Option 1

Para. 67: *1710-1755 MHz paired with 2110-2150/2160-2165 MHz. A variation makes the spectrum available in phases in the band 1710-1790 MHz (similar to NTIA's 2nd segmentation option) paired with spectrum above 2110 MHz.*

The frequency arrangement illustrated below in our response to Option 2 we believe would most effectively deal with the spectrum requirement while maximizing the utilization of the spectrum at 1710-1850 MHz. This arrangement proposes that spectrum in the 2110 MHz frequency range be paired with spectrum between 1750 and 1800 MHz, rather than with 1710-1755 MHz.

Should the spectrum availability above 1755 MHz be severely limited due to DoD considerations, then we would support, as a second choice only, the pairing of spectrum in the band 1710-1790 MHz (similar to NTIA's 2nd segmentation option) with spectrum above 2110 MHz. However, we wish to stress that this option does not yield the maximum 160 MHz of new spectrum required to support 3G implementation.

[4] SRSP307.1, Issue 4, January 18, 1997: "Technical Requirements for Fixed Line-of-Sight Radio Systems Operating in the Band 7 125 - 7 725 MHz." (Available on Industry Canada's web site at: http://strategis.ic.gc.ca/SSG/sf00038e.html)

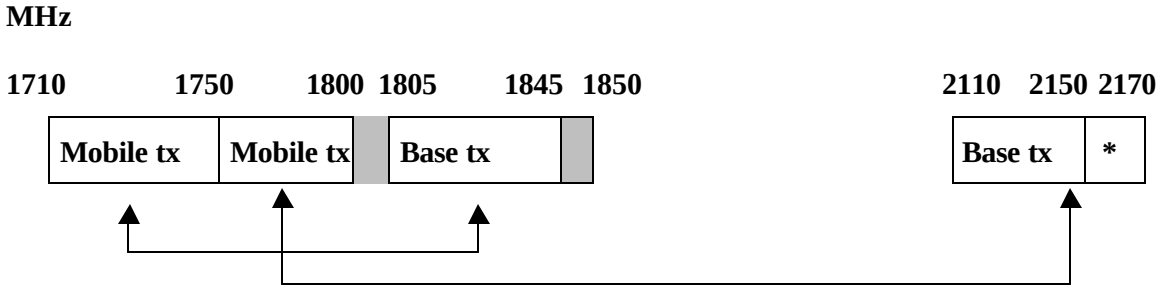
Option 2

Para. 68: *1710-1755 MHz paired with spectrum in the band 1755-1850 MHz. A symmetrical pairing might permit 1805-1850 MHz to be paired with 1710-1755 MHz.*

The RABC believes that a symmetrical frequency pairing similar to that suggested (1710-1755/1805-1850 MHz) would go part way towards satisfying the 160 MHz identified requirement. In combination with a variation of Option 1, we believe that the total requirement could be met.

One such frequency arrangement shown in Figure 1, which has support within Canada, takes into consideration a 5 MHz guard band between 1 800-1 805 MHz and 1 845-1 850 MHz.

FIGURE 1



*** In Canada, MCS and MDS services use the band 2150 – 2160 MHz. The band 2 160-2 170 MHz is allocated to the MSS in Region 2 (S5.388, S5.389C, S5.389D).**

The plan illustrated above can maximize the use of the 1.7 GHz band. Domestic implementation can vary to balance the spectrum requirements of incumbent and new users and services. With symmetrically paired spectrum in the range 2110-2170 MHz, this provides sufficient spectrum to meet the requirement identified by the ITU.

This frequency arrangement is aligned with proposals from several Region 2 countries, as reflected in the ITU-R WP8F Chairman's Report Document 8F/184, Attachment 6, Annex 3. The rationale for this arrangement is that it provides commonalties in band plans with other Regions:

- **the 1710-1750/1805-1845 MHz pairing is in alignment with the evolution from 2G to 3G technology of the band, in some Regions;**

- **the 1750-1800/2110-2160 MHz pairing uses a common base transmit band to the band plans used in other Regions.**

This combination strives towards global harmonization of existing bands, leading to economies of scale and roaming capabilities. It will also facilitate the evolution of pre-IMT systems into IMT-2000 systems and networks in the 1710 -1845 MHz band.

Within guard bands, the use of low power TDD could be investigated as it would increase the total amount of spectrum available for advanced mobile services including 3G, and provides an additional means of addressing traffic asymmetry.

Option 3

Para. 69: *2110-2150/2160-2165 MHz paired with spectrum in the 2500-2690 MHz band. Alternatively, 1710-1755 MHz could be paired with spectrum in the band 2500-2690 MHz.*

The pairing of spectrum between either the 1710 MHz or 2110 MHz frequency ranges with spectrum above 2500 MHz would seem to present a number of technical problems in addition to raising difficult problems of reallocation in multiple frequency bands. Such action would not contribute to spectrum harmonization, even Regionally, at least in the short-term.

Yours truly

R.D.C. Coles
President
Radio Advisory Board of Canada