MANDATORY RADIO STANDARDS IN CANADA

PHASE II

This study was performed pursuant to Research Contract 36100-0-7365 between the Department of Communications for Canada (DOC) and The University of New Brunswick (UNB)

FOREWARD

This study was undertaken at the request of Mr. S.N. Ahmed, Director General of Engineering Programs for the Department of Communications (DOC). Dr. R.W. McCaughern, Deputy Director General of Engineering Programs, was the departmental representative for the study team. This study is Phase II of a broad study entitled "Mandatory Radio Standards in Canada" and was carried out between November 1990 and March 1991, pursuant to a contract between the DOC and the Faculty of Law of the University of New Brunswick. DOC/study team interaction consisted of periodic meetings to clarify the terms of reference for the study and to review progress. Comprehensive input was received through a series of 24 meetings with 34 governmental and private sector organizations in Canada and the United States. Additionally, the study team conducted independent research. The conclusions and recommendations reflect the judgment of the study team and are its responsibility solely. The study team gratefully acknowledges the gracious cooperation of the many organizations and individuals who provided input.

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OVERVIEW

BACKGROUND

This overview provides a brief review of Phase II of a study undertaken at the request of the Department of Communications by J.J. O'Shaughnessy, P.Eng. and Professor David Townsend of the Faculty of Law of the University of New Brunswick. In addition to this Overview, an Executive Summary and the full report are available from the Department of Communications.

THE MANDATE

In October of 1990, the DOC asked the study team to do the following:

1) To verify that there is indeed a real need in and a practical advantage to Canada of harmonizing this nation's mandatory radio standards with those in the U.S.A.

2) To specify how candidate standards for harmonization should be identified.

3) To outline processes:
   a) to develop harmonized standards;
   b) to bring about reciprocal recognition of test results and equipment authorizations in the two countries;

   and to assess the legal implications of those processes.

THE PROCEDURE

To form an information base upon which to judge the needs and wishes of industry, government, and users of the radio spectrum in Canada and the U.S.A., extensive consultations where held in Ottawa, Toronto and Washington, D.C. There were 24 meetings with a total of 64 middle to senior level management personnel from 34 Canadian and U.S. organizations or government departments. In addition to the interviews, the study team carried out independent research which generated additional options and approaches.

CONSULTATIONS

Some of the key opinions obtained from the interviews are:

1) Canadian manufacturers, service providers and user groups are in full agreement on the need to harmonize mandatory radio standards to the maximum extent possible.
2) No group suggests that the harmonization of all radio standards is desirable or even possible.
3) Most groups agree that it will be necessary for Canada to identify which standards

first should be harmonized.

4) There are a number of schools of thought in Canada on how the harmonizing of standards should proceed, once they have been identified. There is no one scenario which will be universally accepted.

5) All organizations in Canada and the U.S.A. agreed that there should be mutual recognition by Canada and the U.S.A. of test results on radio equipment which is carried out in either country against a harmonized standard. In circumstances where standards are not fully harmonized, it is desirable that there be mutual recognition of test results to the extent that technical elements within the standards are technically equivalent.

6) There is no consensus about either the need for reciprocal recognition of radio equipment certified in Canada or the U.S.A. or about the process, if there were to be reciprocal recognition of equipment certification.

RECOMMENDATIONS

Highlights of the 25 recommendations made by the study team include:

1) The DOC should clearly confirm to Canadian private sector groups, and to the FCC and the Department of Commerce in the U.S.A., that it strongly supports the objective of a maximum degree of harmonization of technical parameters of mandatory radio standards with the U.S.A., while retaining the sole right to mandate a harmonized radio standard in Canada.

2) The DOC should request the Radio Advisory Board of Canada (RABC) to provide the coordinating role necessary to identify the standards which should first be harmonized.

3) For new standards for new products, Canadian organizations, in liaison with the DOC, should continue to work on U.S. standards committees as equals amongst many organizations and influence the decision making process by the validity of their arguments. Such standards do not become mandatory until legally implemented by the regulatory authority in each country. During the implementation process, each regulatory body has the right and authority to modify the proposed standards as they see fit to protect national interests.

4) Where different standards already exist in the two countries for certified, consumer oriented products, Canada should make every effort to adopt the technical parameters of the current FCC approved standard. Many of these products are licence-exempt and readily transportable across the Canada/U.S. border. If Canada has a legitimate need for a radio standard different from the current FCC standard, Canada should make every attempt to have the FCC change their existing standard. If accommodation cannot be reached, Canada should be prepared to live with a different standard or with different technical elements within a standard which is otherwise technically equivalent to its American counterpart.

5) The DOC should explore with industry the benefits, to that portion of Canadian industry that trades in Europe, of introducing a national government approved lab

accreditation scheme such as is in place in the European Community.

6) Canada must maintain a certification process within the DOC, for both legal and practical reasons, and not consider accepting automatically, as has been suggested by some, the certification (or decertification) of equipment by the FCC.

7) The existing RSS's and SRSP's should be rolled over into "ministerial standards" in accordance with section 5(1)(d) of the Radiocommunication Act.

8) The Equipment Certification Procedure RSP-100, should be recast and then drafted in the form of subordinate legislation (as regulations) under the provisions of the Radiocommunication Act. Section 4.5.5 of the study contains a number of policy recommendations for consideration during such a drafting exercise. For example, changes should be made to the terms of RSP-100 to tighten the process for accepting test data from labs for equipment certification and to define better the responsibility of the professional engineer. A seventh issue of RSP-100 is currently being prepared by the DOC.

9) The DOC should review the general principles and comments contained within the National Standards Policy for radiocommunications set out within Section 6 of this study to see which would be appropriate for inclusion within departmental policies related to mandatory radio standards.

10) The DOC should consult with both the equipment manufacturers and the service providers of the Canadian radio industry about the desirability of downgrading, from "mandatory" to "precatory", the legal status of the receiver performance features for the radio equipment enumerated within the listing supplied to the study team by Electrical and Electronic Manufacturers Association of Canada (EEMAC). (See Appendix 3 of the study.)

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SECTION I - EXECUTIVE SUMMARY

1.1 BACKGROUND

The Minister of Communications is empowered under the authority of the Radiocommunication Act to ensure "the orderly development and efficient operation of radiocommunication in Canada."

The Department of Communications, as the body authorized by the Minister to carry out these functions, has undertaken a number of studies over the years to assist it in carrying them out. In October, 1989, the Department commissioned J.J. O'Shaughnessy, P. Eng. and Professor David Townsend to conduct Phase I of a study on mandatory radio standards in Canada. The primary objective of that phase was to determine whether mandatory radio standards were truly required in Canada and whether it would be desirable and appropriate to harmonize mandatory radio standards with those in the U.S.A. and also have reciprocal recognition between the two countries of equipment testing and equipment authorizations.

A full report was submitted by the study team in March 1990 and concluded that harmonization of standards and reciprocal recognition of equipment authorizations were desirable.

1.2 THE MANDATE

In October 1990, the DOC asked the same study team to undertake a second phase of the study and to take the "theoretically desirable" aspects of Phase I and turn them into

"practically implementable" procedures in Phase II.

The study team was asked to do the following:

(1) To verify that there is indeed a real need in and a practical advantage to Canada of harmonizing mandatory radio standards with the U.S.A.

(2) To specify how candidate standards for harmonization should be identified.

(3) To outline a process to develop the harmonized standards and assess the legal implications of that process.

(4) To outline a process to bring about reciprocal recognition of test results in the two countries and to assess the legal implications of that process.

(5) To outline a process to bring about reciprocal recognition of equipment authorizations in the two countries and to assess the legal implications of that process.

In responding to these five questions, the study team was also asked by the Department to:

(1) Review the Canadian radio equipment authorization rules.

(2) Review the hierarchy of technical documentation and the Radiocommunication Act.

(3) Provide the elements of a national policy for mandatory radio standards in Canada.

1.3 THE PROCEDURE

To form an information base on which to judge the needs and wishes of industry, government, and users of the spectrum in Canada and the U.S.A., extensive consultations were held in Ottawa, Toronto and Washington. There were 24 meetings with 64 persons from 34 Canadian and U.S. organizations. These meetings/discussions were with middle to senior management personnel and lasted one or two hours each. The discussions, without exception, were frank and friendly. The organizations contacted in Canada represented a good cross section of service providers, manufacturers, users, laboratories, standards bodies and government. A summary of the organizations represented in the various meetings is shown in Appendix 2 of this report.

In addition to the interviews, the study team carried out independent research which generated additional options and approaches.

1.4 CONSULTATIONS AND FINDINGS

Section III of the report provides, in some detail, the opinions of those interviewed and lists additional options generated by the independent research performed by the study team in response to the five major questions identified in Section 1.2 above.

The conclusions and recommendations of the study team in relation to these opinions and research findings are recorded in Section VIII and IX.

The essential elements from these interviews and research findings are:

(1) Canadian manufacturers, service providers and user groups are in full agreement and reconfirmed the desirability of, and the need for, harmonizing mandatory radio standards between Canada and the U.S.A. to the maximum extent possible. It is important to note that the term "harmonization" is used in this study as defined in Section 2.2.2. Harmonization is broadly defined as the process of making technical standards or specifications either technically identical, or technically equivalent in practice. It does not require that respective laws, rules or administrative processes in the two countries be identical or directly comparable.

Canadian manufacturers are most anxious to have one standard and therefore one production run to be better able to produce a less expensive product and better able to compete in a CAN/USA market. The service providers and the user groups in Canada are convinced that harmonized standards will result in lower prices and a greater variety of products to meet the needs of the service provider and user groups.

(2) No group suggests that the harmonization of all radio standards is desirable or even possible. Differences in frequency allocations in the two countries exist in some circumstances and effectively foreclose the possibility that either the spectrum used or the technical specifications involved can be harmonized

at a reasonable cost. Most groups agree that it will be necessary for Canada to identify which standards should first be harmonized. The Electrical and Electronic Manufacturers Association of Canada (EEMAC) is willing to undertake this role in certain fields. The Radio Advisory Board of Canada (RABC) is another group that is well positioned to do this and would be well accepted by the various groups (including EEMAC).

(3) As described in detail in Section 3.3 of the report, there are at least three schools of thought in Canada on how the harmonizing of standards should proceed once they have been identified. There is probably no one scenario which will find universal acceptance.

One scenario has Canadian organizations continuing to work on U.S. standards bodies such as the Telecommunications Industry Association (TIA) or the American National Standards Institute (ANSI) to develop a common standard which is ultimately approved as an industry standard by a U.S. organization. Note that a standard approved by industry must still be approved by the regulator (DOC or FCC) to become mandatory.

The second scenario involves the creation of an additional level of standards writing bodies, and requires the creation of a North American Standards Institute (NASI) where Canada and the U.S.A. (and potentially Mexico)

would meet as equal entities to develop common North American standards. The standards would still have to be approved by the member nations. NASI would be the equivalent of the European Telecommunications Standards Institute (ETSI).

The approach developed by the third school finds particular application to the harmonizing of existing as compared to new standards, especially in the general consumer products area. It would have its greatest applicability to situations where existing standards in the two countries have technical differences - for what are primarily consumer products. This third approach suggests that Canada make every effort to adopt the current U.S. FCC approved standard for these consumer-oriented products or to adopt as much of the technical parameters of the FCC approved standard as possible. This approach tends to find favour amongst pragmatists and to cause concern amongst Canadian nationalists.

The study team's conclusions and recommendations are outlined in Sections VIII and IX of the report.

(4) All organizations interviewed in Canada and the U.S.A. agreed that there should be mutual recognition by Canada and the U.S.A. of test results on radio equipment carried out in either country against a harmonized standard.

There are, however, significant differences between the equipment approval processes in the two countries: in the way that tests are carried out and validated; in the assignment of responsibility for the validity of the tests; and in the amount and manner of checking of test results by the two regulators. These differences and their implications are discussed in detail in Sections 3.4 and 4.3.

Alternative approaches to solving the problem of reciprocal recognition of test results are outlined. They include:

(a) Both Canada and the U.S.A. adopting the approach of the European Community (EC) by creating "notified bodies" which are testing or certification entities officially recognized by national governments which are signatories to a reciprocal recognition agreement.

(b) The FCC adopting the Canadian approach (within the U.S.A.) of accepting test results from any lab whose data are certified by a professional engineer who is registered to practice within a Canadian province.

(c) The DOC adopting the U.S. approach of accepting test data from any lab (not necessarily approved by a professional engineer) and relying upon competitive pressures from other manufacturers to ensure reliability of test results.

Here again, there is not unanimity amongst those interviewed as to the "good"

approach. The conclusions and recommendations of the study team are outlined in Sections VIII and IX of the report.

(5) It is interesting to note that, amongst the many groups interviewed, there is no consensus about either the need for reciprocal recognition of equipment certified in Canada and the U.S.A. or about the process, if there were to be reciprocal recognition of certification.

Section 3.5.2 of the report records many of the comments received and underlines the divergence of opinion that exists. Sections VIII and IX record the conclusions and recommendations of the study team.

(6) Despite the fact that Canadian interviewees were uncertain about the desirability of having reciprocal acceptance of equipment authorizations, most radio equipment manufacturers, service providers and users within Canada appeared to support a Canada/U.S.A. regional trading zone in spectrum related equipment. The three principal motivations for this support were trade enhancement, a bigger market share for profitability (and to write off research and development costs) and an increase in the variety of equipment and operational features from which to select (procurement). The notion of a Canada/U.S.A. regional trading zone in spectrum related equipment is a very attractive one.

(7) While the Canadian interviewees liked the idea of such a regional trading zone, they had not thought a great deal about how it might come about, what impediments now exist to its creation or about what they may be prepared to give up to get it.

(8) Comparative research performed upon the technical standards and specifications in spectrum laws in Canada and the U.S.A. revealed that a great amount of technical compatibility already exists in this area. For example, the current standards for aeronautical, marine, cellular, and television receivers have many common or identical technical parameters and elements. Generally, where radio equipment involves a mass market, and it is very portable, these similarities are evident. In fact, when one adopts the compatibility notion of harmonization, one must conclude that for these categories of radio service the vast majority of equipment approved for the U.S. market could be readily authorized for use within Canada.

(9) Research performed by the study team suggests that the greatest impediment to harmonization of Canadian and American technical radio policy is the difficulty of accommodating the philosophical (privatization/ liberalization/ deregulation) and explicit rule-based nature of U.S. subordinate radiocommunication legislation within Canada's existing legislative and policy infrastructure. These philosophical differences are reflected within the

spectrum management laws in the U.S.A. For example, the FCC has different notions of "spectrum efficiency", "interference protection", "performance standards", "system capacity", and "service delivery". Canadian industry and the DOC should be aware of the potential for a Canada/U.S.A harmonization exercise to change substantially how the spectrum is managed in Canada and the type and nature of service delivered to the radio industry by the DOC. Canadian spectrum users may have to be prepared to accept both a higher level of radio interference and a lower level of government (DOC) service related to activities such as domestic frequency coordination.

(10) Research into mandatory radiocommunication standards suggests that legal complications will rise dramatically, the closer major trading partners try to move toward reciprocal acceptance of test data or equipment authorizations. For radio spectrum related equipment and products, while reciprocity in these areas will result in a true regional trade zone, the certain legal complications of that effort should be weighed carefully. An alternative to the trading zone option would be to concentrate efforts upon making the technical (as opposed to the procedural) parameters and elements within the mandatory radio standards between Canada and the U.S.A. as comparable or as equivalent as possible. This would facilitate the trade of a large percentage of the radio spectrum related equipment at issue.

(11) Technical standards and technical policies will have a great impact upon the competitiveness of the Canadian radio industry. For this reason in particular, it is time for the Department of Communications to consider the creation of a national standards policy which will contain strategies on matters such as technical harmonization, to help to it to respond to the spectrum management issues and trade-promotion environment it now faces, and inform the radio industry, Canadian provinces and the public about the future directions of radio engineering matters for this decade.

1.5 CONCLUSIONS

The comprehensive consultations with governmental bodies and private industry provided significant input to the study. The conclusions reached, however, reflect the judgment of the study team. Section 8.2 of the report lists the 21 conclusions reached.

1.6 RECOMMENDATIONS

The recommendations for action are the responsibility of the study team. Section IX of the report lists the 25 recommendations made by the study team.

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MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION II - THE STUDY

2.1 BACKGROUND

As outlined in the Phase I report, radio equipment has been authorized for use, and its technical parameters managed, for almost 90 years in Canada. During this period, Canadian regulators have attempted to set technical radio spectrum policies which are consistent with international and Canadian/U.S.A. bilateral obligations, while ensuring that domestic technical spectrum-related policies are developed in the best interests of Canadian radio users, service providers and equipment manufacturers. For the most part, technical radio regulatory issues have centred upon matters such as interference management and spectrum efficiency.

Today, technical radio regulatory matters increasingly are complicated by broad public policy issues such as international and bilateral trade agreements, regulatory developments in the United States, and government resource cutbacks. Also, new technologies and new markets for radio spectrum-related equipment are evolving rapidly.

Against this complex and evolving background, the question has been raised (with increasing frequency of late) whether Canada should now adopt a deliberate policy of harmonizing many of its mandatory technical standards, specifications, testing and equipment authorization processes with those in the U.S.A. The recent proclamation in October 1989 of comprehensive radiocommunication legislation in Canada made the need for such a

review more apparent and pressing. Bill C-6, known as the Radiocommunication Act, came into force in October 1989 and empowered the Minister of Communications with wide authority to ensure "the orderly development and efficient operation of radiocommunication in Canada."

The Department of Communications, as the body authorized by the Minister to carry out these functions, has undertaken a number of studies over the years to assist it in carrying out these functions. In October 1989, the Department contracted, with the University of New Brunswick, for the performance of a study on mandatory radio standards in Canada. Through the University, two principal investigators were engaged. These investigators were J.J. O'Shaughnessy, P.Eng. a consultant and Past President of the Radio Advisory Board of Canada, and David Townsend, an Associate Professor of Law at the University, and author of the 1987 report for the DOC entitled, Canadian Municipalities and the Regulation of Radio Antennae and Their Support Structures. The 1989 study became the precursor of this Phase II study.

The main conclusions and recommendations of the Phase I study were:

1- Mandatory radio standards are required in Canada and their approval should stay as the responsibility of the DOC.

2- It is desirable that mandatory radio standards be harmonized with the U.S.A.

3- It would be desirable to have reciprocal recognition of test results and authorized certification bodies in both countries.

4- The elements of a national policy for mandatory radio standards in Canada should be defined.

5- There should be a review made of the Canadian radio equipment authorization rules.

In October 1990, the DOC asked the University of New Brunswick to undertake a second phase of the study on mandatory radio standards in Canada and to engage again J.J. O'Shaughnessy, P.Eng. and David Townsend, Associate Professor of Law at the University, as the principal investigators. The mandate for Phase II follows.

2.2 THE MANDATE

2.2.1 General

The main objective of the DOC in undertaking this study was to take the "theoretically desirable" aspects of Phase I and turn them into "practically implementable" procedures in Phase II.

The study team was asked to do the following:

1- To verify that there is indeed a real need in and a practical advantage to Canada of harmonizing mandatory radio standards with the U.S.A.

2- To specify how candidate standards for harmonization should be identified.

3- To outline a process to develop the harmonized standards and assess the legal implications of that process.

4- To outline a process to bring about reciprocal recognition of test results in the two

countries and to assess the legal implications of that process.

5- To outline a process to bring about reciprocal recognition of equipment authorizations in the two countries and to assess the legal implications of that process.

In responding to these five questions, the study team was also asked by the Department to:

1- Review the Canadian radio equipment authorization rules.

2- Review the hierarchy of technical documentation and the Radiocommunication Act.

3- Provide the elements of a national policy for mandatory radio standards in Canada.

2.2.2 Definition of Terms

As the interviews revealed, the many technical and regulatory terms in use today have different meanings to different persons. For the purposes of the Phase I and Phase II studies, the following definitions are used:

Radiocommunications: This includes all radio services except radio and TV broadcasting, and specifically includes:

(a) fixed microwave service

(b) mobile service
- i - aeronautical
- ii - marine
- iii - land
- cellular
- general radio service
- paging

(c) satellite services

(d) low power, license exempt, radio equipment.

Mandatory Standard: Any document that contains technical parameters or processes with which one must comply in order to receive a license or to have equipment authorized for distribution, sale or use. In Canada, mandatory standards, may be contained within:[1]

- Standard Radio System Plans (SRSP's)
- Radio Standards Procedures (RSP's)
- Radio Standards Specifications (RSS's)
- Telecommunications Regulation Circulars (TRC's)

Harmonization: "The bringing into consonance or accord" (Webster's New Collegiate). For the purposes of this study, interviewees were asked to regard "harmonization" as the process of making technical standards or specifications either technically identical or technically equivalent in practice. However, it is important to recognize that trade law principles define harmonization as the process of making domestic laws, rules and processes compatible or equivalent to those of other trading partners. In the area of technical regulation such

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[1] Whether examined collectively or individually, it is very difficult to assess the "mandatory" nature of the plans, procedures, specifications or circulars referenced here. Such an examination would have to account for the apparent and defacto nature or treatment of the technical parameter or process. For example, some documents use mandatory language ("shall" and "must") but often are applied in a discretionary nature within some of the DOC's five regional administrations. Other provisions are drafted as guidance or precatory policy, but, they have become referenced into licence criteria as mandatory requirements. For comment upon the apparent legal status of the Department of Communications technical documents, see Sections 5.2 and 5.3 of the Phase I study.

compatibility or harmony will permit mutual recognition of the respective mandatory technical standards and certification processes between nations; and mutual recognition of conformance testing to those requirements. Harmonization does not require that respective laws, rules or processes be made identical or even directly comparable.[2]

Certification: The issuance of a "certificate of type-approval or technical-acceptability" (RSP 100-Appendix 1). The authorization process that confirms "that the equipment complies with technical specifications, standards or requirements established by the Department" (RSP 100, Para 1.1.2).

Reciprocity: "A mutual exchange of privileges: specifically, a recognition by one of two countries or institutions of the validity of licenses or privileges granted by the other" (Webster's New Collegiate).

Licensing: Licensing occurs when certain regulatory and technical parameters are met by

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[2] The word "unification" is used when nations must adopt identical or common laws. For reference purposes, it should be noted that Article 604 of the Free Trade Agreement (FTA) requires both nations, "To the greatest extent possible, and taking into account international standardization activities, each Party shall make compatible its standard-related measures and procedures for product approval with those to the other Party." (underlining added) The Technical Standards chapter of the Agreement goes on to define make compatible as meaning, "the process by which differing standards, technical regulations or certification systems of the same scope which have been approved by differing standardizing bodies are recognized as being either technically identical or technically equivalent in practice". (underlining added) Essentially, the FTA obligation for standards and approval processes requires mutual recognition (where possible) of the foreign counterpart regulations to domestic rules. This matter was discussed more fully within Section 4.4 of the Phase I study.

the applicant and may apply to any or all of radio services, radio systems, or radio equipment. Licensing may occur with or without certification of equipment. There are also certain types of equipment which require certification but do not require licensing. Appendix 1 provides a simple description and chart of licensed services and licence exempt equipment.

2.3 THE PROCEDURE

To form an information base on which to judge the needs and opinions of both private sector and government groups involved in the use and management of the radio spectrum in Canada and the U.S.A., extensive consultations were held in Ottawa, Toronto and Washington D.C. There were 24 meetings with 64 persons from 34 Canadian and U.S. organizations.

These meetings were with middle to senior management personnel and lasted one to two hours each. The organizations contacted represent a good cross section of service providers, manufacturers, users, laboratories, standards bodies and government. Many of the organizations were associations (such as the RABC, EEMAC, Information Technology Association of Canada (ITAC) and Telecom Canada) who in turn spoke on behalf of hundreds of member companies and associations.

A summary of the organizations contacted is shown in Appendix 2. The results of these interviews are listed in Section III. That the opinions and recommendations of those

interviewed differ is to be expected. Regulators, other government bodies, manufacturers, service providers, user groups and standards bodies are hardly monolithic in their structure or in their interests.

The study team has analyzed the various comments in some depth and then applied its own judgment to draw its own conclusions in Section VIII and make its own recommendations in Section IX.

In addition to the interviews, the study team carried out independent research which generated additional options and approaches.

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION III - CONSULTATIONS AND FINDINGS

This section records the opinions of those interviewed in relation to the five major questions identified in Section 1.2. and also lists additional options generated by the independent research of the study team. The conclusions and recommendations of the study team in relation to these findings and opinions are recorded in Sections VIII and IX.

3.1 THE NEED FOR HARMONIZED MANDATORY RADIO STANDARDS IN CAN/USA

3.1.1 General

In the Phase I Study, the Department of Communications had asked whether there was still a need in today's generally deregulatory environment for Mandatory Radio Standards. As reported in the Phase I report, the 74 participants in the 19 meetings in Canada affirmed the need for mandatory standards in Canada. There was a similar unanimity of agreement by American organizations about the need for mandatory standards in the U.S.A.

There was also general agreement in both countries about the desirability of "harmonizing" these standards in both countries. In this Phase II study, the study team was asked to explore, in greater depth, the real need for and the advantages to Canada of "harmonizing" mandatory radio standards.

3.1.2 The Real Need for Harmonized Mandatory Radio Standards in CAN/USA

It is important, at this stage, to understand the term "harmonization". For the purposes of

this study, it is defined in Section II, Para 2.2.2. It is broadly defined as the process of making technical standards or specifications either technically identical or technically equivalent in practice. It does not require that respective laws, rules or administrative processes in the two countries be identical or directly comparable. Extensive discussions were carried out with representatives of manufacturers, service providers, and users in Canada on the advantages to Canada of harmonization. All be it for slightly different reasons, all three groups were in agreement.

The manufacturers in Canada were most anxious to have one standard and therefore one production run to be able to produce a less expensive product and be better able to compete in a CAN/USA Market. There was not one Canadian manufacturer looking for a different Canadian standard. Their strong desire is to compete in the U.S. Market on the bases of quality and price of product. They do not now operate in Canada, and they do not wish to operate in the future, on the basis of protectionist standards.

Canadian service providers and user groups shared the conviction that a harmonized standard is the appropriate way to go. As expressed by them, one standard means more market potential. Larger markets mean lower prices and more manufacturers. More manufacturers mean a greater variety of products to meet service provider and user needs. Common standards are seen as a win/win situation by all Canadian groups. Appendix 3 provides a list of some products the standards for which, in the opinion of EEMAC, are unnecessarily different in Canada and the U.S.A. and should therefore be harmonized.

3.2 IDENTIFICATION OF STANDARDS FOR HARMONIZATION

3.2.1 General

Given, for the reasons stated in the preceding paragraph, that there is a perceived need to harmonize standards, how should candidate standards for harmonization be identified? No group suggested that the harmonization of all radio standards is desirable or even possible. In a number of circumstances, existing frequency allocations in the two countries differ and may effectively foreclose the possibility that either the spectrum used or the technical specifications involved can be harmonized.

A commonly held view is that the need for harmonization of standards is less in services involving microwave and satellite communications for which there are relatively few service providers and equipment manufacturers, and for which licensing does not require equipment certification. The need is greater in the area of more consumer oriented products such as mobile and personal communication services which have many service providers and equipment manufacturers and for which equipment certification is not required.

Appendix I provides additional background on "Licensing and Certification" of services and products.

3.2.2 A Canadian Process to Identify Standards To Be Harmonized

Harmonization activities, particularly at the bilateral level between countries, are time consuming and expensive. To justify the expenditure of such resources, there is a belief that

there must be a real economic benefit to or a strong service need by a Canadian organization.

Canadian organizations acknowledge that they must be willing to allocate resources to the harmonization process, beginning with the analysis of and decision on which standards should first be harmonized. EEMAC is on record to this study team (Phase I report, page 25) as being willing and able to undertake this role in certain fields.

The RABC is another group that is eminently qualified to achieve consensus amongst the Canadian radio services community as to which standards should first be harmonized. It is also considered important to identify separately standards for new services for which there are no existing standards, such as digital cellular or personal communications services, and standards for existing services for which standards are already in existence.

There is agreement amongst those interviewed that a Canadian organization should be identified to coordinate the identification of the standards that should be harmonized.

3.3 THE DEVELOPMENT OF HARMONIZED CAN/USA MANDATORY RADIO STANDARDS

3.3.1 The Process

Our discussions with private and governmental organizations indicate that there are at least three major schools of thought in Canada on how the harmonizing of standards should proceed once they have been identified:

a) Today, there are several standards writing organizations in the U.S.A. in which Canadian organizations participate fully as equals to American organizations. The TIA (Telecommunications Industry Association) and ANSI (American National Standards Institute) are two good examples of such organizations.

Those in this first school of thought state that, since over 90% of the CAN/USA market is in the U.S.A., a product to compete must meet the needs of that market, and a TIA approved standards (for example) developed with Canadian participation could readily be supported by the regulators (the DOC and FCC) in both countries.

(b) The second school of thought reflects the thinking of many that Canadian organizations on a U.S. standards body will always be the poor cousins; there on sufferance; and therefore not able to protect adequately Canadian sovereignty needs.

To avoid this, it is suggested that the equivalent of an ETSI (European Telecommunications Standards Institute) be formed. In ETSI, each European country meets as an equal to develop standards. The equivalent here would be to

form a NASI (North American Standards Institute) where Canada and the U.S.A. and Mexico, if appropriate, would meet as equal entities to develop North American harmonized standards. The concern about this approach is that it creates another level in the standards writing hierarchy which is already a multi-storeyed tower, if not also a many towered complex.

c) The approach developed by the third school finds particular application to the harmonizing of existing as compared to new standards, especially in the general consumer products area. It would have its greatest applicability to situations where different standards already exist in the two countries for what are primarily consumer products. This third approach suggests that Canada make every effort to adopt the current U.S. FCC approved standard for these consumer oriented products or to adopt as much of the FCC approved standard as possible. This approach tends to find favour amongst pragmatists and to cause concern amongst Canadian nationalists.

During the study team meeting in Washington with the FCC, an observation was made by Bob Cutts, Chief of the Authorization and Evaluation Division of the Office of Engineering and Technology of the FCC. He commented that work on the standards to be harmonized by the two countries could be coordinated or overseen by a senior level CAN/USA governmental committee such as the existing "CAN/USA Spectrum Management Technical Liaison Committee."

3.4 RECIPROCAL RECOGNITION OF TEST DATA IN CAN/USA

3.4.1 General

Section 3.3 outlined a process to create a harmonized mandatory radio standard against which testing and certification of a radio product could be carried out in either Canada or the U.S.A.

As recorded in the Phase I report (p.4, (4); p.104 (16)), all organizations interviewed in Canada and the U.S.A. agreed that there should be mutual recognition by Canada and the U.S.A. of data from tests on radio equipment carried out by authorized bodies in either country against a harmonized standard. This section 3.4 discusses alternative ways of providing that reciprocal recognition of test data. Prior to outlining these ways and because during the interviews conducted by the study team it was found that there were many misunderstandings about the current way in which test data are and are not accepted by the FCC and the DOC, the following paragraphs in this "General" section are provided to give additional background on test labs and test data that may prove useful to those not directly involved in the issues. While a detailed description of the Canadian and American radio equipment authorization rules are found within Sections 4.3 and 4.4 of this report, a brief overview of these rules is provided below for the convenience of the reader.

3.4.1.1 Canadian Considerations

In Canada, the rules and process for testing of equipment against a DOC approved mandatory standard are listed in RSP-100 and RSP-100, Appendix 3. The following

summary of the process is taken from Appendix 5 of the Phase I Report:

"In summary form, for certification to be given by the DOC for a particular set of equipment, the equipment must be tested against the DOC approved mandatory-standards (RSP 100, para 1.1.2) at either the DOC laboratory or a private laboratory. If the testing is performed by a private laboratory, an Engineering Brief is also required. Although not shown in RSP-100, Appendix 3, an Engineering Brief is provided by the DOC lab, also, if the testing is done at the lab.

The Engineering Brief is a document signed by a Canadian professional engineer "to certify that the equipment performs in accordance with the data submitted in the brief." (Para 2.1.1).

It should be noted that RSP-100 implies but does not state that the Engineering Brief must confirm that:

a) All the tests required in the mandatory standard were carried out.

b) The test procedures were carried out in accordance with the mandatory standards.

c) The equipment has met the mandatory standards.

It should also be noted that no where in the Canadian Certification Process is there a requirement that a lab be approved as qualified or even to have been judged as qualified to carry out the tests outlined in the mandatory standard."

In essence, acceptance of the reliability of test data by the DOC is based on two factors:

1) Reliance on the signature of a Canadian professional engineer as proof that

the equipment performs in accordance with the data submitted.

2) Reliance on the further analysis by the DOC that all the required tests were carried out; that the test results met the standard; that the test procedures by the private lab were appropriate.

3.4.1.2. U.S. Considerations

In the U.S.A., the situation in relation to the lab testing is more complex. There also, there is no official lab accreditation program required by the FCC. Test data are accepted from any lab in the U.S.A. or in Canada. There is also no requirement to have lab results certified by a professional engineer. Lab results must be submitted by the company seeking certification of the equipment and signed by an officer of that company, not by an officer of the lab. Should the test results prove to be spurious, the company, not the lab, is held responsible by the FCC. The FCC, while performing some overview of the test results submitted, primarily relies on competitive pressures from other manufacturers in the U.S.A. to ensure reliability of test results.

In the U.S.A., all test result submissions are public knowledge. In Canada, they treated as if they are confidential.

This whole question of testing and lab accreditation is also a matter of concern to NIST (National Institute Standards and Technology), the former Bureau of Standards in the U.S.A. NIST favoured the creation of a SCUSA (Standards Council of the U.S.A.) to

parallel the SCC (Standards Council of Canada) with its authority to recognize voluntary standards writing, testing and certification bodies.

Discussions with Dr. Stanley Warshaw, Director of the Office of Standards Services of NIST in Washington, provided additional useful information:

In December 1989, the Office of Standards Services of NIST announced in the Federal Register that a public hearing on "Improving U.S. Participation in International Standards Activities" would be held in April 1990. The stated purpose of the hearing was "to gather information, insights, and comments related to improving U.S. participation in international standards-related activities and to possible government actions". A proposal was also circulated by NIST to consider the establishment of a Standards Council of the United States of America (SCUSA).

The concept, based on the Standards Council of Canada, proposed an organization with the Department of Commerce (the Department in which NIST is located) whose function would be to administer U.S. standards and certification work in the international arena, including the accreditation of national standards developers. The hearing, chaired by Dr. Warshaw, was held on April 3-5, 1990 and produced a comprehensive report. Over 300 parties provided either oral or written testimony.

A thorough reading of the ANSI and official NIST analyses of the hearing reveals that very

few participants in the hearing supported the need for a stronger role for the Government in the standards development process. They similarly did not support the need to establish a SCUSA with authority in the area of standards development.

In sharp contrast to the comments on the standardization process, about 50% of each group of commentators on the conformity assessment process (testing and lab certification) stated that the Government must play a major role and another 12% favoured private sector cooperative support for government's role.

In the area of bilateral agreements between countries, the hearing noted that "most foreign governmental entities require attestation of conformity by Government-accredited labs and certifiers within their own borders." Many of the commentators raised the question of "notified bodies", which are European testing or certification entities officially recognized by the national governments of EC member countries. Particular interest was expressed in the subject of whether domestic testing and certifying organizations in the U.S.A. might attain recognition from the EC.

As a result of the hearing, NIST made a number of proposals for action by the executive branch of the U.S. Government and by the private sector. Some of the proposals particularly germane to this Phase II study are:

1) The Government and the private sector should take steps to implement the policy of using international standards when available.

2) The Government should seek implementation of the concept of EC recognition of "notified bodies" in the U.S.A. Note that "notified bodies" implies testing or certification bodies officially recognized by the national government, that is, an accreditation program.

3) Appropriate systems should be developed in the U.S.A. to meet the needs of U.S. manufacturers and exporters to have U.S. conformity assessment programs accepted abroad.

On another front in the U.S.A., it is worth noting that in 1989, the influential U.S. Advisory Committee for Trade Policy and Negotiations recommended to the Honourable Carla A. Hills, the U.S. Trade Representative, that the U.S. Government "press for the establishment of appropriate mechanisms that will lead to the mutual recognition of testing data and certification procedures".

3.4.1.3. GATT and FTA Considerations

Both GATT and the FTA (Free Trade Agreement) point to the need for reciprocal recognition of testing and certification performed in member countries.

The FTA (Art. 605, para 1) states that "each party shall provide for recognition of the accreditation systems for testing facilities, inspection agencies and certification bodies of the other Party".

In GATT, the Standards Code came into effect on January 1, 1980. While GATT and the FTA do not require that domestic standards systems recognize the tests, test data or product certifications of the other signatory countries, they do create the expectation that they will.

3.4.2 Alternative Approaches to Reciprocal Recognition of CAN/USA Test Data

To some in Canada, the existing process of accepting lab results based on attestation by a Canadian professional engineer is working satisfactorily. It is simple for the DOC to administer; it requires minimal governmental involvement; and it should be continued.

To others in Canada, the existing process in Canada is extremely loose; the role of the engineer is ill-defined; and while the vast majority of manufacturers is most reliable, the process has loop-holes that work to the advantage of the less reliable manufacturer or importer. This group of interviewees believes that, as a minimum, the existing process must be improved.

A third group believes that data from any Canadian or U.S. lab should be accepted (unsigned by any professional engineer), as it is in the U.S.A., and that the manufacturer or the importer should be held responsible for any spurious data submitted.

Another solution held by some would be to adopt the approach of the EC and to set up "notified bodies" (See Section 3.4.1.2) which are testing or certification entities officially recognized by the national governments in the EC. The test results from any such "notified

body" are automatically accepted by the certification bodies in any other country with which there is a reciprocal agreement at the government level.

It is important to note that the acceptance of a lab by a foreign country is predicated upon the lab's having been approved by the national government to provide some degree of assurance internationally that the lab is indeed qualified to test in the area under consideration.

It is equally important to note that, while the lab must be accredited, it does not have to be directly accredited by the national government. It is quite permissible for the government to delegate its authority for accreditation to another national body, such as the SCC in Canada, who would give the direct accreditation. The essential requirement from an international point of view, is that the national government be ultimately responsible for the reliability of the labs accredited in its country.

It does not seem to be a widely known fact in Canada that there already exists one Government mandated lab accreditation scheme. Through the authority of the CRTC, the DOC Certification and Engineering Bureau (Clyde Ave.) has been given the legal authority to accredit labs, both in Canada and internationally, which wish to perform testing on equipment seeking certification to be connected to the Canadian telecommunications network. This program is commonly known as TAPAC (Terminal Attachment Program Advisory Committee). By all reports, this TAPAC lab accreditation program is working

well.

The creation of such a government approved lab accreditation scheme would naturally be expensive for the government body involved, but it would also be quite practical to perform individual lab accreditation reviews on a cost recovery basis.

It is also possible to apply a lab accreditation scheme only to labs which wish to test for international certification of products. Canadian labs wishing to test products for domestic use only, could conceivably operate under the present DOC process of having the lab's results certified by a Canadian engineer.

The conclusions and recommendations of the study team in relation to these various alternatives are found in Sections VIII and IX.

3.5 RECIPROCAL RECOGNITION OF EQUIPMENT AUTHORIZATIONS IN CAN/USA

3.5.1 General

In Canada, the only body authorized to certify radio equipment for sale is the DOC in accordance with RSP-100, Certification of Radio Equipment. In the U.S.A., the similar and only body is the FCC.

The question to be addressed in this section is whether it is practical to certify, automatically in Canada, radio equipment that has been approved by the FCC for sale in the U.S.A.

Reciprocal recognition of DOC authorization would be required by the FCC. This section assumes that Canada and the U.S.A. have agreed upon a common standard (Section 3.3) and agreed upon reciprocal acceptance of test results (Section 3.4) of equipment measured against that standard.

3.5.2 Interviewee Comments and Research Findings

It is interesting to note that, amongst the many groups interviewed, there is no consensus about either the need for reciprocal recognition of equipment certified in Canada and the U.S. or about the process if there were to be reciprocal certification.

The following (edited) comments were received during the interview stage of Phase II and they were made by:

- Certelecom Labs Inc.
- The RCMP Telecommunications Branch
- The Telecommunications Advisory Committee of the Canadian Association of Police Chiefs
- The DOC Certification and Engineering Bureau
- The DOC International Relations Group
- The DOC Spectrum Management Operations Group
- Transport Canada - Aviation
  - Coast Guard
- Marine Committee - Western Canada Telecommunications Council
- Telecom Canada

- Electrical & Electronic Manufacturers Assoc. of Canada
- Information Technology Association of Canada
- Standards Council of Canada
- Radio Advisory Board of Canada

Comments Received and Research Findings

1. "Canada should accept equipment certified by the FCC as long as there is a common standard and agreement on mutual acceptance of test data."
2. "A Canadian certification body is a must if only to provide a service for Canadian manufacturers who would otherwise have to go to the U.S.A. for certification."
3. "A Canadian certification body is required to provide for any unique Canadian requirements."
4. "It is probably impractical to consider total, reciprocal recognition of all equipment certified by either country. However, with agreed upon testing methodology against a common standard, certification by either country of equipment certified in the other country could all but be rubber stamped."
5. "If Canada (or the U.S.A.) is going to license, we (they) must certify equipment in order to be able to pursue legally and enforce later any decertification."
6. "If there were not separate certification by each country, decertification would either have to be done jointly, which would be a procedural nightmare, or there would have to be mutual and automatic decertification by one country when the other decertifies."

7. With marine radio products, Transport Canada essentially accepts U.S. testing and certification. Only the spectrum aspects of marine equipment are certified in Canada and that is done by the DOC, not the Coast Guard.

8. Transport Canada - Aviation accepts testing and certification of aeronautical radio equipment by the U.S. FAA (Federal Aviation Agency). The FAA does not accept Canadian testing and certification. This is not a problem because there is little or no aeronautical radio equipment manufactured in Canada.

9. "There is no support for any Canadian marine radio equipment standard that is different from that in the U.S.A. Most is manufactured in the U.S.A. and any FCC approved marine radio equipment should be rubber stamped by the DOC."

10. "The DOC must retain as a minimum a Canadian certification overview."

11. The Standards Council of Canada is essentially an "accreditor" of accreditation organizations and of labs. The SCC was formed by an act of Parliament in 1970 to coordinate voluntary standardization in Canada and to carry out certain specific programs in that regard. These programs include:

- Accreditation of standards writing organizations and approval of National Standards of Canada. The SCC does not write or develop standards. It accredits bodies that develop and accredit standards. (e.g. CSA)
- Accreditation of testing organizations. The SCC does not "test". it does, however, accredit individual labs as compared to accrediting only organizations that accredit labs.
- Accreditation of certification organizations. Again the SCC does not accredit

equipment. It accredits organizations that accredit equipment.

The accreditation programs are all voluntary. The SCC could not mandate the accreditation of radio test labs as an example. However, the DOC could, if it so chose, mandate that only labs accredited by the SCC would be acceptable to the DOC.

12. - "It is more important to Canadian manufacturers to have a common standard with the U.S.A. than a common certification label."

3.5.3 Summary of Interviewee Comments on Reciprocal Equipment Authorizations with the U.S.A

There is clearly no consensus amongst those interviewed about the need for reciprocal acceptance by each country of equipment authorized in the other.

The study team has reached its own conclusions. They are listed in Section VIII. Recommendations are in Section IX.

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION IV - A REVIEW OF THE CANADIAN RADIO EQUIPMENT AUTHORIZATION RULES

4.1 INTRODUCTION

The objectives of this section of the report are to examine the legal and regulatory problems surrounding the current Canadian radio equipment authorization scheme and to suggest improvements which will make it more efficient and effective. Such improvements should capitalize upon the full potential of the enabling authority within the new Radiocommunication Act, and should maximize the potential for Canada and the U.S.A. to harmonize their rules for the testing and authorization of radio spectrum related equipment.

4.2 GENESIS OF THE CANADIAN AND AMERICAN RADIO EQUIPMENT AUTHORIZATION RULES

Radio equipment authorization, by means other than by licensing, developed in Canada and in the U.S.A. in the early 1950's. In conjunction with a rapid succession of international and regional radio conferences to rationalize the use of the radio spectrum in the post-war era, both nations began implementing the decisions reached at those conferences through the creation of technical radio equipment standards. These standards amounted to minimum technical performance requirements. During the early 1950's both countries created an equipment approval scheme and a government testing laboratory, to ensure compliance with these new standards.

In the United States, radio standards followed the pattern of other mandatory federal

government standards programs which developed in the post-war era. The radio standards scheme applied throughout the entire equipment distribution chain (manufacture/importation, distribution, sale, lease and use) and was enforced with criminal and administrative sanctions. Due the legal requirements of the Administrative Procedure Act, which had been passed in 1946, the Americans had to draft and promulgate their technical standards in the form of subordinate legislation. Their equipment approval process also had to be encodified in subordinate legislation. This meant that both their technical standards and authorization processes had to be created and amended by means of a formal, public rulemaking procedure.

The nature and scope Canadian technical standards and equipment authorization scheme were quite different from their counterparts in the U.S.A. for two reasons. The reason why the nature of the standards and processes was different was that Canada had no equivalent to the Administrative Procedure Act in the 1950's, to require that technical standards or authorization processes be drafted within subordinate legislation. And, when the Telecommunications Division within the Department of Transport (DOT) was looking for a basic format as the model for its standards and authorization rules, it settled upon the format used by the department's Civil Aviation Division for the airworthiness of aircraft. These rules implemented international agreements and were drafted as technical departmental documents by DOT engineers who consulted directly with aircraft manufacturers and user groups. These technical documents were not drafted in the form of regulations.

The reason why the scope of application of the Canadian technical scheme for radio equipment was considerably different from the one which developed in the U.S.A. was because of a political promise made in 1938. When the Radio Act was first enacted in 1938, C.D. Howe, the minister responsible for this legislation promised that nothing within the new act would impact upon radio equipment which was within the distribution scheme. Thus, the 1938 Act extended control over radio apparatus only to the limits of its installation, operation or possession, if such possession was related to its installation or use. In the 1950's, when radio standards and equipment approval schemes were being planned, the Telecommunications Division did not enjoy a high enough profile within the Department of Transport to press for the legislative amendments necessary to extend radio regulatory powers beyond the operation and possession of equipment. Another factor which influenced the decision not to extend the scope of the application of the Radio Act was that aircraft airworthiness requirements were enforced at the point of equipment licensure, not at the point of importation of the aircraft. As noted above, the radio equipment scheme was modeled after the aircraft certification regime.

4.3 THE EXISTING CANADIAN RADIO EQUIPMENT AUTHORIZATION SCHEME

4.3.1 Standards and Technical Requirements

This nation's approval rules for radio frequency related equipment are contained within seven types of departmental documents called radio regulations, schedules, procedures, specifications, plans, lists and policies. Most of these instruments were drafted by engineers

and technical staff within the Department of Communications[3] in consultation with manufacturer, service provider and user groups; and with general public consultation through notice in the Canada Gazette. With very few exceptions, they were created under the regulatory mandate of the former Radio Act, which was repealed upon proclamation of the new Radiocommunication Act on October 5, 1989.

While determination of the legal status of each policy instrument would require a considerable amount of research, generally one must conclude that the department's existing procedures, specifications, plans, lists and policies likely have no independent legal status. Unlike the regulations and schedules referred to above[4], these documents were not drafted as subordinate legislation, so that any legal status which they enjoy is pursuant to their subsequent incorporation into law, by means of a direct reference within a valid legislative enactment[5]. In a number of cases such an incorporation by reference exists, but in many cases it does not.

Since the current radio equipment authorization process is centred around the department's

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[3] Of course, long standing technical and procedural documents were drafted by the engineering staff of the Department of Transport. The Department of Communications came into existence in 1969.

[4] Standards and technical requirements set out within subordinate legislation do have an independent status of law. For example, technical standards for certain interference-causing equipment are mandated within the Radio Interference Regulations.

[5] It is not unusual for technical standards for particular categories of radio frequency related equipment to be made mandatory by means of direct reference of the standard (by name, number and issue date) into the General Radio Regulations, Part II.

procedures, specifications, plans, lists and policies, these should be explained further so that the Canadian equipment authorization scheme and its problems might be understood more fully. They are as follows:

Radio Standards Procedures (RSP's)

These are information documents which detail information about radio standards, radio systems and radio equipment approval. The principal RSP document related to equipment approval is RSP-100 (Issue 6 : 25 July 87) which sets out the general conditions (eligibility, filing and procedural) surrounding the issuance of an equipment approval for licensing, or exemption from licensing. This approval process, referred to generally as equipment certification, will be discussed more fully within subsection 4.3.2 of this report.

Radio Standards Specifications (RSS's)

The RSS's are documents which specify minimum technical equipment performance parameters related to use of the radio spectrum. These documents are issued in "Provisional" and "Final" format, and only when an RSS is in its final format is compliance a precondition of issuance of an equipment certification. Where such compliance is required, a "type-approval" will be issued by the Department. Typically, these RSS's relate to particular categories of radio equipment (licensed or licence-exempt and they contain minimum performance characteristics for both the transmitting and receiving

aspects of the equipment to which they apply. Often, a detailed test methodology is included within the RSS itself.

Standard Radio System Plans (SRSP's)

These documents arose from efforts in the early 1960's to comprehensively plan the orderly development of terrestrial microwave installations in Canada. They address the technical requirements for the radio equipment and its antennae, and set out preferred frequency channelling arrangements. While these SRSP's constitute a form of equipment certification, these plans appear to be a mixture of frequency assignment, equipment authorization and installation control instruments.

Radio Equipment List (REL)

These lists are published quarterly by the department as a public notice of the radio equipment for which a valid equipment certification (type-approval or technical- acceptance) is extant.

Spectrum Utilization Policies (SP's) and Radio Systems Policies (RP's)

SP's and RP's are radio spectrum utilization plans and policies which tend to be used in the microwave portions of the spectrum. In addition to being guideline allocation documents these plans often set out minimum

performance requirements for categories of radio equipment. Radio equipment for which a mass consumer market is anticipated may require an equipment certification procedure.

4.3.2 Equipment Certification and Testing

As noted above, the document entitled; "Certification of Radio Equipment" (RSP - 100) is the basic regulatory and procedural instrument for the approval (certification) of radio frequency related equipment. It supplies the certification rules for radio equipment (where such requires certification). According to this document, the two forms of equipment certification are "type-approval" and "technically-acceptable".

Type-Approval

This designation is reserved for equipment for which technical evidence exists that a representative sample of the equipment has met the minimum technical requirements contained within a particular RSS (Radio Standard Specification).

Technically-acceptable

For all remaining equipment requiring an authorization, the designation technically acceptable means that a representative sample of the equipment has met (or has satisfactorily performed in relation to) the requirements of a technical standard which was not contained within a final RSS (RSP - 100:

> Para. 2.2.2.2). In other words, when the department does not have a settled standard in place it will select a set of technical parameters of best fit in the interim. On occasion, provisional RSS's have been selected as interim standards for this grant of equipment authorization.

Once the appropriate technical standard has been notified, the applicant either must have a representative sample[6] tested to that standard by the departmental lab or, in the alternative, they must have the unit tested at a private facility[7] and submit the technical data to the department in the form of an "engineering brief". For testing not done by the Department of Communications, with only a few exceptions, an engineering brief is required (Para. 1.6.2). This engineer's brief must be submitted under the seal and signature of an individual licensed by a Canadian provincial professional engineering association (Para. 2.1.1). Effectively, the result of this rule is that data from engineering tests performed outside of Canada are not acceptable to the department unless the data has been endorsed by a Canadian engineer. In an attempt to ensure that the remainder of the units in a production run also comply with the appropriate standards Paragraph 1.4.3 of RSP -100 states:

> "Adherence of subsequent production units to the technical quality and characteristics under which certification was originally granted is implicit in

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[6] On the form itself, the applicant signs a statement warranting that the unit(s) submitted for testing are representative samples of the production run.

[7] There are a growing number of commercial testing facilities in Canada. Additionally, a few large manufacturers have testing facilities located within their own laboratories.

the granting of a certificate. Failure to meet this requirement is sufficient cause for revocation of a certificate."

Once equipment has been certified as type-accepted or technically-acceptable the certificate is issued to the applicant manufacturer or Canadian distributor (if the equipment is manufactured outside of Canada), and the equipment is entered on to the department's Radio Equipment List (REL). Once a certification has been issued, according to Paragraph 1.4.1.2, the Department reserves the right to do audits of equipment to ensure that subsequently manufactured or imported units comply with the terms of the certificate. Also, the grantee of a certificate must immediately inform the Department of alterations, of a technical nature, made to models of equipment which have been approved.

One final condition of eligibility for equipment certification within Canada should be noted. This requirement is that all applicants must provide assurance in writing of the existence of a Canadian maintenance facility which is capable of repairing the equipment or declaring it irreparable. The condition also states that a departmental representative might inspect the maintenance facility from time to time (Para. 1.4.2).

4.4 THE CURRENT AMERICAN RADIO EQUIPMENT AUTHORIZATION SCHEME

The Federal Communications Commission's radio equipment approval rules are found within the Communication Act of 1934 (as amended), Title 47 of the Code of Federal Regulations, the Consolidated Omnibus Budget Reconciliation Act of 1985 and FCC Forms 731 and 740. These rules are extensive and comprehensive, and almost every authorization

element (procedural, regulatory or technical) exists within a form of legislation, either primary or subordinate. The scheme applies to almost all types of radio frequency equipment in the country and the scope of control extends from point of manufacture or importation of equipment, to licensing or exemption from licensing, to putting radio equipment into operation. For most categories of radio equipment, importation and marketing are illegal unless an FCC equipment authorization has been obtained in advance. Issuance of a grant of authorization is premised upon compliance with technical standards and technical requirements which, for the most part, are set out by category of radio service or equipment-type within discrete subparts of Title 47 of the U.S. Code of Federal Regulations (C.F.R.). Almost without exception, these technical standards or technical requirements are related to the characteristics of the emissions of the equipment and the applicable test methodologies not generally part of U.S standards per se. Instead, the name or other identifier of the appropriate test methodology is usually referred within the standard. Generally, the FCC will not accept test data which were not obtained using the referenced test methodology.

The FCC does not have one basic radio equipment approval process, it has five. The applicability of these separate processes is dependent upon the particular authorization type called for in the FCC rules (C.F.R. Title 47). For the most part, the real determinant of the form of equipment approval and process is the category of equipment to be authorized. The Commission has four separate types of authorizations for which an approval is specifically issued or granted; and one form of self-verification of compliance, where nothing is expressly

granted by the Commission. The four types of express authorizations (and processes) are as follows:

Certification

A grant of equipment certification is available for certain unlicensed digital equipment and low power radio frequency-related devices, and for most types of consumer Industrial, Scientific and Medical (ISM) equipment. The certification process requires that an applicant have a representative sample of their equipment tested for compliance with the appropriate technical rules, and submit that data for a desk review by Commission staff. The submission of a sample unit for FCC testing is not required, but the Commission has the power to order the production of a sample prior to or subsequent to the issuance of its grant. (Part 2.907)

Type-Acceptance

This form of authorization is used for many categories of radio transmitting equipment which is operated in conjunction with a station licence. Issuance of a type-acceptance grant is based upon a Commission desk review of test report data submitted by the applicant. This data should establish to the reviewer's satisfaction[8] that the proper tests and test methodologies were

[8] It should be appreciated that all data is not reviewed in a detailed manner by the authorization staff at the FCC. Generally, labs which have never submitted data before and those labs which have a reputation for submission of unreliable data are given careful

followed and that the particular equipment has complied with the appropriate technical requirements. Except in a very few circumstances, submission of a sample is not required. Submission of a sample can be ordered by the Commission. (Part 2.905)

Type-Approval

Certain licence-exempt equipment covered under FCC rules is subject to type-approval authorization. Under this form of approval one or more samples of equipment must be submitted to the Commission laboratory for testing to ensure compliance with the appropriate technical standards for that equipment. (Part 2.903) Once the Commission's staff has determined that the sample(s) comply with the technical standards a grant of type-approval will be issued.

Notification

Under the notification procedure the applicant tests the equipment, and submits to the Commission a form which attests to the fact that the appropriate tests were conducted and that the equipment was compliant. The applicant for a notification grant must maintain its records of the tests, test methodologies, and test equipment calibrations used to obtain the results

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scrutiny. Test data from other sources is reviewed or audited on a random basis. (Approximately 20% - 25% of all data is reviewed in detail).

submitted. At its discretion, the FCC may request that either the test data or an equipment sample be submitted to the Commission for review or testing. (Part 2.904)

The one form of equipment approval process which does not involve the issuance of an FCC authorization is called verification. Its process and other requirements are as follows:

Verification

This form of equipment approval requires the seller or importer of radio frequency related equipment to determine which are the appropriate technical requirements and tests for the particular equipment at issue; and to ensure that their equipment is in conformity with all requirements prior to selling or importing it. Under this form of honour system no FCC application or filing is required and no Commission authorization is issued. At its discretion, the FCC may require submission of the test data or a representative equipment sample in order to confirm the equipment's compliance. Verification applies to certain digital apparatus and certain receivers covered under Part 15 of the Commission's rules, FM broadcasting and television receivers, non-consumer ISM equipment and certain ultrasonic communicating equipment which can cause interference to radiocommunications. (Part 2.902)

While these five equipment approval types and processes may vary, they have a number of

common regulatory characteristics which can be discussed together. The commonality of the approvals is most obvious when comparing the four forms of FCC-issued authorizations.

(i) Scope of application - The application or jurisdiction of the equipment approval requirements contained within the FCC rules cover the full range of activities from manufacturing or importing radio frequency related equipment to putting it into operation. FCC rules expressly require that all radio frequency equipment which is imported from outside of the United States must comply with the regulatory and technical requirements of one of the five types of equipment approvals as a condition precedent to importation into the United States[9]. These requirements are mandated by the Communications Act itself (which does contain a few exceptions, such as when such devices are for export only).

(ii) Scope of authorization - The Commission's rules expressly state that

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[9] FCC rule Part 2.803 states, "...no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease) or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any such radio frequency device, unless, prior thereto, such devices shall have been type-approved, type-accepted, certified or notified as the case may be...". For equipment covered by a verification process, Part 2.805 states, "In the case of a radio frequency device which, in accordance with the rules in this chapter, does not have to have a grant of equipment authorization....but, nevertheless, must comply with specified technical standards prior to use, no person shall sell or lease,... [etc.]....or import, ship or distribute...unless prior thereto such device complies with the applicable administrative and technical provisions (including verification of the equipment, where required) specified in the Commission's rules."

equipment authorizations apply to particular categories of radio frequency equipment but that the authorization itself is issued to the particular applicant. Once granted, it may not be assigned or transferred to a second party. Authorizations may only be licensed to second party manufacturers or marketers, but the original grantee of the authorization remains legally responsible for the compliance of the equipment. (Part 2.929).

It should also be noted that the rules provide that once a type-acceptance, type-approval, certification or notification has been granted, the authorization extends (attaches) to all subsequently imported or produced equipment of the grantee which is identical ("identical", within the variations expected using quality production techniques). (See Part 2.908)

(iii) Acceptance of test data - The FCC's rules do not authorize the Commission to treat foreign test data in a manner different from that which resulted from tests performed within the U.S.A. Rule Part 2.947 states that the FCC will accept data which have been measured in accordance with its own approved test methodologies or those published by national engineering societies (if such methodology is acceptable to the Commission). The FCC produces a listing of domestic and foreign laboratories which have demonstrated a desire to perform conformance testing for the public on a

contract basis, and this list[10] is made available as a public service. The only governmental scrutiny of those facilities which request to be listed is that they must file certain information with the Commission to prove that they possess equipment capable of measuring specific types of unlicensed radio frequency devices subject to certain Part 15 technical requirements[11].

(iv) Compliance mechanisms - In the FCC rules and regulations related to radio equipment authorization, the prohibitions, the sanctions for non-compliance and the parties legally responsible for compliance are explicitly prescribed. As noted previously, FCC prohibitions state that no person shall sell or lease or offer for sale or lease or lease (including advertising for sale or lease) or import, ship or distribute for the purpose of selling any radio frequency equipment which is subject to compliance to technical requirements unless the equipment has been issued an FCC authorization, or is in compliance where no authorization is required. Under Part 2.909 of the

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[10] The list is called "Contract Test Sites on File" the current issue is as of January 1, 1991. This list contains a number of non-U.S.A. facilities, including five located within Canada.

[11] The FCC's policy of treating test data of foreign or U.S. origin in an identical manner was explained in detail, in part, to clear up confusion about this matter which arose during consultations with members of the Canadian manufacturers' association, EEMAC. A few of the member representatives were of the view that FCC rules or policy required that Canadian test data would not be accepted by the Commission unless it was certified by a U.S. engineer. Clearly, such is not the case. The only rule which might limit the submission of foreign test data is Part 2.953(b), which requires that all test material be submitted in English.

Commission's rules the principal party responsible for the compliance of radio frequency equipment for which the FCC issues an authorization is the grantee of that authorization. For verified equipment, principal responsibility for conformance rests with the manufacturer or importer of those devices. Also, anyone who is profiting from the sale or use of the equipment can be held liable for its non-compliance if they knew or had reason to know that it was not in conformity.

The sanctions for non-compliance with the Commission's rules related to equipment authorization include administrative fines and forfeitures, blacklisting of grantees who have a history of non-compliance, cease and desist orders, customs enforcement (including forfeiture of monetary bonds and equipment), revocation of an issued grant and criminal prosecution. As of January 1, 1990, the maximum sanctions for monetary forfeitures for marketing and equipment violations were increased dramatically. According to Public Law 101-239, the maximum sanctions are now set at $10,000.00 per violation to a maximum of $75,000.00 for a single act. In recent history, the FCC has been issuing administrative citations at the rate of almost 1000 per year to a combined value of approximately $800,000.00 per annum[12].

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[12] While FCC staff did talk openly about this particular form of compliance mechanism, it uses with regularity an "informal policy" of voluntary equipment surrender. Once an officer in the field has informed a person of the administrative or judicial consequences of their non-compliant activity, they may be given the option of surrendering their equipment to the officer with no further process issued. This policy developed around the CB linear

> In addition to the spot audits[13] which the FCC performs on radio frequency equipment following the issue of an authorization, the Commission's rules facilitate the receipt and processing of complaints from those who have reason to believe that a competitor's equipment is not in compliance with its authorization(s). Currently, the Commission's enforcement efforts are very dependent upon identification of non-compliant equipment through complaints by those who assert that such non-conformity may be giving a competitor an unlawful advantage.

This review of the Federal Communication Commission's radio frequency equipment approval rules has revealed a comprehensive and complex scheme, involving five types of equipment authorization, with a number of different and common processes and requirements. Generally, the scheme extends over the entire range of anticipated activities (manufacture, importation, marketing, etc.) and the Commission has at its disposal, and in fact uses with regularity, its compliance and sanction powers.

4.5 THE POTENTIAL FOR GREATER EFFICIENCY AND HARMONIZATION IN THE RADIO EQUIPMENT APPROVAL SCHEME IN CANADA IN RELATION TO ITS U.S. COUNTERPART

4.5.1 Introduction

The terms of reference for this report call for comment upon how the existing Canadian

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amplifier round-up of the 1980's.

[13] For rules dealing with auditing see Parts 2.943, 2.945, 2.946, 2.956, 2.957 and 15.29.

radio equipment approval scheme can be made more effective and efficient. In particular, investigation was directed toward the possibility of increasing efficiency by increasing the amount of harmonization between the Canadian scheme and the U.S. equipment approval system. These research efforts were to capitalize upon the enabling authority within the new Radiocommunication Act to support this harmonization and to support improvements to the Canadian system which would make it more effective and efficient.

4.5.2 Reciprocal Acceptance of Foreign Radio Equipment Authorizations

One policy response to render equipment authorizations more effective and efficient would be for Canada and the U.S.A. to move toward reciprocal acceptance of the other administration's radio frequency equipment authorizations. In other words, once one administration had issued an authorization for a particular category of radio frequency equipment, the other administration would promptly issue an equivalent authorization upon being petitioned to do so by authorized national agent of the successful foreign grantee. Under such a policy the "seconding" radio regulatory administration would impose no further testing or certification requirements[14].

In order to implement a program of reciprocal acceptance of foreign authorizations, a number of practical or political preconditions would have to be met. At a minimum, it

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[14] One must remember that marketing in the seconding administration may require conformity with additional (non-radio related) regulatory obligations set by other governmental authorities. Such additional regulations might include electrical shock or fire hazard precautions, or bilingual labelling and marking requirements.

would be necessary for each country to have:

(i) - roughly equivalent equipment technical standards and technical requirements. The notification rules within the Free Trade Agreement would serve to inform the other nation of proposed changes in the standards so that equivalency might be maintained.

(ii) - roughly equivalent equipment approval test methodologies. The notification rules within the Free Trade Agreement would serve to inform the other nation of proposed changes in these methodologies so that equivalency might be maintained.

(iii) - full confidence in the integrity of the equipment authorization processes of the other administration.

(iv) - a notification process for prompt notice to the other administration of withdrawal or suspension of an equipment authorization. Such notice should include reasons for the action taken. (Either administration could cancel an authorization for cause.)

The "seconding" radio administration might participate in a reciprocal authorization scheme only if its officials had a reasonable level of confidence in the reliability of:

(i) - the test data submitted to the granting administration.

(ii) - test data which was not solicited or reviewed by the granting administration[15].

(iii) - the conformity of radio equipment which is manufactured or marketed within, or imported into the granting administration pursuant to the initial authorization[16].

It should be noted that Canada has gone beyond this policy with respect to two categories of unlicensed radio frequency related equipment. For some time, Canada has recognized valid FCC authorizations issued for models of Citizen Band (CB) equipment. Under the applicable RSS for the General Radio Service (GRS), U.S. approved units are regarded as lawfully being licence-exempt within Canada, despite the fact that no DOC authorization has been issued. A similar approach is now being taken with certain digital apparatus which has been authorized within the U.S.A. under Part 15 rules, and is subsequently imported into Canada. These policies are regarded as going further than the policy under investigation because the U.S. grantee is not asked to apply for a Canadian authorization

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[15] For example, the FCC's notification and verification schemes normally do not require the submission of test data or equipment samples.

[16] If the U.S. seconded an authorization issued in Canada they would have to permit models of that equipment to cross their border freely, unless they suspected that the equipment was non-compliant, or otherwise unlawful in the U.S.A.

and none is issued in Canada.

Canada's approach to GRS equipment and certain digital apparatus is not recommended for additional categories of radio frequency equipment, unless DOC officials find that the equipment is being unlawfully brought into Canada in great quantities, and such an approach appears to be in the public interest.[17] The principal difficulty with this approach is that it offers Canada no means of enforcement against the foreign manufacturer or its Canadian agents; be they importers, distributors or retailers. It is interesting to note that the U.S.A. does not have a reciprocal policy with Canada in regards to either of these two categories of radio equipment.

4.5.3 Technical, Legal, Regulatory and Practical Impediments to Reciprocal Issuance of Radio Authorizations

As an initial problem to reciprocal issuance of radio authorizations it must be appreciated that, while many of the "technical numbers" within many Canadian and American technical standards and technical requirements are identical or roughly equivalent, there are some fundamental differences also. As noted within the Phase I study, the allocation of radio spectrum differs for a number of categories of radio equipment. Additionally, there is the often-raised impediment to harmonizing activities of the existence of radio receiver

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[17] Understandably, some categories of consumer-related radio devices do and will enter Canada, from the United States, in great numbers. The philosophy of "free trade" and recent increases in Canadian taxes are making cross-border shopping by Canadian consumers a national past-time. In some cases, if Canadian radio regulators do not move toward unconditional recognition of a valid FCC authorization, they will forego any control over the equipment through the licensing process (and forego also, the licensing revenue).

performance standards within Canadian technical requirements. The issue of harmonization of receiver standards is addressed within Section VII of this study.

As matters stand, legal and regulatory impediments to reciprocal equipment authorizations abound. For example, the U.S. Communications Act of 1934 expressly prohibits the importation of radio frequency equipment which has not been authorized pursuant to the FCC's procedural and technical authorization rules. Obtaining an amendment to primary legislation will be much more difficult than amending subordinate legislation or regulatory policy. It may also pose a problem to reciprocity that test data must be submitted in English in the U.S.A. Canada has had two official languages for some time. The Canadian requirement for the existence of a repair depot within its border, for imported equipment, may be seen as legal impediment because the U.S.A. has no equivalent rule[18]. Also, while not truly a regulatory problem, it should be appreciated that the FCC frequently mandates its "verification" procedure (for which no authorization is issued by the Commission), thus there would be no state action for Canadian officials to reciprocate upon. Where the verification procedure is mandated in the U.S. enforcement action within Canada for non-compliance would be complicated by the fact that no promises or warranties concerning equipment would be made to Canadian officials.

One practical complication to reciprocity should be mentioned. As set out above, the

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[18] During consultations with EMMAC representatives in Canada, the opinion was expressed by more than one individual that the DOC should drop this requirement as it was not radio related.

seconding administration must put a considerable amount of faith in the functioning of the equipment approval system in the administration which issues the principal authorization. According to a number of the Canadians consulted during both phases of the radio standards study, the equipment approval system in this nation does suffer from some credibility problems with the radio industry. These problems stem from a number of factors. First, the current requirement for the submission of test data under the seal and signature of a Canadian-licensed engineer is not regarded as a sufficient check on the reliability of the data. Second, it is well known that the Department of Communications does not prosecute companies for non-compliance with its radio equipment approval rules. Third, industry representatives appreciate that, for enforcement purposes, the regulatory reach of the current authorization system extends only to the licensing of equipment and not to its marketing or importation. While these complaints were not raised by American government or private sector representatives when interviewed for either phase of this study, such matters are bound to cause problems if negotiations toward harmonization become serious. One must remember how competitive the private sector is in the U.S.A. The radio industry would start to regard Canada and the U.S.A. as one competitive market where the risk and reach of prosecutorial action should be applied equally to all.

Before leaving the matter of reciprocity within the equipment authorization procedure one minor point should be raised. For some time, the Department of Communications has permitted foreign applicants to pay their authorization processing fees in Canadian or U.S. funds. Due to FCC rule Part 1.1108, all authorization processing fees must be paid by

cheque, bank draft or money order "denominated in U.S. dollars and deposited in a United States financial institution". Accordingly, this FCC rule does not permit the Commission to extend the same courtesy to Canadian-based applicants for U.S. equipment authorizations. If harmonization activities in relation to equipment authorization are pursued, this rule should be changed to accommodate the payment of U.S. authorization fees in Canadian currency (using applicable exchange rates). Such an accommodation by the U.S. government to Canadian industry could be justified to other (excluded) nations on the basis of the harmonization objectives contained within the Free Trade Agreement.

4.5.4 Reciprocal Acceptance of Foreign Test Data

As an alternative to reciprocal issuance of equipment authorizations, Canada and the U.S.A. may decide to investigate the policy option of further harmonizing their processing of test data. There are two basic options here. The first is to accept in a reciprocal manner foreign test data which is submitted in conformity with domestic technical standards and test methodologies. This option is now available. The second, and more complex, option is to first harmonize (or make equivalent) a series of technical standards and test methodologies, and then to accept (reciprocally) data submitted from test houses located in either administration in conformance with those harmonized standards and methodologies.

As the Canadian and American radio authorization rules and processes now stand there are only a few impediments to the reciprocal acceptance of test data. On the U.S. side, the only problem is that all data must be submitted in English. Despite the fact that the submission

of Canadian data to the FCC in French will not arise often as a practical matter, French is an official language in Canada yet the FCC would not process French documentation. On the Canadian side, the chief impediment to reciprocal acceptance of test data would be the requirement within Certification Procedure RSP - 100 that all data be submitted over the signature and seal of a Canadian-licensed professional engineer. While the study team has learned that a few American-based engineers do maintain a registration with a Canadian provincial governing body of engineers, such memberships are not common.

4.5.5 Policy and Legislative Improvements to Radio Equipment Authorization in Canada

In Canada there would seem to be problems with the level of confidence in the current radio frequency equipment authorization scheme. The reasons which underlie this confidence problem are related to both the legal integrity of the requirements within the scheme itself and the limits to the general scope of application of the approval rules. Clearly, the policy response required is that the Equipment Certification Policy, RSP - 100, must be recast and then drafted in the form of subordinate legislation under the new Radiocommunication Act. During this drafting exercise a number of policy changes or clarifications must be made to improve the legal integrity of the scheme, make it more effective and efficient and achieve or facilitate further harmonization of Canadian equipment authorization equipment approval rules vis-a-vis their American counterpart.

Upon legal analysis of the current equipment approval policies and procedures, it is recommended that the following policies should be codified within a new scheme. Within

subordinate legislation (regulations) the following changes are recommended:

(i) A clear prohibition should apply to the manufacture, importation, distribution, lease, offering for sale or sale of any radio frequency related equipment for which technical standards or technical requirements have been created unless the equipment is in compliance with those standards or requirements[19].

(ii) Applicants for radio authorizations must be required to warrant expressly that their equipment does, and will continue to, comply with the appropriate technical standards or technical requirements.

(iii) A provision must state clearly that authorizations extend only to a particular model or category of equipment and that the approval and promise of compliance extends to all identical equipment. The applicant must have an express obligation to inform the Department of Communications promptly of alterations to their equipment.

(iv) A statement within the authorization rules must clearly state that an authorization is extended only to the applicant for the grant, and that it is not

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[19] While such prohibitions now exist within section 4(1) of the Radiocommunication Act it is important that these prohibitions be tied directly into the equipment authorization regulations being recommended.

assignable or transferable. If a transfer of assets is completed, a new authorization with a promise of compliance must be secured. The new rules should state that radio authorizations will be issued only to corporations or legal entities resident in Canada. (A national presence, a Canadian agent for example, is required so as to give DOC jurisdiction for compliance activities.)

(v) The requirement that test data be confirmed under the signature and seal of a Canadian-licensed professional engineer should be maintained, but the authorization rules must require the engineer to attest to the accuracy of the test data, to the level of competence of a reasonably skilled and prudent professional engineer[20].

(vi) The rules should include an obligation by the test administrator to warrant under signature: the test(s) performed; the methodology(gies) used; the accuracy of the data and that they are competent to perform the test(s) undertaken.

(vii) A section in the regulation should incorporate by reference a schedule

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[20] The objective here is that engineers will be legally accountable to their clients, the federal government and to their professional governing bodies for the professionalism of their services. This requirement is not to make engineers insurers of the accuracy the tests performed. They need only attest that they personally followed generally acceptable engineering practices and procedures. The engineer should be required to sign a statement which parallels the type of professional accountability statements which other professional groups are required to sign when putting their competence on the line.

of fees related to the authorization services rendered by the Department of Communications. This schedule of fees should be created as subordinate legislation.

(viii) A "notification" process similar in nature to that existing in the FCC rules should be created within the new authorization process. This will permit rapid commercialization of certain equipment where the applicant will sign an attestation that their equipment complies with the requisite technical standards or technical requirements.

(ix) An express provision within the authorization rules should extend to the Minister the right to test any equipment for compliance with the appropriate technical standards or technical requirements. The grantee of a radio authorization should have an obligation to provide the sample(s) necessary to confirm that units of a production run comply with the applicable standards.

(x) Failure to comply fully with the authorization requirements must be referenced to the prohibitions and offenses within the Radiocommunication Act dealing with non-compliance with the terms and conditions of radio authorizations.

(xi) The authorization rules should set out a complaint procedure so that third party complaints related to conformance could be referred to grantees for comment and correction (where appropriate).

(xii) The current requirement that a maintenance facility be arranged in Canada should be discontinued. So long as authorizations are issued only to corporations or legal entities resident in Canada, existing product liability laws in Canada should ensure an adequate level of customer protection.[21]

4.6 TECHNICAL POLICY CHANGES AND THE ENABLING AUTHORITY WITHIN THE RADIOCOMMUNICATION ACT

The policy recommendations enumerated above can be enabled lawfully under the rulemaking provisions set out in the Radiocommunication Act. Enabling authority for a new radio equipment authorization scheme, set out with subordinate legislation, is contained within section 6(1)(d) of the Act. It states:

" 6(1) The Governor in Council may make regulations:

(d) prescribing the procedure governing the making of applications for radio authorizations, or any class thereof, including form and manner, and prescribing the processing and disposition of those applications and the issuing of radio authorizations by the Minister; "

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[21] Product liability laws in Canada have developed a great deal since the original requirement to arrange for maintenance facilities was set out in early equipment authorization rules. Without doubt, the legal protection offered to radio users (consumers) within the existing edition of RSP - 100 is more illusory than real.

This provision will work best if all categories of radio equipment authorization are sub-categories of the "technical acceptance certificate" set out in sections 2 and 4(2) of the Act.

Authority to prescribe authorization fees for the new scheme can be found within section 6(1)(l) of the statue. It states that the Governor in Council may make regulations prescribing fees:

> " (i) for radio authorizations, applications therefor and examinations or testing in relation thereto, and
> (ii) for services provided by the Department of Communications relating to spectrum management,
>
> and respecting interest payable on unpaid fees so prescribed; "

Compliance to the authorization scheme would be supported by the sanction provisions set out within sections 10 and 13 of the Radiocommunication Act. For contravention of authorization requirements related to technical acceptance certificates, section 10 provides for fines and imprisonment up to $5,000.00 or one year in jail or both, where the offender is an individual; and fines of up to $25,000.00 where the offender is a corporation. Section 13 of the new act provides for an equipment forfeiture procedure, subsequent to a conviction.

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION V - HIERARCHY OF TECHNICAL DOCUMENTATION ANTICIPATED FOR THE RADIOCOMMUNICATION ACT

5.1 INTRODUCTION

Throughout the Spring and Summer of 1988, draft policy provisions were completed for the new Radiocommunication Act. One of the greatest challenges for the framers of the new statute was planning for the technical regulation of the equipment, devices and machinery to which the jurisdiction of the legislation was to apply. The new act had to provide an enabling framework for technical standards, equipment authorization rules and ad hoc determinations of harmful interference. Many of the technical rules and requirements enabled under that framework had to be mandatory, and non-compliance with those rules and requirements had to be redressable through government prosecution. At the same time, the enabling provisions related to technical regulation had to allow for maximum regulatory flexibility, and even regulatory forbearance, where such was appropriate. Also important, was that as many as possible of the existing technical standards and technical requirements had to be preserved and incorporated into the new legislative framework. This section of the report will explain how these challenges were addressed within the new Act.

5.2 HIERARCHY OF TECHNICAL DOCUMENTATION

As proclaimed on 5 October 1989, the technical jurisdiction of the Radiocommunication Act extends to three types of radio frequency related equipment, devices or machinery; radio

apparatus (RA), interference-causing equipment (ICE) and radio-sensitive equipment (RSE)[22]. The first category of apparatus is radio equipment. Under the statute this equipment may require a radio authorization in the form of either a radio licence or a technical acceptance certificate (or both), or it may be exempt from all forms of authorizations, yet be subject to mandatory technical standards. Interference-causing and radio-sensitive equipment are separate categories of non-radio equipment; the use or functioning of which either causes or is capable of causing interference to radiocommunication (ICE), or is or can be adversely affected by radiocommunication emissions (RSE). Both of these latter categories of equipment may require the issuance of a radio authorization, in the form of a technical acceptance certificate, or they may be subject to no form of prior approval process, yet be subject to mandatory technical standards.

The Radiocommunication Act was drafted so as to support the creation and enforcement of two principal categories of technical standards and technical requirements. Under the Act, these standards and requirements are to be applied to the three principal types of equipment, devices or machinery. The two categories of technical standards or technical requirements are Governor in Council (GIC) Standards and Ministerial (Min.) Standards. According to the provisions of the Act, GIC standards are mandatory and Min. standards

[22] The definitions for these three types of equipment, devices and machinery can be found within section 2 of the statute.

are precatory[23] in nature, unless made mandatory by being incorporated into some valid legal instrument. Each should be examined in turn.

5.2.1 Governor in Council (GIC) Standards

Section 6(1)(a) of the Radiocommunication Act provides for the creation, by means of Governor in Council regulation, of mandatory technical standards for the three principal categories of equipment, devices and machinery (RA, ICE and RSE), to which the act applies. Once established, GIC technical standards are made mandatory through the general prohibition contained within section 4(3) of the Act[24]. Section 6(1)(a) provides:

> " 6.(1) The Governor in Council may make regulations
>
> (a) respecting technical requirements and technical standards in relation to
> (i) radio apparatus,
> (ii) interference-causing equipment, and
> (iii) radio-sensitive equipment,
> or any class thereof;"

To appreciate the integration of GIC standards and requirements into the overall technical plan of the Radiocommunciation Act one should note that they can exist as free standing technical standards (by force the s. 4(3) prohibition), or they can be incorporated directly,

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[23] "Precatory" in this context means that compliance is desirable, but not required under the provisions of the legislation.

[24] "4(3) No person shall manufacture, import, distribute, lease, offer for sale or sell any radio apparatus, interference-causing equipment or radio-sensitive equipment for which technical standards have been established under paragraph 6(1)(a), unless the apparatus or equipment complies with those standards."

as "terms and conditions",[25] into one of the three forms of equipment authorization expressly set out in the Act. These three types of "radio authorization" are radio licenses, broadcasting certificates and technical acceptance certificates. Compliance with GIC standards could also be made compulsory through incorporation into the mandatory preconditions for exemption from all licensing or technical acceptance certificate processes for radio apparatus (under the authorization exemption powers contained within section 6(1)(m) of the act[26]). Finally, conformity with GIC standards could be incorporated within the prescribed factors for consideration by the minister for assessment of blame for "harmful interference" under section 5(1)(l) of the statute[27].

Generally, enforcement of GIC technical standards and technical requirements would be pursuant to sanctions contained within section 10(1) of the Radiocommunication Act. This section provides for fines up to $5,000.00 (per day) or imprisonment up to one year, or both; in the case where an individual is convicted under the act of failing to comply with either: free standing GIC standards; or the terms and conditions incorporated within the three types of radio authorizations related to equipment; or an order of the Minister under paragraph

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[25] Both the governor in council (s. 6(1)(e)) and the minister (s. 5(1)(a) and (b)) may stipulate "terms and conditions" to the radio authorizations issued by the minister under powers contained within section 5 of the Radiocommunication Act.

[26] Section 6(1)(m) provides that the governor in council may make regulations, "prescribing radio apparatus, or any class thereof, that is exempt, either absolutely or subject to prescribed qualifications, from the application of subsection 4(1);"

[27] Section 6(1)(q) of the act states, in part, that the governor in council may, by regulation, prescribe: "the factors, including signal quality requirements, that the Minister shall take into account when making those determinations [of harmful interference];"

5(1)(l) of the act. Where the infraction was committed by a corporation, the maximum monetary sanction climbs to $25,000.00 (per day) and the directors of the corporation may be liable up to the maximum monetary sanctions and jail terms for individuals. Additionally, enforcement could be through a court-issued injunction under subsections 10(3) and (4) of the act.

5.2.2 Ministerial (Min.) Standards

As stated previously, all ministerial standards made under the Radiocommunication Act have no independent legal status as mandatory technical standards. Ministerial standards are enabled under section 5(1)(d) of the Act and it states as follows:

> " s. 5(1) Subject to any regulations made under section 6, the Minister may....
>
> (d) establish technical requirements and technical standards in relation to
> (i) radio apparatus,
> (ii) interference-causing equipment, and
> (iii) radio-sensitive equipment,
> or any class thereof;"

On their own, Min. standards are merely precatory in nature because no prohibition in the Act commands compliance to them or prescribes a sanction for non-conformance with them. To achieve mandatory status, it is necessary for ministerial standards to be incorporated by reference into technical prescriptions which are mandated under the statute. Thus, under the implementation scheme for the Radiocommunication Act, Min. standards can be made

mandatory through incorporation[28] within:

(i) the terms and conditions within the text of radio authorizations issued for the three categories of equipment to which the act applies (RA, ICE and RSE)[29];

(ii) mandatory GIC regulations, respecting technical standards and technical requirements for all three categories of regulated equipment (RA, ICE and RSE), made under the authority of section 6(1)(a) of the Act;

(iii) mandatory GIC regulations, created under the authority of s. 6(1)(i), prohibiting or regulating the manufacture, importation, installation, distribution, etc. of equipment to which no authorization process applies;

(iv) mandatory GIC regulations, exempting radio apparatus from all

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[28] Due to the flexibility accorded by section 6(2) of the Radiocommunication Act any classification, standard, procedure or other specification may be incorporated into a section 6 regulation by express reference within the subordinate legislation. The classification, standard, procedure or specification may be incorporated, "as amended from time to time." Thus, if an updated version of a ministerial standard were issued, it would not be necessary to amend the regulation so as to refer to the new issue.

[29] Both the minister (ss. 5(1)(a) and (b) and the governor in council (s. 6(1)(e)) can set terms and conditions for radio authorizations. The governor in council must set such terms and conditions by regulation. The minister can incorporate them directly into the text of the licenses or certificates issued without resorting to legislative action. Ministerial standards could also be incorporated into requirements within the technical acceptance certificate program structured under ss. 6(1)(g) and (h) of the Act.

authorization requirements, made under the authority of section 6(1)(m);

(v) prescribed factors which the minister must take into account when making determinations of harmful interference in accordance with the minister's powers set out in section 5(1)(l)[30];

At this point, it might be useful to explain why ministerial standards have no independent mandatory status. As will be explained more fully in section 5.3 of this report, the Department of Communications and its predecessor, the Department of Transport; developed, over a thirty-five year period, a comprehensive set of technical instruments called Radio Standards Specifications (RSS's), Standard Radio System Plans (SRSP's), Spectrum Utilization Policies (SP's) and Radio Systems Policies (RP's). Most of these technical instruments never had an independent legal status. The previous Radio Act did not enable their making[31] and, while made with direct consultation with the Canadian radio industry, they were not created through any legislative process. Their drafting was done in such a casual style that these instruments would not meet current drafting standards for subordinate legislation. This is especially so considering that they were drafted in English and translated

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[30] The governor in council must prescribe these factors under the authority of section 6(1)(q).

[31] With the possible exception of certain of the instruments related to the technical regulation of broadcasting undertakings, which were provided for in the Radio Act.

subsequently into French[32]. Thus, stated simply, the majority of these instruments could not be incorporated into the mandatory aspects of the new hierarchy of technical documentation under the Radiocommunication Act because they would not pass the level of scrutiny for subordinate legislation. Despite this problem, a number of them can still be incorporated by reference into valid legislative instruments.

5.3 THE INTEGRATION OF EXISTING TECHNICAL INSTRUMENTS

Since the mid-1950's, the Canadian government has regulated licensed and unlicensed radio apparatus and interference-causing (non-radio) equipment through the use of technical standards and technical requirements. Generally, the technical standards and requirements for radio apparatus had no independent legal status. Often, they acquired the status of law by being incorporated by reference into subordinate legislation such as the General Radio Regulations, Part II[33]. Other technical requirements were incorporated into radio licenses, as one aspect of their mandatory terms and conditions. The technical standards for interference-causing equipment were often set out as mandatory technical requirements within the Radio Interference Regulations. As noted within Section IV of this study, the equipment authorization scheme described within Equipment Certification Policy, RSP - 100

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[32] Today, English and French versions of legislation are equally authoritative for interpretive purposes. In circumstances where the quality of the French text is not up to current drafting standards, it would not support prosecutorial actions for non-compliance. This result would occur regardless of the choice of official language selected for the trial.

[33] For example, Radio Standards Specification (Provisional) 118, Issue 1, was rendered a mandatory technical standard for cellular radio equipment through just such an express incorporation within GRR Part II.

also had no independent status of law. Frequently, it has been converted into a legal requirement for certain categories of radio equipment, for equipment authorization purposes, by express reference within sections of the General Radio Regulations, Part II[34].

One of the key challenges for those planning for the implementation of the provisions of the Radiocommunication Act, was to create legislation which would support the maximum amount of 'rollover' of the existing technical standards and technical requirements into the new legislative framework. In particular, rollover was most critical for the many extant Radio Standards Specifications (RSS's) and Standard Radio System Plans (SRSP's). It is submitted that maximum rollover will be achieved if RSS's and SRSP's are treated as "ministerial standards" under the new hierarchy of technical documentation anticipated under the Radiocommunication Act.

The following guidance is offered for the rollover of existing standards, specifications, procedures or plans into ministerial "technical requirements or technical standards" under the Radiocommunication Act. This guidance is especially relevant to ministerial technical standards which subsequently may be incorporated by reference in such a manner as to give it mandatory status. For the rollover exercise the Department of Communications should ensure that:

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[34] It should be noted that mandating procedural requirements or information filing conditions, within an equipment authorization scheme, may set up valid preconditions to the issuance of an equipment approval, but such preconditions do not necessarily create a regulatory scheme which will support legal prosecutions if its terms are not complied with.

(i) - a good quality French translation of the document is available.

(ii) - (when mandating radio standards) that it strikes an appropriate balance, between incorporating into law ministerial or voluntary standards by use of the incorporation by reference power contained in the Radiocommunication Act, and drafting standards and technical requirements as subordinate legislation.

(iii) - RSP-100 is not incorporated by reference as a ministerial or a Governor in Council rule.

(iv) - existing standards, specifications, procedures or plans are properly authorized by the enabling authority contained within the Radiocommunication Act.

(v) - existing sub-legislative documents do not employ definitions or terminology which is not consistent with those contained within the Radiocommunication Act.

(vi) - existing sub-legislative material is properly drafted using language which refers clearly to acts of omission or commission when attempting to form the foundation of a regulatory offence. Such material should be written in a manner which is not inconsistent with current drafting standards and with legal interpretation principles. In other words, is the language clear, concise and consistent?

(vii) - existing sub-legislative material does not impose a fee or a charge without express authority to do so.

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION VI - A NATIONAL POLICY FOR MANDATORY RADIO STANDARDS IN CANADA

6.1. INTRODUCTION

The mandate of Phase II of the standards study calls for the study team to offer direction (following consultations) on how the content and process of Canada's radio standards and equipment authorization rules should change in the future. The study team was asked to consider and recommend policy elements for inclusion within a national standards policy related to the technical aspects of radiocommunication regulation. Specifically, the terms of reference for Phase II required the provision of general policy direction for the following:

a) the general principles upon which mandatory standards might be based;

b) a recommended procedure for creating mandatory radio standards in Canada;

c) the role of industry in the mandatory radio standards creation process;

d) the circumstances under which Canada/U.S.A. harmonization of mandatory radio standards is desirable;

e) the products or services for which harmonized standards should first be developed.

Recognizing that the most the study team can provide under the terms and resources of this study is a primer for such a national policy, the following elements are offered for discussion and consultation purposes.

6.2 GENERAL PRINCIPLES FOR CREATING MANDATORY RADIO STANDARDS

Historically, within Canada, mandatory standards have been created with a modest amount of forward or strategic planning of technical regulatory matters. While it is true that policy and planning documents have been created since the early 1960's, these have not concentrated sufficiently upon technical issues, and they generally have been limited to examination of the use of frequencies above 1 Ghz. As the momentum toward harmonizing technical policies with those of the U.S.A. and other countries builds, it is imperative that the Department of Communications begin to think of mandatory technical standards and other technical requirements in strategic terms. The competiveness of the Canadian radio industry, in particular, is at issue.

Clearly, technical standards and equipment authorization rules have significant impact upon trade. In part, they control access to the domestic radio equipment market; and countries which export their standards and technical rules will also export their products. Also, technical radio equipment policies must complement broader spectrum utilization plans and decisions.[35] Equally importantly, technical radiocommunication policies have served, and

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[35] Both the Department of Communications and the U.S.A.'s National Telecommunications and Information Administration (NTIA) very recently commenced broad spectrum policy reviews. The DOC commenced its enquiry by release of Canada Gazette, Part I, Notice No. DGTP-03-90 and a policy paper entitled, Towards A Spectrum Policy Framework For The Twenty-First Century. The comment period for this enquiry has ended and a departmental response is expected shortly. In the U.S.A., the NTIA instituted its policy review by means of a Notice of Inquiry entitled, "Comprehensive Policy Review of Use and Management of the Radio Frequency Spectrum in the United States", dated December 8, 1989. In March of 1991, the NTIA released its reply to its enquiry in the form of a strategic policy paper called, U.S. Spectrum Management Policy: Agenda for the Future, U.S. Department of Commerce, NTIA Special Publication 91-23, February 1991,

must continue to promote, broad public policy objectives. Such objectives include national security; the delivery of domestic cultural products to a diverse and dispersed populous; telecommunication outreach to isolated parts of the country; investment in research and development in new technologies; and stimulation of the national economy. No technical policies, including technical harmonization, can be pursued in isolation from these broader considerations.

Phase I of this study of mandatory radio standards, issued in March of 1990, provided an introduction to the general principles upon which mandatory radio standards in Canada should be premised. These general principles were as follows:

> (i) There is a need for the government to mandate radio standards through legislation, to enable the radio spectrum to be managed for the benefit of all Canadians.
>
> (ii) Mandatory radio standards should be kept to the minimum required to:
>
> (a) ensure efficient use of the spectrum,
>
> (b) prevent harmful interference between services and users,
>
> and

U.S. Government Printing Office: Washington, D.C. (Including appendixes, this report is approx. 200 pages in length.)

(c) ensure public safety.

(iii) Radio standards specified as mandatory should not include technical requirements of a consumer quality of performance nature (unrelated to spectrum efficiency). Such consumer selectivity features should be developed by voluntary standards bodies, and should left to the market place to determine.

(iv) The development, authorization and mandating of mandatory radio standards should reside principally within the Engineering Programs directorate of the DOC.

(v) The current participatory approach used by the DOC to develop mandatory radio standards jointly with industry is highly regarded by the radio industry and viewed as fair.

Also quoted within Phase I of the standards study were a number of trade-based general principles related to the creation of mandatory standards in Canada. The following principles are general obligations which apply to Canada pursuant to the Standards Code contained within General Agreement on Tariffs and Trade (GATT). These principles were specifically affirmed by the provisions of the Canada/U.S.A. Free Trade Agreement. Pursuant to these agreements, Canada must commit to:

(vi) Use international standards as the base for developing new standards, where such are appropriate.

(vii) Create standards which are based upon performance criteria as opposed to design criteria, where appropriate.

(viii) Not engage in standards related activities which would act as an unnecessary obstacle to international trade.

(ix) Ensure that imported products are treated no less favourably than domestic products.

(x) Permit foreign suppliers of goods to have access to domestic standards and certification systems on an equal basis to those accorded to domestic manufacturers.

(xi) Provide a central enquiry point which will provide answers to requests for information about technical regulations, standards and rules for product certification.

(xii) Notify the GATT Secretariat of significant changes to standards, technical rules or certification requirements which may impact upon

international trade.

6.3 GENERAL PRINCIPLES RELATED TO HARMONIZATION

In addition to the foregoing general principles, the study team offers the following principles related to harmonization activities, for consideration for inclusion within a national standards policy:

(i) The DOC must assess strategically how mandatory standards policies complement evolving national public policy objectives, such as the development of trade competitiveness.

(ii) Harmonized mandatory standards policies and radio equipment authorization rules must be compatible with Canada's broad spectrum utilization strategies.

(iii) To ensure that the preceding two compatibility exercises (harmonization principles (i) and (ii)) are performed, the Department of Communications should create an informal review process to be carried out by the Department before the (harmonization) work of technical committees has begun. One option would be to institutionalize such an assessment procedure by creating a more structured process appropriately called a

Harmonization Impact Analysis (HIA).[36]

(iv) Harmonized mandatory radio standards policies must continue to allow for the introduction of special 'niche market' radio services and equipment within Canada, which may not be authorized within the U.S.A.[37]

(v) Harmonization activities should accommodate the long-standing policy of permitting the five regional administrations within the Department of Communications to apply mandatory standards rules with discretion. This discretion should continue to be available in circumstances such as when fixed radio services may be installed in remote areas of the country where they will not cause harmful interference.[38]

6.4 GENERAL PROCEDURES FOR CREATING MANDATORY RADIO STANDARDS IN CANADA

As noted within section 6.3 of this study, there is general satisfaction, within the Canadian radio industry, with the procedure used by the Department of Communications when

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[36] The Harmonization Impact Analysis is discussed more fully within section 6.5.1.

[37] The subscriber radio service, developed for the dispersed population on the prairies, is an excellent example of a niche market radio service which cannot be authorized in the U.S.A. because the necessary frequencies are not available.

[38] Canada should be careful not to harmonize in an inflexible manner with congestion-based (U.S.) technical policy solutions to problems which exist in only a few large urban centres within Canada.

creating mandatory radio standards. Clearly, this satisfaction is based upon three and a half decades of mutual trust and accommodation. While not wishing to make dramatic changes to the current standards creation process, and while recognizing that much of the process related to the creation of federal standards contained within subordinate legislation is mandated by federal rulemaking requirements, the study team offers the following general principles related to the procedure for creating mandatory radio standards:

(i) The process for creating mandatory radio standard should be flexible and adaptive, and it should facilitate the rapid commercialization of new technology.[39]

(ii) Efforts to create mandatory radio standards must be commenced in a very timely manner. If efforts are stimulated too far in advance of the development of the applicable technology or market there is a great risk that the standards will never be implemented. If mandatory standards are implemented within Canada long after other nations have acted, established international equipment markets will use this advantage to capture Canada's newly established domestic market.

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[39] As an aside note, rapid commercialization might be accommodated by use of the fifth category of radio authorization contained within section 5(1)(a)(v) of the new Radiocommunication Act. This ad hoc form of authorization might be used to create conditional experimental approvals for temporary introduction of new radio services or equipment.

(iii) The Canadian process for implementing ITU technical decisions related to radiocommunications should be flexible and expeditious.[40]

(iv) The Department of Communications must make positive efforts to broaden the base of its consultations during the rulemaking process for mandatory radio standards. More efforts must be made to directly involve business and consumer users of radio frequency related equipment and services in the process.[41]

(v) When mandating radio standards, the Department of Communications should ensure that it strikes an appropriate balance, between incorporating into law ministerial or voluntary standards by use of the incorporation by reference power contained in the Radiocommunication Act, and drafting standards and technical requirements as subordinate legislation.[42]

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[40] New technologies and services approved through ITU decision making will be first established, on a trial basis, in countries which first implement the ITU's decision. This may mean a substantial investment in research and development funding. If Canada is slow to implement ITU technical decisions, the newly authorized products or services may be so established in other countries that foreign manufacturers or service providers will have a competitive advantage over domestic companies when Canada does implement the decision, and authorize the new equipment or service in this country.

[41] This point will be discussed more fully within section 6.6 of this report.

[42] Even with pre-publication of proposed standards within the Regulatory Plan and/or the Canada Gazette, incorporation by reference (into law) of ministerial or voluntary standards material does not accord with the current federal rulemaking process related to subordinate legislation. Changes to the federal rulemaking process in the mid-1980's were intended to bring new democracy and accountability to the creation of quasi-legislative material like standards. It would be inappropriate, and it would attract the attention of the

6.5 SUGESSTED PROCEDURE FOR STANDARDS HARMONIZATION

Regardless of the process used, harmonization activities are likely to be resource intensive for the DOC, and even more so for the FCC. Moreover, because all mandatory standards with application in the U.S.A. will have to go through the formal American rulemaking process, before being implemented in to law, there is a considerable risk that the harmonized standard may be altered by the FCC to reflect comments received during the rulemaking stage.[43]

Also, it should appreciated that standard making, or re-making, like all state regulatory decision making, produces winners and losers. Should harmonization decisions go beyond making relatively inconsequential alterations to the text of existing standards, these activities may result in significant changes to such things as technology, equipment, service delivery, and even frequency allocations and assignments. For example, harmonization of the technology used for a particular radio service could require digitalization or rechannelling of existing equipment. Manufacturers might be very pleased to be offered a combined

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Department of Justice division of the Privy Council Office, if the DOC attempted to resort to its incorporation by reference option too frequently.

[43] The FCC could not promise to implement the harmonized standard regardless of the comments it received during the rulemaking process. While the Commission could have a strong disposition not to alter the harmonized standard, the law would regard such behaviour as acceptable to a degree. Administrative rulemaking jurisprudence would not permit the FCC to "fetter" its discretion in advance of consultations. Canadian administrative law likely would adopt a similar, but somewhat less stringent, approach if the standard was to be adopted directly into subordinate legislation. In Canada, if the harmonized standard was to be incorporated by reference into existing law, fettering would be far less problematic.

Canada/U.S.A. market in such equipment, but the service providers or users who must accommodate such changes may feel quite differently.

Harmonization of the radio equipment authorization processes in both countries may harm the viability of the growing commercial testing and certification[44] industry in Canada. This may be especially so if Canada and America were to accept radio equipment authorizations or test results in a reciprocal manner. Depending upon the efficiency and competitiveness of the Canadian equipment testing industry, Canadian, U.S.A and off-continent businesses may select the country with the largest potential market as the location for their testing and certification requirements.

As a final caveat by example, it should be remembered that a number of technical decisions in Canada have been taken so as to achieve spectrum utilization or broad public policy objectives. For example, the Canadian success involving the development of subscriber radio for residents of the Canadian prairies comes readily to mind.

Due to these concerns, it is apparent that the Department of Communications must have a timely means to assess the broader impact of harmonization activities before they get carried very far. In circumstances when such assessments reveal that particular harmonization exercises likely will impact negatively upon important spectrum planning or

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[44] The testing and certification industry is viewed as one sector for the purposes of this comment, but it is recognized that the DOC is the only entity in Canada which can certify radio frequency related equipment.

broad national interests, the DOC must inform the Canadian radio industry in a timely manner that it is unlikely that it will implement the harmonized standard into Canadian law.

While supporting technical harmonization as an objective, and taking into consideration the foregoing policy limitations and warnings, the study team suggests that the following elements be included within the process for the harmonization of mandatory radio standards.

6.5.1 Harmonization Process for Existing Mandatory Radio Standards

In the short term, and as an initial harmonization experiment, the DOC should consult with the Canadian radio industry about the possibility of downgrading, from 'mandatory' to 'precatory', the receiver performance features for the listing of equipment provided to the study team by EEMAC (Appendix 3). If such downgrading were appropriate, the best methodology would be to separate the receiver portion from the applicable standards, and convert that portion of the standard into a ministerial standard under the Radiocommunication Act.

If DOC officials are interested in participating within a bolder harmonization experiment[45], the following features are suggested for inclusion within a harmonization process for existing

[45] During FCC consultations for both phases of this study representatives of the Commission's engineering department informed the study team that they would consider participation in a harmonization experiment if a handful of standards was selected.

mandatory standards:

Step 1 A general public notice should be issued simultaneously by the DOC and the FCC, requesting contributions to an initial list of mandatory standards for which harmonization is regarded as necessary or desirable. Suggested standards should be sent to the respective federal regulator and to the national organizations and associations in both Canada and the U.S.A. involved in standards writing activities related to radiocommunications. Organizations or associations which would be prepared to dedicate resources (organizational or supervisory functions and/or representatives) to technical committees which would undertake to harmonize particular standards, should be encouraged to contact their counterparts in the neighbouring country to explore the possibility of forming technical committees with membership from both countries.[46]

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[46] It is an integral aspect of this 5 Step process that the actual harmonization activities be selected, initiated and performed by the private sector in both countries. The organization, membership, structure and functioning of the technical committees, which would undertake particular harmonization exercises, should be determined 'organically' (without government control or direction). Accordingly, the structure, representation and functioning of the technical committees which will result from a policy of organic determinism may resemble or be part of existing institutions or they may be quite novel. For example, the Canadian radio industry can make a collective decision whether its interests, within the context of a particular harmonization exercise, will be served satisfactorily by the placement of a single representative upon an existing U.S. standard writing body (like the Telecommunication Industry Association (TIA)), or whether its

For particular harmonization exercises where technical committees have been formed, these decisions should be communicated to the FCC and/or the DOC. Government notices should include a statement which explains that the harmonized versions of standards created by technical committees must go through the normal rulemaking process, and that the (final) selected features of the standards continue to be the responsibility of the respective government regulator.

Step 2 The DOC and the FCC should next share the respective listings of suggested standards and the committees formed to undertake to harmonize them.[47] At this point, the DOC should perform an informal harmonization impact assessment (HIA) upon the technical standards which have been (initially) selected by industry for harmonization.[48]

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interests require the creation of a new bilateral committee with equal representation from each country.

[47] In the event that a number of U.S. industry associations or standard writing organizations wish to participate within a particular harmonization exercise, the FCC should inform them that they must settle the issues of committee structure and representation without government direction. There would be considerable pressure to determine such issues in an appropriate manner. Clearly, if harmonization activities proceed without recognition and inclusion of strategic vested interests, the (harmonized) standard would be attacked strongly during the FCC's formal rulemaking proceedings.

[48] Within its various policy sectors, the DOC should attempt to assess some of the costs and benefits of harmonization of the matching candidate standards for which a committee structure has been determined. The HIA should attempt to address matters such as the

Step 3 If, based upon the results of its HIA exercise, the DOC determines that a particular harmonization activity will pose a significant risk to an important spectrum utilization or broad national interest, it promptly should inform all parties involved that it is unlikely that the harmonized standard would be implemented into law in Canada. At this point, it would be up to the technical committee to decide how best to proceed. It may decide to disband or to proceed, with or without taking DOC's concerns into account. If the committee decides to proceed, it should be asked to prepare a tentative timetable of it activities and to designate a Canadian and American contact person. In addition to the production of a harmonized version of the standard under examination, the committees should be asked to suggest an implementation and amortization timetable (if amortization of existing equipment will be necessary).

Step 4 Both government administrations should issue public notices of the standards selected by industry for harmonization, the names

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possible impact upon spectrum utilization policies and plans, national public policy objectives (not directly related to spectrum utilization), and DOC administrative resources (i.e. enforcement expectations). It is submitted that the resources necessary to perform the HIA will be far less that those necessary to create the Regulatory Impact Analysis Statements (RIAS) which are now required for the purposes of assessing the impact of proposed subordinate legislation. What is most important is that the enumerated issues be taken into consideration.

and address of respective contact persons, and the proposed timetable for the committees' deliberations. These notices should invite interested parties to contact the committees directly with their concerns, and for information updates.[49]

Step 5 Upon receipt of the harmonized standard (if efforts were successful), and the suggested implementation and amortization timetable, each administration would apply its normal rulemaking process for mandatory technical standards. If these rulemaking processes do not result in amendments of any consequence, the objective will have been achieved. Even when alterations have been made to the version submitted by the joint technical committee, it still may be possible for both administrations to recognize the two respective versions of the standard as 'technically equivalent'.

6.6 THE ROLE OF INDUSTRY IN THE STANDARDS CREATION PROCESS

The Canadian radio industry has a thirty-five year history of direct involvement in the technical standards creation process. This involvement has ranged from informal consultations on the technical needs of the industry, to the actual preparation of initial drafts

[49] Those wishing to contact the committees could designate whether their submission is to be shared with the entire committee, or whether it is intended to be read only by the representatives of the country of the contact person to whom it was addressed.

of standards for consideration by the Department of Communications. Since the mid-1940's, the three constituencies which have comprised, and publicly represented, the Canadian radio industry have been equipment manufacturers, service providers and user groups.

Over the years, the industrial structure of the radio equipment industry has changed considerably. In the 1950's and 1960's a substantial amount of the radio equipment used in Canada was manufactured here. At present, a very modest percentage of all radio equipment in this country is Canadian designed or manufactured. As is the case in many other countries, due to a series of buy outs, transnational mergers and international joint ventures, the ownership and market of the radio equipment industry in Canada is far more global than national in nature. One suspects that, to a certain extent, the equipment industry in Canada now consists of a number of importers and distributors of East Asian equipment, and of American-based branch plants which distribute their line of products within Canada. The Canada distribution rights of the foreign-based manufacturers of this radio equipment have been secured through private sector contracts and through the Department of Communication's equipment certification scheme. It must be remembered that equipment authorizations are particular to the applicant - it is not a general authorization of the equipment per se.

As noted above, the tripartite composition of the Canadian radio industry has also consisted of service providers and radio users. Currently, service providers consist primarily of large telecommunication organizations and companies such as Telecom Canada, Bell Cellular and

Cantel. The composition of radio users has not changed substantially over the past few years; it consists of large user groups like police associations, government users and radio amateurs.

A few points should be drawn from the industry examination above. The first is that it is based too much upon speculation by the study team. It was apparent to the study team that not enough is known within Canada, about the industrial composition and other important characteristics of this nation's radio industry. It is important that the Department of Communications undertake a radio industry profile study (including trade statistics) so that it will be in a better position to assess and predict the impact upon Canadian interests from harmonization activities between Canada and the U.S.A., or between Canada and the European Economic Community.

The second point is that the composite constituencies of the radio industry in Canada have always been defined by the industry itself. However, it is submitted that the creation of technical policy today requires a broader range of views and constituencies than those which have been available in the past. For example, there would seem to be inadequate representation of the commercial testing industry, the academic community which is performing electromagnetic spectrum-based research, business users of radiocommunications and consumers of radio spectrum related products within the standards creation process. While the three existing industry associations, the RABC, EEMAC and ITAC, claim to represent such interests, it is not apparent that these interests have direct impact upon the

standards making process for radio equipment or radio services.[50]

The third point is that technical spectrum management decisions will become so complex and political in nature during this decade that the Department of Communications itself will require the policy input and political support of the entire range of radio interests in Canada. Clearly spectrum allocation and assignment decisions are becoming more charged politically as the availability of this resource becomes more limited. Identification of the best policy options for the national interest will require articulation of the broadest range of the interests involved.[51]

Also, as exploitation of the radio spectrum becomes increasingly tied to strategic economic issues, Canadian provinces and other interests will want to have a direct role in technical spectrum management decisions.[52] At present, provincial claims for a direct roll in

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[50] At the point of writing this study the RABC was going through the application process to become accredited by the Standards Council of Canada (SCC) as a 'national standards writing organization'. The SCC criteria for such accreditation include constitutional and operational requirements to accommodate participation by a cross section of interest groups. (See: "Criteria and Procedures for Accreditation of Standards-Writing Organizations", SCC publication Can-P-1.) The outcome of this accreditation process should be monitored to see if it responds to the concerns raised.

[51] In the United States a number of the companies involved in the technical design of telephone and other terminal equipment are actively recruiting business and consumer users into their design and testing processes. This involvement is not a form of pandering, these telecommunication companies have come to realize that the competitive terminal equipment market requires equipment and services which are very responsive to the public interest, as defined by the public.

[52] Such challenges are not far away. For example, a position paper to be submitted to the 25th convention of the Quebec Liberal Party, claims that Quebec requires exclusive jurisdiction over communications and a shared jurisdiction over telecommunications. Exactly

management of the wireline side of telecommunications may actually result in a constitutional amendment which will fragment the comprehensive telecommunication jurisdiction which was affirmed in the recent Alberta Government Telephones decision rendered by the Supreme Court of Canada. The political support necessary to forestall and prevent such constitutional fragmentation on the wireless side of telecommunications may well come from business and consumer users of radiocommunications.

In consideration of the comments above, the study team makes the follow recommendations related to the participation of the radio industry and other constituencies within the standard creation process:

(i) The Department of Communications should continue to support by word and deed the development of mandatory radio standards in Canada through the long standing partnership arrangement which has existed between the Department and the radio industry for the past 35 years. As government resources continue to be redeployed or pared by successive federal budgets, the active participation by industry groups becomes all the more critical to the task of creating the most relevant, reliable and respected[53] standards.

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where spectrum management functions would fit into these claims is not clear as yet. See: "A Quebec Free to Chose", Report of the Constitutional Committee of the Quebec Liberal Party, January 28, 1991 (at pp. 28 and 38) This submission is also know as the Allaire Report.

[53] It must always be remembered that efficient and successful regulatory programs require a high degree of voluntary compliance with their mandatory provisions. The highest

(ii) The DOC should undertake a study of the composition and economics of the radio industry in Canada so that it may better understand its needs within the broad context of technical standard making in the 1990's.

(iii) The Department of Communications should explore means by which participation in the standards creation process could be broadened to include the testing industry, business and consumer users of radio and academics performing spectrum related research.[54]

(iv) Should the DOC engage in harmonization activities with the FCC, the Department must be particularly attentive to the views of Canadian service providers and radio users, especially if the notion of user is expanded to include business and consumer users of radiocommunications. Service providers and user groups are in an excellent position to help the Department of Communications to define the national interest.

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level of voluntary compliance with any particular rule is demonstrated when those to whom the rule applies have had a meaningful role in its creation.

[54] The DOC might experiment by attempting to stimulate the creation of a user group similar to the Canadian Interest Group on Open Systems (CIGOS), of which the Canadian Bankers' Association was a founding member. The current notice and comment procedure within the federal government's rulemaking process does not truly encourage broad participation. It will take a proactive effort by the DOC to broaden participation as recommended.

6.7 WHEN CANADA/U.S.A. HARMONIZATION IS DESIRABLE

As reported in Phase I of this study, the feedback obtained from a surprisingly high number of the Canadian industry and government representatives interviewed, revealed that they were prepared to support, or at least to discuss seriously, further harmonization of the technical aspects of radio regulation in Canada and the U.S.A. They would support such harmonization for the explicit objective of enhancing trade in radiocommunication equipment between the two countries. International trade in telecommunication equipment (wireline) is a growing phenomenon. Global trade in radiocommunication equipment is very undeveloped at this time.[55]

Phase I of this study also contained an assessment of both the International Agreement on Technical Barriers on Trade, January 1, 1980 (also called The Standards Code) and the provisions within the Canada/U.S.A. Free Trade Agreement related to technical standards, to discover their application to harmonization activities between Canada and the U.S.A. Succinctly, while both agreements strongly encouraged the harmonization of technical standards, they do not require it. But, as was noted during consultations, the Free Trade Agreement in particular, contains a trade related philosophy which has produced an expectation on both sides of the border that harmonization is to occur in the near future. Despite this expectation, the study team was informed, during the current stage of consultations, of very few examples where Canadian and American government or industry

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[55] Section 6.4 of the Phase I report, briefly discusses the potential for trade in spectrum related equipment.

officials were actively involved in harmonization activities.

In Canada and the United States the desire to harmonize radio standards can be gauged most reliably by the preparedness of the radio industries in both countries to dedicate resources to a harmonization exercise. Since these industries will be the principal beneficiaries of harmonization they should be left to perform their own cost/benefit analysis of the prospective outcome of the harmonization of a particular standard. Thus, it falls to the FCC and the DOC merely to stimulate harmonization activities by indicating that they are willing to support, but not to direct or conduct harmonization efforts. This support could be indicated by stimulating a harmonization experiment similar in nature to the five step process outlined in section 6.5.1 of this study.

It is the belief of the members of the study team that, from a Canadian perspective, four preconditions are essential to a successful harmonization exercise:

(i) There must be a strong economic need or a strong service benefit to a Canadian organization.

(ii) The Government of Canada must be willing to demonstrate that it supports the cause of harmonization with the U.S. Government. Also, the Department of Communications must indicate that within the legal confines and responsibilities of its rulemaking processes, it will implement into law the

harmonized standard.

(iii) A Canadian organization must be willing to dedicate substantial resources to oversee and participate within the harmonization process. The Canadian association EEMAC is on record (Phase I report, page 25) as being willing to do so. The RABC would also be a willing organization capable of performing such roles.

(iv) There must be accredited U.S. organizations which are willing and able to oversee and participate within the harmonization process.

6.8 THE PRODUCTS OR SERVICES FOR INITIAL HARMONIZATION

As a starting point, EEMAC has provided a listing of equipment models which they maintain are authorized in the U.S.A., but not approved within Canada chiefly by reason of Canadian receiver standards. In consultation with radio industry representatives, the Department of Communications should review this list to see if these are receiver standards which could be downgraded from 'mandatory' to 'precatory' status.

Secondly, the Department should consider participating in the five stage harmonization exercise outlined within section 6.5.1 of this study. The first step of that process calls for the identification of products appropriate for initial harmonization.

In addition to the two preceding suggestions, the study team offers the following general principles for the selection of products or services for initial harmonization:

(i) Harmonization may be appropriate in circumstances where a standard applies to a particular type of radio equipment which is not manufactured within Canada, and there is little prospect that a manufacturing outlet will develop without some form of protectionism.[56] In such circumstances unique technical features within Canadian engineering standards can only be justified for valid spectrum management requirements.

(ii) As a general principle, Canada should harmonize the standards for equipment involving new technologies (especially those which facilitate efficient use of spectrum) in circumstances where there is no strategic spectrum utilization or national interest advantage to having a different standard.[57]

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[56] For the most part, aeronautical and marine radio equipment is no longer manufactured within Canada. For a number of years, with the exception of aeronautical and marine satellite standards (where the influences are more international than bi-national), Canadian technical standards for these categories of radio equipment have been fully harmonized with those in the U.S.A. During consultations, the study team was informed that it is often the case that our version of aeronautical and marine standards is essentially the current American edition with a Canadian cover affixed to it. Where such is the case, Canadian industry or government representatives usually have interacted directly with the American technical committee which created the standard, while it was being created.

[57] On many occasions there may be a distinct political advantage to paralleling an American move to a new technology. During this decade, as radio spectrum becomes increasingly scarce as a resource, technical decision-making will become increasingly

(iii) Canadian officials should make a realistic assessment of the marketing realities of future radio technologies. In many cases, it is clear ab initio that the U.S.A. is the market for the product or service which will result from a new technology. In such cases, it may be folly to create unique Canadian standards, unless there was a very compelling national interest at stake.[58]

(iv) There is little doubt that Canada must harmonize standards for radio products or services with transnational roaming or networking requirements. The transnational business activities of many large corporations resident in Canada, such as those offering transportation of goods by rail or truck, is a reality of the 1990's. Networking within categories of radio services[59] and interoperability with other telecommunication services, such as the Public Switched Telephone Network, will require harmonized standards.

(v) Canadian government officials must make a realistic assessment of the behaviour of the consumers of Canada, when new radio frequency related

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politicized. Sensitive technical decisions, which produce financial winners and losers, will be easier for Canadian officials to make and justify if they are done in harmony with U.S. regulatory action.

[58] From the beginning of radio and television broadcasting in North America, Canada has recognized the U.S. dominance of the market, and has harmonized almost all of its broadcasting receiver standards.

[59] Many Canadian businesses now operate extensively within the U.S.A. While within the United States, these businesses often depend upon the existence of harmonized equipment standards because they must contract directly with FCC-authorized service providers for their radiocommunication service.

products are introduced to North America. Clearly, if a mass market is created within the U.S.A., which involves readily portable radio equipment, these consumer products will be brought into Canada regardless of the wishes or efforts made by the Department of Communications. Canadian consumers now regard the American border as almost transparent, and this trend will continue throughout this decade. To create unique standards or frequency allocations for such portable radio equipment would be a futile task.

(vi) With the exception of certain emerging satellite-based services[60], DOC officials should concentrate their attention below 1 GHz for equipment or services to harmonize. Generally, since the mid-1960's, Canada has allocated frequencies above 1 GHz to radio services which are very dissimilar to service allocation decisions made within the U.S.A. If harmonization at these higher frequencies required rechannelling or reallocation to even higher frequencies, the costs for Canadian service providers or users could be prohibitive.[61]

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[60] WARC 1992 likely will result in a major reallocation of frequencies from 1-3 GHz in order to accommodate certain new regional satellite services. There is little doubt that there will be great potential for harmonizing the technical standards for these services.

[61] For example, the cost to Telecom Canada of moving its terrestrial microwave equipment and service from 2 GHz to higher bands has been estimated at 250 million dollars, and will require the abandonment of 190 million dollars of existing equipment. From: "Report of the Fixed and Fixed Satellite Working Group" Preparatory Paper for WARC 92 (at p.28)

(vii) The DOC should recognize that certain technological developments are making post-design, or post-production, accommodation to unique Canadian technical requirements almost impossible. For example, the digitization of certain models of radio equipment has resulted in the production of units containing silicon components which cannot be modified, in an economical manner, once the unit has been produced. The consequence of insisting upon unique Canadian technical requirements in such circumstances would be that the equipment could not be introduced into this country. And, the software design and production costs of such digital equipment may be such that no Canadian manufacturer would make the units (to Canadian specifications), considering the modest size of our market.[62]

[62] This problem was raised by representatives of the RABC during consultations with the study team.

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION VII - TECHNICAL HARMONIZATION AND RECEIVER STANDARDS

Radio equipment receiver standards have been a regular technical feature of mandatory radio standards in Canada since 1955. In that year, officials at the Department of Transport created, with direct consultation with the radio industry, an RSS for marine equipment. Due to serious spectrum congestion problems experienced by marine traffic on the Great Lakes, the department sought to change dramatically the spectrum efficiency of existing equipment, which was amortized over the next five year period. The DOT choose, as the base standard for its new RSS, an international EIA standard which contained receiver performance specifications.

Over the past thirty-five years, Canadian regulators of the technical aspects of radiocommunications have been steadfast in their belief that receiver standards are an integral aspect of electromagnetic compatibility (EMC) analysis and spectrum efficiency. Testimony to this is the fact that the majority of the existing RSS's contain minimum receiver performance characteristics. In 1975 the Department of Communications began development of the computer-based automated spectrum management system relied upon so extensively today. The spectrum utilization principles incorporated into the software of this system have always depended upon minimum receiver performance parameters, for the program's allocation and assignment functions. The computer's receiver parameters have been fully compatible with the Department's published radio standards.

It would appear that, until very recently, the Canadian radio industry has supported the inclusion of receiver standards within the government mandated portions of radio standards. This support has been very apparent within the service provider and radio user subsectors of the industry.[63] During the late 1980's, trade-based and multinational service considerations began playing a larger role within the activities of the Canadian radio industry. Equipment manufacturers and many service providers began pressing for Canada to harmonize its mandated radio standards with those in the U.S.A. Their objective was to combine much of the equipment service markets. Since the FCC regulated receiver characteristics in only a very few instances, Canada's receiver standards quickly came to be viewed as impediments to technical harmonization. The study team regarded Canadian receiver standards as a significant impediment to harmonization when they were examined within the Phase I report.

At the point of writing this report, a number things were in train which may impact upon the future of radio standards in Canada and, possibly, in North America. The first activity began when EEMAC canvassed many of its members and produced a listing of radio equipment which member associations contend are lawful in the U.S.A., but cannot be authorized within Canada chiefly because of the existence of Canada's receiver standards. It is the wish of those submitting this list that Canadian officials remove the receiver portions from the standards involved. The study team has attached this list for consideration

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[63] Public sector radio users such as police associations, government departments and the Canadian military have been the most staunch advocates of mandatory receiver standards.

by the DOC. (See: Appendix 3)

The second thing which occurred was that interaction between the study team and the radio industry, to obtain feedback with respect to receiver standards, stimulated the membership of the RABC to commence a debate between themselves about their position on mandatory receiver standards. It is expected that meetings to reach a consensus will commence in the near future. (Industry views about the need to mandate receiver standards were being faxed to the study team as this report was being written and typed. See: Appendixes 4,5,6,and 7)

Thirdly, the U.S. National Telecommunications and Information Association (NTIA) released its radio spectrum policy review in mid-March, 1991.[64] Within its report, the NTIA has subtly encouraged the FCC to reconsider its stance on mandatory receiver standards. While commending the FCC for its (private sector) approach in the past with respect to radio equipment in the home, the NTIA report stated,

> "NTIA recognizes, however, that mandated receiver standards may be appropriate when there are public safety or national security concerns. Also, sophisticated communications systems, when there are complex sharing arrangements, may require that the receiving equipment have an active signalling function, raising both interoperability and interference standards

[64] This spectrum policy paper is called, "U.S. Spectrum Management Policy: Agenda for the Future", U.S. Department of Commerce, NTIA Special Publication 91-23, February 1991, U.S. Government Printing Office: Washington, D.C.

> concerns. In such cases, the FCC and NTIA might have a legitimate role in regulating receivers, both as emitters of potentially interfering signals and, from a public safety point of view, to ensure interoperability.....NTIA is willing to work with the FCC, through the Joint Strategic Planning Council discussed in Chapter 2, to determine if there is a broader case for government-mandated receiver standards, and further explore and define the conditions that would justify such action." (At pp. 78-79)

The study team is generally of the view that receiver standards are an important complement to transmitter standards for spectrum efficiency and interference management, and that the DOC and the Canadian radio industry should continue to work together to create them. But, the study team does not see the need to mandate them in all cases. There would appear to be a number of instances, such as for cellular telephones, when receiver standards could be given a 'precatory' as opposed to a 'mandatory' status under the provisions of the Radiocommunciation Act.[65] To continue to require conformance to

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[65] Even if conformance were not required under the Radiocommunication Act, this legislation accommodates such flexibility, with respect to the setting and use of interference protection criteria, that even 'precatory' status may be quite a useful alternative. In situations where conformance was not required, such compliance could be used as a condition precedent criteria for receiving interference protection from other (lawful) sources of electromagnetic energy. For example, voluntary conformance could be used as a positive factor which the minister could take into consideration when exercising the minister's discretion under section 5(1)(l) of the Act. Pursuant to section 5(1)(l), the minster is empowered to make determinations as to the cause of particular interference problems (in a blameworthiness sense), and issue orders to the persons deemed responsible, to cease or modify the operation of their equipment or apparatus. In circumstances where conformance with voluntary receiver standards may have prevented the interference problem, the non-conforming individual could be regarded as the cause of their own misfortune. Over time

receiver standards, if the majority of the Canadian radio industry did not support them, would not be wise,[66] unless the Department of Communications felt that there was an important national interest at stake. It is hoped that the results of the current debate within the Canadian radio industry, about the status of receiver standards, will help to provide direction to the DOC on this matter.

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the manufacturers, service providers and users of radio equipment would come to realize that certain radio equipment, which did not conform to published receiver standards, would receive a lower level of interference protection - but, the equipment would not be unlawful in Canada. Industry representatives who support such initiatives should think through the spectrum control implications of such policies. Canadian industry has come to depend upon a high level of service from the Department of Communications. Those who support such policies may be frustrated when they are refused assistance because the Department has determined that the specifications of their receivers are not adequate for the particular radio environment. As an example of a similar type of spectrum control policy, one should note that for the past few years, the British DTI radio interference investigation service has ceased to respond to complaints of interference to television receivers if the complainant does not have an external television antenna.

[66] During consultations with representatives with the RABC, one individual stated that, in circumstances where he does not support the mandating of a particular receiver standard because he feels that its minimum level is to demanding, he will use his influence on Canadian standards committees to "loosen" the engineering requirements so that all (or most) equipment on the market can be approved. Clearly, to the extent that such efforts are successful, they undermine the spectrum management objectives for that standard. A relevant and appropriate, but voluntary, standard would be preferable to one which has been watered down, but is mandatory.

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION VIII - CONCLUSIONS

8.1 GENERAL

Section II of this report outlined five of the major questions, in the broad field of mandatory radio standards in Canada, for which the Department of Communications sought answers. Section III provided a summary of the findings that resulted from the meetings with the 31 private sector and governmental organizations interviewed by the study team and from independent research performed by the study team.

Sections IV and V provided reviews of the Canadian radio equipment authorization rules, and the hierarchy of technical documentation and the Radiocommunication Act.

Section VI outlined general principles to be considered in the establishment of a national policy for mandatory radio standards in Canada. Section VII addressed the issue of receiver standards and suggested how they might be managed legislatively in the future.

This section summarizes the conclusions reached by the study ream in relation to the issues discussed in these sections. The conclusions reflect the judgment of the study team and are its responsibility.

8.2 CONCLUSIONS

8.2.1 The Need for Harmonized Mandatory Radio Standards in CAN/USA

(1) All be it for slightly different reasons, manufacturers, service providers and user groups in Canada are in full agreement on the desirability of and need for harmonizing mandatory radio standards between Canada and the U.S.A. to the maximum extent possible. It is important to note that the terms "harmonization" and "mandatory radio standards" are used in this study as defined in Section 2.2.2.

The manufacturers in Canada are most anxious to have one standard and therefore one production run to be able to produce a less expensive product and be better able to compete in a CAN/USA market. They do not now, and they do not wish to operate in Canada on the basis of standards aimed at the protection of the radio manufacturing industry in Canada.

The service providers and the user groups in Canada share the conviction that harmonized standards are to the benefit of all. They believe that one standard means more market potential. More market potential means more manufacturers. More manufacturers mean lower prices and a greater variety of products to meet the needs of service providers and user groups.

It is recognized by all involved groups that the mandating of a harmonized standard is the sole responsibility of the DOC and the FCC. (See Recommendation 2)

8.2.2 Identification of Standards for Harmonization

(2) No group in Canada, nor for that matter does the study team, suggest that the harmonization of all radio standards is desirable or even possible. In a number of circumstances, existing frequency allocations in the two countries differ and effectively foreclose the possibility that either the spectrum used or the technical specifications involved can be harmonized.

Harmonization activities, particularly at the bilateral country level, are time consuming and expensive. To justify the expenditure of such resources, there must be a real economic benefit to or a strong service need by a Canadian organization. There must be a group identified as willing and able to provide the coordination necessary to identify the standards that should be harmonized.

It will also be important to identify, separately, standards for new services for which there are no existing standards (e.g. digital cellular or personal communications services) and standards for existing services for which different standards already exist in the two countries.

The study team concludes that the RABC is the body in Canada best able to provide the coordinating function necessary among diverse groups to identify the candidate standards for CAN/USA harmonization. The study team believes that there would be no opposition to their being given this role. (See Recommendation 3).

8.2.3 The Development of Harmonized CAN/USA Mandatory Radio Standards

In Canada and the United States the desire to harmonize radio standards can be gauged most reliably by the preparedness of the radio industries in both countries to dedicate resources to a harmonization exercise. Since these industries will be the principal beneficiaries of harmonization they should be left to perform their own cost/benefit analysis of the prospective outcome of the harmonization of a particular standard. Thus, it falls to the FCC and the DOC merely to stimulate harmonization activities by indicating that they are willing to support, but not to direct or conduct harmonization efforts.

As discussed in Section 3.3, there are at least three major schools of thought in Canada on how the harmonization of standards should proceed once they have been identified. There is probably no one approach that would find universal acceptance. This study team has reached the following conclusions:

(3) For new standards for new products, Canadian organizations, in liaison with the DOC, should continue to work on U.S. standards committees as equals amongst many organizations and influence the decision-making process by the validity of the arguments. Standards developed by such organizations (eg. TIA and ANSI) are voluntary but they carry much weight because they represent a consensus among involved, responsible bodies.

These standards do not become mandatory until so decreed by the regulatory

authority which has the right and authority to modify as deemed necessary in the national interest for spectrum efficiency or for other public interest objectives.

(4) When different standards already exist in the two countries for what are primarily mass-market consumer products, Canada should make every effort to adopt the current technical elements in the FCC approved standard for those consumer-oriented products or to adopt as many technical elements of the FCC approved standard as possible. It is the belief of the study team that such different standards would be the exception and not the rule.

It should be emphasized that this recommendation relates to certified radio products that tend to be consumer-oriented products such as domestic broadcasting receivers (TV and radio), general mobile services, burglar alarms, cordless telephones, paging, wireless microphones and telemetering. Many of these products are also licence exempt and readily transportable across the border.

With few exceptions, Canadian manufacturers, service providers and user groups share the opinion that, while some Canadian standards are tighter (more required elements and more stringent elements) than U.S. ones, the advantages to the Canadian consumer of having a common standard outweigh the advantage of having a separate though better quality product mandated.

It is difficult for the study team to understand that there is a real need for Canada to set standards that are different for these consumer type products that are so readily transportable across the border.

(5) If Canada has a legitimate need for a standard different from the current FCC one, Canada should attempt to have the FCC and U.S. standards bodies change their existing standards. If accommodation cannot be reached, Canada should live with the different standards where there is truly a legitimate need for difference.

(6) The responsibility to coordinate or oversee the work on standards to be harmonized should be assigned to a senior level CAN/U.S.A. governmental committee. There is a need to explore what committee would be most appropriate. An option would be to utilize the existing "CAN/U.S.A. Spectrum Management Technical Liaison Committee" expanded as appropriate.

(7) There is still room for some application of the approach (See 3.3.1) in which the two bureaucracies of standards writing organizations in the two countries come together in a NASI (North American Standards Institute).

Circumstances which might justify the creation of another level of standards writing would be to provide a counter-weight to ETSI, the standards body of the European Economic Community. A body such as NASI could also readily accommodate

Mexico should it seem advisable politically and economically to form a North American Standards block.

It is the opinion of the study team that, while the creation of a NASI might be justified on the need to have Canada and U.S.A. come together as a block to counter-balance ETSI, it should not be created as an attempt to force a better balance in decision making between the two countries. History would indicate that in such a situation, there is still always a "first amongst equals". (See Recommendation 8)

(8) Should the DOC conclude that the process outlined by Conclusions 3 to 6 does not sufficiently recognize Canada's interests, as a sovereign nation, or if the full range of bilateral technical committee structures is deemed not to be appropriate, the DOC could consider as an alternative adopting, with variations as necessary, the five step harmonization process discussed within subsection 6.5.1 of this study. This alternative process provides for early identification and communication by DOC (to industry) of national spectrum or other strategic interests, before harmonization efforts by Canadian and American industry progress very far. The "organic determinism" notion built into the five step process would permit Canadian industry and standards bodies to decide (in a per-standard, ad hoc manner) which committee structure would best facilitate the recognition of, and accommodation to, their strategic interests.

The key difference with this alternative harmonization procedure is that the lines of communication between DOC and the Canadian radio industry and the public, while the harmonization exercise is ongoing, are more structured. This structure is intended to facilitate input by DOC as to the particular technical standards to be harmonized and the early identification of strategic, or otherwise important, national interests which likely will inhibit or prevent the success of the harmonization efforts by Canadian and American industry. (See Recommendation 9)

8.2.4 Reciprocal Recognition of Test Data

There are two basic options for the recognition of test data. The first is to accept in a reciprocal manner foreign test data which is submitted in conformity with domestic technical standards and test methodologies. The second, and more complex, option is to first harmonize (or make equivalent) a series of technical standards and test methodologies, and then to accept (reciprocally) data submitted from test houses located in either administration in conformance with those harmonized standards and methodologies.

(9) As discussed in Section 3.4.2, 3.4.5.2 and in Section IV, some organizations in Canada believe that the existing process of accepting lab results based on attestation by a Canadian professional engineer is working satisfactorily. Others do not. It is the opinion of the study team that the existing process requires tightening and the role and responsibility of the professional engineer requires better definition. (See Recommendation 11).

(10) As the Canadian and American radio authorization rules and processes now stand there are only a few impediments to the reciprocal acceptance of test data. On the U.S. side, the only problem is that all data must be submitted in English. Despite the fact that the submission of Canadian data to the FCC in French will not arise often as a practical matter, French is an official language in Canada yet the FCC would not process French documentation. On the Canadian side, the chief impediment to reciprocal acceptance of test data would be the requirement within Certification Procedure RSP - 100 that all data be submitted over the signature and seal of a Canadian-licensed professional engineer.

As discussed in Section 3.4.5.3, the FCC will accept test results from any Canadian lab just as they do from any U.S. lab because the onus and legal responsibility for accuracy of submitted data rests principally with the manufacturer or importer who is seeking to have the equipment certified for sale in the U.S.A.

(11) It is the judgment of the study team that a system based upon the acceptance of test data from any lab would not work in Canada and that the DOC should not adopt such a rule or policy which would permit the acceptance of data from any lab - whether American or Canadian - without a Canadian engineer's attestation for the following reasons:

a) In the U.S.A. test data submitted are public knowledge and the FCC relies upon competitive pressure from other manufacturers to police the validity of

the data. The FCC is also very prone to taking court action against offenders.

b) In Canada, test data submitted is treated as confidential information, and there are fewer manufacturers to provide competitive pressure, even if the test results were available to them. Also, there is little or no history of court action by the DOC against offenders. However, the study team does conclude that it would be practical for Canada to accept test data from any U.S. lab that has been submitted to the FCC for a product that has subsequently been certified by the FCC. (See Recommendation 12).

(12) It is the conclusion of the study team that, in the long term, the reciprocal acceptance of test data issue will be resolved by conformance testing rules, negotiated at the international level. The study team believes that the EC eventually will require Canada and the U.S.A. to have "notified bodies" (See Section 3.4.3) which are testing entities officially recognized by the national government. Under such a scheme, the test results from any such notified body are automatically accepted by the certification body in any other country with which there is a reciprocal recognition agreement at the governmental level. And, as noted in Section 3.4.5.1, the acceptance of a lab by a foreign country is predicated upon the lab's having been approved by the national government to provide some degree of international comfort that the lab is indeed qualified to test in the area under consideration.

It is also the judgment of the study team that, for Canadian (or American)

manufacturers to compete in the EC, they will want to have their Canadian test results accepted by the EC, which eventually will require the Canadian government to have "notified labs". We also believe that the U.S.A. will have to have national accreditation of labs in order to compete in Europe. (See Recommendations 13 and 14).

8.2.5 Reciprocal Acceptance of Equipment Authorizations in CAN/USA

Reciprocal acceptance of the other administration's radio frequency equipment authorizations means that once one administration has issued an authorization for a particular category of radio frequency equipment, the other administration will promptly issue an equivalent authorization upon being petitioned to do so by an authorized national agent of the successful foreign grantee. Under such a policy the "seconding" radio regulatory administration would impose no further testing or certification requirements (beyond the filing of test data). Either administration could revoke an authorization which its officials had issued, if audits or investigations revealed that equipment manufactured, imported, distributed, sold or operated subsequent to the issuance of the authorization was non-compliant.

(13) Following legal and policy analysis the study team must conclude that it would be impractical to pursue a policy of reciprocal acceptance of radio authorizations between the DOC and the FCC. The many impediments to such a policy are discussed in section 4.5.3 of this study. It should be noted that amongst the many

groups interviewed, there was no consensus about either the need for reciprocal recognition of equipment authorized in Canada and the U.S.A. or about the process, if there were to be reciprocal recognition. Canadian manufacturers are more interested in having technically equivalent standards than in having a reciprocal certification arrangement between the two countries. (See Recommendation 15).

(14) Canada's current approach of accepting FCC certifications for U.S. imported GRS equipment and certain digital apparatus (Part 15 devices in the U.S.A.), without issuing a Canadian certification, is not recommended for additional categories of radio frequency equipment, unless DOC officials find that the equipment is being unlawfully brought into Canada in great quantities, and such an approach appears to be in the public interest. The principal difficulty with this approach is that it offers Canada little means of enforcement against the foreign manufacturer or its Canadian agents; be they importers, distributors or retailers. No assurance of conformity is given by anyone under such a policy and extra-territorial prosecution would be very difficult. (See Recommendation 15).

(15) The study team believes that the DOC and the FCC should reach an understanding involving the issuance of equipment authorizations. In cases where both countries have equivalent technical requirements for the approval of particular radio equipment and one nation has in fact authorized that equipment, obtaining an authorization in the other nation should be as simple and expeditious a process as

possible. In cases of equivalent technical requirements, each nation should 'all but rubber stamp' the approvals of the other, upon receipt of the application and upon the filing of the test results (See Recommendation 16). In cases where certain technical parameters for radio equipment are technically equivalent, each nation should 'all but rubber stamp' the test results which relate to the equivalent technical requirements.

8.2.6 Assessment of the Canadian Equipment Authorization Scheme

(16) According to a number of the Canadians consulted during both phases of the radio standards study, the equipment approval system should be reformed. The study team encountered three key complaints with the system as it now exists. First, the attestation role of Canadian-licensed engineers must be clarified. The content and effect of the statements which engineers are required to sign are not regarded as a sufficient check on the reliability of the data. Second, it is well known that the Department of Communications does not prosecute companies for non-compliance with its radio equipment approval rules. Third, industry representatives appreciate that, for enforcement purposes, the regulatory reach of the current authorization system extends only to the licensing of equipment and not to its marketing or importation. Compliance activity which must wait for non-conforming equipment to be installed or put into service is very inefficient. (See Recommendation 20 regarding the utilization of the new enabling authority within the Radiocommunication Act).

(17) As the radiocommunication equipment industry becomes more concerned with trade and harmonization of equipment approval schemes, the inadequacies of the contents of RSP - 100 will become more apparent. While the study team concludes that Canada should maintain its own authorization procedure, it is important that the rules contained within RSP-100 be reformed so that other nations, and the U.S.A. in particular, may have a high level of confidence in our equipment authorizations.

8.2.7 Assessment of DOC's Technical Documentation for Radio Standards

(18) The Department of Communications and its predecessor, the Department of Transport, developed, over a thirty-five year period, a comprehensive set of technical instruments called Radio Standards Specifications (RSS's), Standard Radio System Plans (SRSP's), Spectrum Utilization Policies (SP's) and Radio Systems Policies (RP's). Most of these technical instruments never had an independent legal status. The previous Radio Act did not enable their making and, while made with direct consultation with the Canadian radio industry, they were not created through any legislative process. Their drafting was done in such a casual style that these instruments would not meet current drafting standards for subordinate legislation. This is especially so considering that they were drafted in English and translated subsequently into French. Thus, stated simply, the majority of these instruments could not be incorporated into the mandatory aspects of the new hierarchy of technical documentation under the Radiocommunication Act because they would not pass the level of scrutiny for subordinate legislation. Despite this problem, a number

of them can still be incorporated by reference into valid legislative instruments.

8.2.8 Hierarchy of Technical Documentation Anticipated for the Radiocommunication Act

The Radiocommunication Act was drafted so as to support the creation and enforcement of two principal categories of technical standards and technical requirements. Under the Act, these standards and requirements are to be applied to the three principal types of equipment, devices or machinery. The two categories of technical standards or technical requirements are Governor in Council (GIC) Standards and Ministerial (Min.) Standards. According to the provisions of the Act, GIC standards are mandatory and Min. standards are precatory in nature, unless made mandatory by being incorporated into some valid legal instrument.

(19) One of the key challenges for those planning the implementation of the provisions of the Radiocommunication Act, was to create legislation which would support the maximum amount of 'rollover' of the existing technical standards and technical requirements into the new legislative framework. In particular, rollover was most critical for the many extant Radio Standards Specifications (RSS's) and Standard Radio System Plans (SRSP's). It is submitted that maximum rollover will be achieved if RSS's and SRSP's are treated as "ministerial standards" under the new hierarchy of technical documentation anticipated under the Radiocommunication Act. (See Recommendations 19 - 21).

A National Standards Policy for Canada

8.2.9 The Need for a National Standards Policy

The Department of Transport created the first engineering bureau, and began publishing radio standards, in 1954 in an effort to respond to such post-war problems as: rapid advancement in radio technology; dramatic growth in radio use; emerging new categories of radio services; highly stimulated international technical policy making activity at the bilateral and multilateral level; new mass (in relative terms) markets in radio and non-radio, interference-causing consumer equipment; and serious spectrum congestion for certain radio services.

Of significant interest is the fact that the Engineering Programs Branch of the 1990's faces an information age equivalent to each of these problems, but the challenges of today go far beyond those of the post-war era. In addition to the modern parallel problems, to those historic matters set out above, the Department of Communications must be prepared to respond to: the high level of political and legal scrutiny which is now applied to subordinate legislation; changes to the role and functions of the federal government; the evolving changes in the structural profile of the radio industry in Canada; the trend toward regional radio services which must network with other radio services, or the with Public Switched Telephone Network (PSTN); trade-based pressure from within and without Canada to structure technical radio policies so as to harmonize them with the equivalent policies of major trading partners; and the spectre of demands by Canadian provinces for more control over spectrum utilization plans and decisions which may impact upon provincial economies.

As matters stand, the Department of Communications must respond to the challenges of the 1990's with technical standards documentation and an equipment authorization scheme which were created 30 to 35 years ago.

(20) It is time for the Department to consider the creation of a national standards policy which will contain strategies to help it to respond to the spectrum management issues, and larger environment, it now faces; and inform the radio industry, Canadian provinces and the public about the future directions of radio engineering matters for this decade. (See Recommendations 22 - 24).

8.2.10 The Role of Industry in the Standards Creation Process

The Canadian radio industry has a thirty-five year history of direct involvement in the technical standards creation process. This involvement has ranged from informal consultations on the technical needs of the industry, to the actual preparation of initial drafts of standards for consideration by the Department of Communications. Since the mid-1940's, the three constituencies which have comprised, and publicly represented, the Canadian radio industry have been equipment suppliers and manufacturers, service providers and user groups.

Over the years, the industrial structure of the radio equipment industry has changed considerably. As is the case in many other countries, due to a series of buy-outs, trans-national mergers and international joint ventures, the ownership and market of the radio

equipment industry in Canada is far more global than national in nature.

As noted above, the tripartite composition of the Canadian radio industry has also consisted of service providers and radio users. Currently, the service providers consist primarily of large telecommunications organizations and companies such as Telecom Canada, Bell Cellular and Cantel, and members of the RadioComm Association of Canada. The composition of radio users has not changed substantially over the past few years; it consists of large user groups like police associations, government users and radio amateurs.

(21) The composite constituencies of the radio industry in Canada have always been defined by the industry and by DOC. However, it is submitted that the creation of technical policy today requires a broader constituency of interests than has heretofore existed. There would seem to be inadequate representation of the commercial testing industry, the academic community which is performing electromagnetic spectrum-based research, business users of radiocommunications and consumers of radio spectrum related products within the standards creation process. For various reasons, these constituencies generally have not availed themselves of the standard opportunities for providing input to the standards creation. In the future, additional means should be attempted to stimulate their involvement. For the reasons enumerated in Section 6.6 of this study, the Department of Communications will require the broad input and support of these groups during the 1990's. (See Recommendation 24).

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
SECTION IX - RECOMMENDATIONS

The following recommendations are based upon the consultations conducted and upon independent research performed by the study team. These recommendations flow from the conclusions made within Section VIII of this study. They reflect the judgment of the study team and are its responsibility.

RECOMMENDATIONS

The study team recommends that:

General

(1) The Department of Communications should continue its excellent partnership arrangement with the radio industry in the development of mandatory radio standards in Canada. As government resources continue to be redeployed or pared by successive federal budgets, the active participation by industry groups becomes all the more critical to the task of creating the most relevant, reliable and respected standards.

The Need to Harmonize Mandatory Radio Standards

(2) The DOC should clearly confirm to Canadian private sector groups, and to the FCC and the Department of Commerce in the U.S.A, that it strongly supports the objective of a maximum degree of harmonization of the technical parameters of mandatory radio standards with the U.S.A while retaining the sole right to mandate a harmonized radio standard in Canada.

Identification of Standards for Harmonization

(3) The DOC should request the RABC to provide the coordinating role necessary to identify the standards that should be harmonized. The identification should be done separately for standards for new services for which there are no existing standards and for standards for existing services for which there are different standards already in existence in the two countries. (See Conclusion 2)

The Process to Harmonize CAN/USA Mandatory Radio Standards

(4) For new standards for new products, Canadian organizations, in liaison with the DOC, should continue to work on U.S. standards committees as equals amongst many organizations and influence the decision making process by the validity of the arguments. Standards developed by such organizations (eg. TIA and ANSI) are voluntary but they carry much weight because they represent a consensus among involved, responsible bodies.

These standards do not become mandatory until so decreed by the regulatory authority which has the right and authority to modify standards as they see fit to protect national interests.

(5) Where different standards already exist in the two countries for what are primarily consumer products, practically, Canada should make every effort to adopt the technical parameters of the current FCC approved standard for these consumer

oriented products or to adopt as many elements of the FCC approved standard as possible.

It should be emphasized that this recommendation relates to certified radio products that tend to be consumer oriented products such as personal radio services, general radio services, burglar alarms, cordless telephones, paging, wireless microphones and telemetering. Many of these products are also licence exempt and readily transportable across the border.

(6) If Canada has a legitimate need for a standard different from the current FCC one, Canada should attempt to have the FCC and U.S. standards bodies change their existing standard. If accommodation cannot be reached, Canada should live with the different standard where there is truly a legitimate need for a difference.

(7) The responsibility to coordinate or oversee the work on standards to be harmonized should be assigned to a senior level CAN/USA governmental committee. The "CAN/USA Spectrum Management Technical Liaison Committee" is one possibility.

(8) Canada should not promote the establishment of another level in the hierarchy of standards writing organizations by the creation of a North American Standards Institute (NASI) in an attempt to force a better balance in decision making between the two countries. At the political level, if there is a need foreseen to create a NASI

as a counter-balance to ETSI (the standards body of the European Community), the creation of a NASI could be considered. (See Conclusion 7).

(9) Should the DOC conclude that the process outlined by Recommendations 4 - 7 does not sufficiently recognize Canada's interests or if the full range of bilateral technical committee structures is deemed not to be appropriate, the DOC could consider as an alternative adopting, with variations as necessary, the five step harmonization process discussed within subsection 6.5.1 of this study. This alternative process provides for early identification and communication by DOC (to industry) of national spectrum or other strategic interests, before harmonization efforts by Canadian and American industry progress very far. The "organic determinism" notion built into the five step process would permit Canadian industry and standards bodies to decide (in a per-standard, ad hoc manner) which committee structure would best accommodate the recognition of, and accommodation to, their strategic interests. This alternative process would require FCC agreement. (See Conclusion 8.)

(10) Harmonization activities should not be permitted to undermine DOC's long-standing policy of permitting its five regional administrations to apply mandatory standards rules with discretion.

<u>Reciprocal Recognition of Test Data in CAN/USA</u>

(11) The requirement that test data should be confirmed under the signature and seal of

a Canadian-licensed professional engineer should be maintained, but the authorization rules must be changed to require the engineer to attest to the accuracy of the test data. The engineer should be required to sign a statement which clarifies exactly what is being attested to, and this statement should parallel the language of professional accountability statements which other professional groups are frequently required to sign. For example, they could assert that they attest to the accuracy and reliability of the data submitted, "to the level of competence of a reasonably skilled and prudent professional engineer." (See Conclusion 9).

At the time of writing this report, "Issue 7" of RSP-100 was being prepared. It will be distributed for consultation during the Summer and it is expected that it will be issued officially in the Fall of 1991. This policy will respond to a number of the concerns raised above.

(12) The DOC and the FCC should investigate the possibility of accepting test data in a reciprocal manner (without additional review), when the standards and test methodologies in each country are technically equivalent, and the neighbouring administration already has granted an authorization based upon this data. (See Conclusion 11).

(13) The DOC should explore with industry the benefits to that portion of Canadian industry that trades in Europe of introducing a national government approved lab

accreditation scheme, ("notified bodies") such as is in place in the European Community. (See Conclusion 12).

(14) If Canada proceeds with "notified bodies", the authority to accredit such labs should be given to the DOC Certification and Engineering Bureau (Clyde Ave.). The Bureau already manages the lab accreditation scheme (See 3.4.2) for the testing of equipment attached to the telecommunications network (the TAPAC Program), and its work is well accepted by Canadian industry. Such an accreditation program could be run by the Bureau on a full cost recovery basis. (See Conclusion 12).

Reciprocal Recognition of Equipment Authorizations by CAN/USA

(15) Canada must maintain a certification process within the DOC for both legal and practical reasons, and not consider accepting automatically, as has been suggested by some, the certification (or decertification) of equipment by the FCC.

Canada today recognizes valid FCC authorizations for models of Citizen Band (CB) equipment. Canada also recognizes certain digital apparatus which has been authorized within the U.S.A. under Part 15 rules, and is subsequently imported into Canada. Such recognition is not recommended for additional categories of radio frequency equipment, unless DOC officials find that the equipment is being unlawfully brought into Canada in great quantities, and such an approach appears to be in the public interest (See 4.5.2 and Conclusion 13).

(16) When a product conforms to an equivalent standard in both countries, and test data have been accepted, equipment authorizations by the DOC or FCC should be a mere formality and as procedurally simple as possible. (See Conclusion 15).

(17) The current requirement that a maintenance facility be arranged in Canada as a precondition to the issuance of an equipment certification under RSP-100, should be discontinued. So long as authorizations are issued only to corporations or legal entities resident in Canada, existing product liability laws in Canada should ensure an adequate level of customer protection.

Canadian Radio Equipment Authorization Rules

(18) The process for creating mandatory radio standards should be made more flexible and adaptive, so that it will facilitate the rapid commercialization of new technology. New forms of experimental authorizations, similar in nature to DOC's "Self Certification Process", should be investigated for certain experimental authorizations.

Hierarchy of Technical Documentation Anticipated for the Radiocommunication Act

(19) The existing RSS's and SRSP's should be rolled over into "ministerial" standards in accordance with section 5(1)(d) of the Radiocommunication Act. When it is necessary to convert the legal status of these standards from "precatory" to "mandatory", these ministerial standards should be incorporated by reference into one of the five forms of mandatory standards enumerated within section 5.2.2 of this

study (See Conclusion 19).

(20) The Equipment Certification Procedure, RSP-100, should be recast and then drafted in the form of subordinate legislation (as regulations) under the provisions of the Radiocommunication Act. During this drafting exercise, a number of policy changes or clarifications must be made to improve the legal integrity of the scheme, make it more effective and efficient and achieve or facilitate further harmonization of Canadian equipment authorization equipment approval rules vis-a-vis their American counterpart. Section 4.5.5 of this study contains 12 specific policy recommendations for inclusion within this new authorization scheme.

(21) When mandating radio standards, the Department of Communications should ensure that it strikes an appropriate balance, between incorporating into law ministerial or voluntary standards by use of the incorporation by reference power contained in the Radiocommunication Act, and drafting standards and technical requirements as subordinate legislation. (See Conclusion 19).

A National Policy for Mandatory Radio Standards in Canada

(22) The Department of Communications should review the general principles, suggestions and observations contained within the National Standards Policy for radio communications set out within Section 6 of this study, to see which principles or suggestions may be appropriate for inclusion within departmental policies related to

the creation of mandatory standards. (See Conclusion 20).

(23) The DOC should consider undertaking a study of the composition and economics of the radio industry (manufacturers, equipment suppliers and testing laboratories) in Canada so that it may better understand its need within the broad context of technical standard making in the 1990's. (See Conclusion 20).

(24) The DOC should explore initiatives which would result in a broadening in the range of groups or interests which are actually participating in the standards making and equipment authorization process. Such groups or interests could include the testing industry, business and consumer users of radio and academics performing spectrum related research. (See Conclusion 21).

Technical Harmonization and Receiver Standards

(25) The DOC should consult with both the equipment manufacturers and the service providers of the Canadian radio industry about the desirability of downgrading, from "mandatory" to "precatory", the receiver performance features for the listing of equipment provided to the study team by EEMAC (Appendix 3). Support for such action is mixed, and it is evolving as this study is being written. If such downgrading were appropriate, the best methodology would be to separate the receiver portion from the applicable standards, and convert that portion of the standard into a ministerial standard under the Radiocommunication Act.

APPENDICES

APPENDIX 1

LICENSING, MANDATORY STANDARDS AND CERTIFICATION

Management and control of the spectrum in Canada is primarily brought about through licensing of any or all of radio services, radio systems, or radio equipment.

Licensing occurs when certain regulatory and technical parameters are met. In the context of this study, mandatory standards are those technical parameters that must be met before a license will be granted or before certain types of equipment will be certified.

Certification of equipment requires confirmation that the equipment meets certain approved technical parameters.

In Canada, these technical parameters or mandatory standards are spelled out in varying levels of detail for:

- Microwave Systems in SRSP's (Standard Radio System Plans)
- Satellite Systems in RSP's (Radio Standards Procedures)
- Mobile Systems in RSS's (Radio Standards Specifications)
- Certain License Exempt Equipment in TRC's (Telecommunications Regulation Circulars)

It is most important to note that in the context of this study, these four sets of

documentation (SRSP's, RSP's, RSS's, TRC's) are defined as mandatory standards. It should also be noted that while licensing requires that certain mandatory standards (as defined above) be met, certification of equipment is not always required for the granting of a licence. This is explained further in the following:

LICENSING WITHOUT CERTIFICATION

This approach is used for a "Service" for which there are few service providers or manufacturers of equipment. Examples are "fixed microwave service" and "fixed satellite service."

The technical parameters for such services are spelled out in 21 SRSP's (Standard Radio System Plans) for microwave and in 2 RSP's (Radio Standards Procedures) for satellite service.

The applicant's technical acceptability is judged by verifying technical conformity against the SRSP's or RSP's at the time of the application for a licence.

The trade off from the point of view of the DOC is a more complex licensing procedure (since both technical and regulatory requirements are combined) but only for the few applicants versus a simpler licensing procedure plus a detailed set of technical specifications for equipment and the related certification process.

LICENSING WITH CERTIFICATION

This approach is used when there are many equipment manufacturers or many end users involved. In this case, detailed specifications are developed for the equipment; the equipment must be tested against the specification and then certified that it has passed before a licence is issued. Here it is readily apparent that the licensing process itself is relatively simple but the certification process is an additional step.

This approach has application, for example, with Land Mobile Service where there are many service providers, many suppliers of equipment, and many end users. In this case, detailed specifications are developed for the fixed radio transmitter/receiver and for the transmitter/receiver in each car. All equipment must be tested and certified against the detailed specification. Following that, the issuance of licences to the many service providers and users is relatively straight forward. The detailed standards are issued as RSS's (Radio Standard Specifications).

The services in this "Licence with Certification" category are:

- Land mobile both general and cellular for which there are nine RSS's (Radio Standard Specifications)
- Aeronautical mobile with one RSS
- Marine mobile with four RSS's
- General Radio Service with one RSS.

LICENCE EXEMPT EQUIPMENT

Control of certain low powered radio equipment is effected by defining that a licence is not required to use that equipment as long as the equipment itself meets certain detailed specifications.

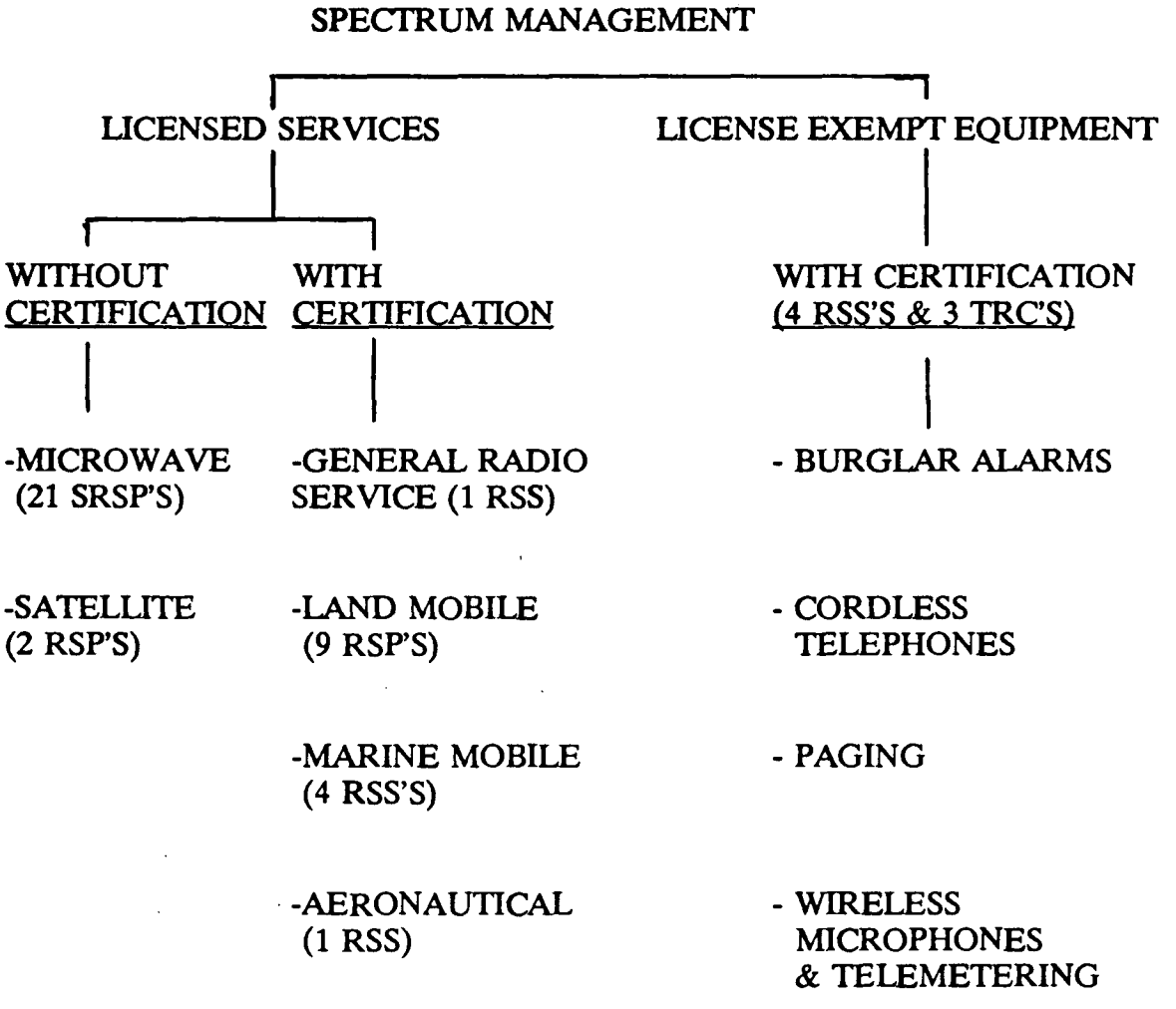
In this case, the equipment must be tested against the approved standard and certified as having passed. These standards are issued as RSS's (Radio Standard Specifications) or as TRC's (Telecommunications Regulation Circulars).

There are four RSS's and three TRC's in this category covering:

- Radio Paging Receivers (RSS 201)
- Burglar Alarm Equipment (RSS 202)
- Low Power Cordless Telephones (RSS 209)
- Low Power Wireless Microphones and Telemetering Devices for One-Way Communication (RSS 214).

RADIO LICENSING IN CANADA

In summary, management and control of the spectrum is carried out by licensing or implied licensing. In diagrammatic form, it exists as follows with the related number and type of mandatory standards in 1990 indicated:



APPENDIX 2

SUMMARY OF MEETINGS AND ATTENDEES

CANADA

	PERSONS IN ATTENDANCE	ORGANIZATIONS IN ATTENDANCE
MEETINGS		
Canadian Standards Association	4	1
Certelecom Lab Inc.	1	1
DOC - Certification & Eng. Bureau	4	1
- Spectrum Policy (2 meetings)	5	1
- International Relations	3	1
- Radio Regulations	1	1
EEMAC - Executive	3	1
- Mobile Committee	7	4
Information Technology Assoc. of Canada	4	4
Radio Advisory Board of Canada	8	5
RCMP	1	1
Standards Council of Canada	1	1
Telecom Canada (2 meetings)	7	3
Transport Canada - Aviation	2	1
- Coast Guard	2	1
Quality Management Institute	1	1
Western Canada Telecommunications Council (Marine Committee)	1	1
SUMMARY - 19 MEETINGS	55	29

UNITED STATES

MEETINGS		
Department of Commerce		
- National Institute of Standards & Technology (NIST)	1	1
- National Telecommunications and Information Administration (NIA)	3	1
Federal Communications Commission	2	1
Office of the US Trade Representative	1	1
Telecommunications Industry Assoc.	2	1
SUMMARY - 5 MEETINGS	9	5

APPENDIX 3

EEMAC SAMPLE LIST OF STANDARDS REQUIRING HARMONIZATION

Electrical and Electronic Manufacturers Association of Canada
Association des manufacturiers d'équipement électrique et électronique du Canada

10 Carlson Court, Suite 500, Rexdale, Ontario M9W 6L2 Tel: (416) 674-7410 Fax: (416) 674-7412

Jim O'Shaughnessey
FAX: (613) 831-3342

Feb.25/91

Jim,

During our meeting on February 7th, you requested from us a short list of samples of products sold or manufactured by our members, which were certified by the FCC but required modifications to meet DOC requirements. This request followed our thesis that special DOC requirements were costly at every level of business and promised no discernable return to the end user in terms of design or application.

Here is a sample list of products modified for DOC requirements:

E.F. Johnson Model	242 7161 VHF Mobile
	242 7163 VHF Mobile
	242 7181 UHF Mobile
	242 7183 UHF Mobile
Bendix/King Model	LMH 302 VHF Mobile
	LMH 314 VHF Mobile
Uniden	AMU 150 UHF Mobile
	AMU 250 UHF Mobile
Saber	Two-Way Portable Radio
HT600	Two-Way Portable Radio
MTX800	Two-Way Portable radio
Spectra	Two-Way Mobile Radio
Maxtrac	Two-Way Mobile Radio
Maratrac	Two-Way Mobile Radio

Should you require more information or if we can assist in any way please contact me at EEMAC.

David R. Bell.

David R. Bell
EEMAC

APPENDIX 4

TELECOM CANADA POSITION ON RECEIVER STANDARDS

Posted: Fri Mar 15, 1991 2:17 PM EST Msg: LTNA-8048-9000
From: DR.SAUNDERS/TCOM.LAURIER/TELECOM.CANADA
TO: J.J.O'SHAUGHNESSY(FAX:6138313342), IRTC
Subject: HARMONIZED CANADA/USA MANDATORY RADIO STANDARDS

TELECOM CANADA MEMORANDUM

From: Doug Saunders
SAUNDERSDR

TO: (ENVOYMAIL_J.J.O'SHAUGHNESSY(FAX:6138313342))

CC: (ENVOYMAIL_IRTC)
CC: (ADCOCKAH)

Subject: HARMONIZED CANADA/USA MANDATORY RADIO STANDARDS

ATTENTION: J.J.O'SHAUGHNESSY

Jim,

Since our meeting of February 21, 1991 we have attempted to answer your questions regarding mandatory standards for radio receivers. The following is Telecom Canada's response reached by consensus of the member companies.

An examination of the listed procedures and specifications show receiver specifications encompass three general areas; they are:

a. Audio performance:
Power, distortion

b. System performance
de-emphasis, sensitivity, spurious attenuation, intermod spurious attenuation, two signal selectivity & desensitization.

c. Radiation
Internal spurious emissions.

The aforementioned three categories of receiver standards should continue to be included in respective DOC mandatory radio standards, until such time as there is a Canadian industry standards organization established/accredited to write voluntary industry radio standards and when such standards as appropriate become available.

Should you have any questions on this response please don't hesitate to call.

Regards,
Doug Saunders
(613)560-3469

APPENDIX 5

MANDATORY RECEIVER STANDARDS

RCMP Comments

The position held by the RCMP and the Canadian Association of Chiefs of Police (CACP) on the need for mandatory receiver standards as reported by G.P. Lutley, Officer-in-Charge, Telecommunications Branch of the RCMP, is as follows:

a) There is no need for mandatory performance standards such as audio quality, distortion, minimum power and other non-spectrum related factors, for receivers.

b) There is a need for mandatory receiver standards to control EMI and to assist in the prevention of interference from other users or services.

c) If appropriate voluntary industry standards were available in Canada, and preferably also in the U.S.A., to accomplish (b) above, it would not be necessary to have such standards mandated by the DOC, if there were some way of ensuring that such voluntary standards would be applied to all equipment sold in Canada. However, it is difficult to see how this could be achieved with products entering Canada from manufacturers world wide.

APPENDIX 6

CELLNET CANADA POSITION ON RECEIVER STANDARDS

Bell Cellular

File: 2300 DOC - Corporate Policy

29 March, 1991

Mr. Jim O'Shaughnessy
65 Bayhill Ridge
Stittsville
Ontario
K2S 1B9

Dear Jim

Subject: Mandatory Receiver Specifications

Further to our conversation recently, I would like to confirm the following on behalf of CellNet Canada members:

At present, we have great reservations about the prospect of eliminating performance and quality requirements from the mandatory radio standards. Our concern relates to receiver specifications.

A cellular telephone network is designed to limit potential interference to the customer, based on knowing the specifications of the equipment at each end of the call path. Such specifications include those of the receiver and the transmitter. Knowing and relying on these specifications is essential to the design of a spectral efficient cellular network, since they dictate how frequently and how close together the limited spectrum can be re-used while maintaining the desired level of customer service quality.

It should also be noted that if the customer has a terminal with poor receiver specifications, it is likely that he will receive degraded service. The subscriber will attribute this to poor network management and consequently blame the service provider and not the poor quality phone which he has just purchased. This is a situation unique to cellular service providers, since most radio systems are closed in that the service provider controls directly the type of unit that is loaded on his system. Cellular users, on the other hand, can purchase phones from any supplier and then load such units on either CellNet Canada's or Cantel's network.

20 Carlson Court • Etobicoke, Ontario • M9W 6V4 • (416) 674-2220

We therefore believe that receiver specifications do play an important role in the spectrum management as well as the quality of service provided. Lower specifications on either the transmitter or the receiver will result in lower capacity per Hertz, lower quality or, more likely, a combination of the two.

You will be receiving a separate response from Cantel, expressing similar concerns.

Please call me if you require additional information, and I will co-ordinate it on behalf of the two national cellular service carriers.

Regards.

C.Vinodrai
Manager
Industry Relations and Standards

CC: CellNet Canada
Rogers Cantel

APPENDIX 7

CANTEL POSITION ON RECEIVER STANDARDS

CANTEL

Head Office
Rogers Cantel Inc.
6315 Côte de Liesse
St-Laurent, Quebec
H4T 1E5

Tel (514) 340-1319
Fax (514) 340-9261

Executive Office
Rogers Cantel Inc.
10 York Mills Road
North York, Ontario
M2P 2C9

Tel (416) 440-1400
Fax (416) 250-4902

April 2, 1991

Mr. Jim O'Shaughnessy
65 Bayhill Ridge
Stittsville, Ontario
K2S 1B9

Dear Mr. O'Shaughnessy,

Mandatory Receiver Specifications

Understanding that you will be making your recommendations to the Department of Communications (DOC) on whether receiver specifications should be included in the DOC radio standards, I would like to express CANTEL's view on this issue.

As a service provider, we have the concern that there would be difficulty for us to plan and maintain our network performance to industry standards if receiver specifications would be eliminated from the DOC standards.

As noted in your first consultancy report to the DOC, almost all other nations have receiver standards. We also take your point that the FCC does expect and assume that minimum receiver performance characteristics will be present in the field but such assumption may well lead to poor field performance by equipment with low receiver qualities.

Not only are transmitters and receivers equally important to deliver the communication service with the desired performance, receiver specifications are also relevant to spectrum efficiency. We might be required to boost up the effective radiated power (ERP) to offset the problem with poorer receiver performance. Greater ERP could then lead to less chance for frequency reuse and hence poorer spectrum efficiency. Besides, low-quality receiver would require more retransmissions of messages hence more air time. We therefore share the same view as other cellular service providers that receiver specifications should be maintained in the DOC radio standards.

If you need more information, please call me at 416-250-4935.

Sincerely,

Mike Buhrmann
Director, Technology Development

c.c. Lenny Katz, CANTEL

MANDATORY RADIO STANDARDS IN CANADA - PHASE II
ANNEX - AN HISTORICAL PERSPECTIVE ON MANDATORY RADIO STANDARDS IN CANADA

A central enquiry which underlies both Phase I and Phase II of the this broad examination of mandatory radio standards concerns the potential for and appropriateness of Canada and the U.S.A. harmonizing their mandatory technical radio standards and equipment authorization rules. Simply put, the potential for technical harmonization depends, to a considerable extent, upon each nation's preparedness either to accept or to accommodate the differences in the technical and procedural regulatory laws of their trade partner(s). Whether Canada is ready to accept, or to otherwise accommodate, the differences between Canadian and American technical and procedural radiocommunication equipment authorization rules is a function of: the extent of the technical, legal and political differences between the rules in each country; this nation's commitment to the status quo; the extent of the pressure to change (or to resist changing); and the preparedness of American vested interests and government officials to accommodate Canadian commercial interests and national public policy objectives. To the extent that certain of these questions involve assessment of a national attitude, it is not possible to offer definitive answers. These very questions are central to the opinions held by Canadians about the merits of most aspects of the Free Trade Agreement. In fact, the current national angst regarding this country's identity (what it means to be Canadian) involves, in no small measure, personal and transnational assessments about the fundamental differences between living and doing business in our two nations.

While the DOC has initiated a number of studies related to particular technical issues or problems, or to the technical aspects of emerging radio services, radio standards and equipment authorization rules have not be examined previously within their broad context - including their historical context and evolution. Clearly, the existing radio standards and equipment approval processes were created to respond to the exigencies, technologies and regulatory philosophies which surrounded their making. These rules, processes, exigencies, technologies, and philosophies evolved over time. To obtain some perspective on the national attitude about the broad harmonization factors enumerated above, it is necessary to be able to answer a number of questions about Canada's existing technical rules: Why were they created? What forces and objectives shaped their evolution? What challenges must they now meet?

To respond to the need for historical perspective, this annex was written and appended to this study.

1. Introduction to the History of Mandatory Radio Standards

Phase I of the study, Mandatory Radio Standards in Canada dealt generally with the history, content and nature of the technical standards and equipment authorization rules which comprise Canada's radio engineering standards. The historical material produced within Phase I demonstrated that the history of mandatory radio standards differs from the history of other federal mandatory technical rules and processes in that the technical managers of the radio spectrum have consulted with the regulated industry and with the public on a more

open basis. Moreover, regulation of radio technical matters has involved more long range planning than for other categories of resource management involving the use of technical standards and authorization rules. What is not contained within the historical material in the Phase I study is an account of how or why particular technical rules or approaches were taken. Such a historical perspective is necessary to perform the investigation required with the terms of reference for the Phase II report. What follows is a brief ninety year history of the technical regulation of radiocommunications in Canada. The reader is asked to note particularly the technical and procedural policies developed during the fifteen year period from 1954 to 1967. It was during these years that the foundation for the current mandatory radio standards and equipment authorization rules was laid. It was also during this period that critical differences appeared between Canadian and American radiocommunication technical policy. These very differences now inhibit standards harmonization between the two countries. By examining Canadian technical policies in their historic context, it is hoped that one can understand this nation's commitment to them.

2. In The Beginning, 1901-1906

For the first five year period of the establishment of radio stations in Canada, the federal government was content to leave the technical aspects of radiocommunication to the Marconi Wireless Telegraph Company of Canada. Through the use of government contracts, which required an initial expenditure of $200,000 of public funds, the Marconi Company constructed 13 coastal radio stations on Canada's east coast, and outfitted four government ships with wireless telegraphy devices. Decisions about the technical

characteristics and operational policies for these wondrous devices were left for the company to determine.

By 1906, federal officials had come to realize that important public policy matters, involving the use of radio, such as the potential for "intercommunication"[1] between different makes of wireless apparatus, were tied integrally to the technical characteristics of the equipment itself. Government officials decided that the national interest required a considerable degree of state control over the technical characteristics of wireless stations. While continuing to contract with the Marconi Company for the establishment of stations in the Gulf of St. Lawrence and on the East Coast, the government took over and upgraded radio apparatus which the company had installed aboard government vessels. Also, federal officials began planning the establishment of the West Coast Radio Service, a wholly government owned and operated venture.[2] From this point onward, federal

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[1] "Intercommunication" was the turn of the century phrase for interoperability with other types or models of radiocommunication equipment. Shortly after entering into the first series of contracts with the Marconi Company to install and operate certain wireless telegraph apparatus, Canadian officials began to feel uncomfortable about the limited technical capacity of the equipment and about the operational policies which the Company was following (refusing to communicate with non-Marconi wireless stations). The principal concern was for the safety at lives at sea.

[2] From: "Wireless Telegraph Stations", Sessional Paper 21, Appendix No.8, Ottawa, October 22, 1907 (at p.96). The Department of Marine and Fisheries took over and upgraded the wireless apparatus on government vessels due to concern that the Marconi Company was not adequately maintaining or improving upon the technical capacity of the equipment. The government chose to establish its own series of wireless coastal stations on the west coast of British Columbia because Marconi equipment did not "intercommunicate" well with other types of wireless apparatus. Canada chose the "Shoemaker" device for these new stations because it would communicate with both "Marconi" and "Massie" equipment, and it was expected that vessels with other types of apparatus would be calling at the ports

communication's officials maintained broad regulatory control over the technical matters affecting the operation of radiocommunication equipment.

3. The Early Years, 1907-1953

During the period from 1907 to 1953 the most significant events which impacted upon the technical control over radiocommunication were the two world wars. During both wars the use of radio was integral to the deployment of troops and equipment, and during World War II radio broadcasting played a critical role in North America to maintain support for the war on the "home front". Government regulation of radiocommunications made few advancements during the war periods. The Department of Navel Service took executive control over most aspects of radiocommunication and amateur radio licenses were suspended. As detailed below, technical standardization issues came to the forefront only upon the return of legal jurisdiction over radio regulation to the Department of Transport in 1945.

From 1907 to the mid point of the 1950's, the technical regulation of radiocommunication equipment was achieved through engineering and operational requirements which were set out within a number of legal documents. These instruments included the enabling radio legislation (statutes[3] and regulations[4]); bilateral and multilateral treaties concerning the

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at Vancouver and Victoria.

[3] The Wireless Telegraphy Act, 1905 (1905-1906), Part IV, The Telegraphs Act (1906-1913), the Radiotelegraph Act (1913-1938), Radio Act (1938-1989) Radiocommunication Act (Oct. 4, 1989-) This legislation was consolidated within federal Revised Statues in 1927,

use of radio[5]; other legislation[6]; and the actual licenses and other authorizations issued by the government. Through these various instruments, technical parameters such as station location, frequency, power, range, equipment type, and antenna type and height were controlled by the federal regulator of the day. Licensees were expressly forbidden from using equipment or technical arrangements other than those authorized, and ministerial regulations obliged all licensees to inform the government promptly of any technical changes. Conformance to these engineering parameters was monitored and enforced through various inspectorate bodies. At first, compliance was the responsibility of the Superintendent of Wireless, and those duly authorized to assist him. Following the establishment of the Interference Section (within the Department of Marine) in 1926, radio inspectors, and radio interference "trouble cars", were stationed across the country.

1952 and 1970.

[4] The very first radio regulations were issued as a two part set on May 29, 1914. These regulations were divided into separate parts because the enabling authority to create them was set out in two different sections of the Radiotelegraph Act which divided regulation-making powers between the federal cabinet and the Minister of Naval Service. Responsibility for regulations with respect to licence fees was given to the Governor in Council (Part I) while the making of technical and operational rules were assigned to the Minister (Part II).

[5] Mandatory technical parameters for radio equipment often were contained within international treaties and agreements. While these international arrangements did not have an independent legal status, almost invariably their provisions were incorporated by reference within sections of the radio regulations and incorporated as licensing conditions referenced (by agreement title and date) upon the face of various classes of radio licences issued by the government.

[6] For example, regulatory authority over radio equipment established within aircraft was contained within a regulation made under authority of the Aeronautics Act of 1919. Authority over marine radio equipment was contained first within provisions of the Radiotelegraph Act of 1913 but, in 1934, this jurisdiction was relocated to the Canada Shipping Act of 1934.

During the forty-six year period under review (1907-1953), radio equipment was subject to rather general engineering requirements which were struck, amended and circumvented (such discretion was exercised by the inspectorate) in a rather ad hoc fashion[7], as international agreements were signed or as interference difficulties arose. The technical characteristics of transmitting and receiving components were not specified in any detail, and models of radio equipment were not subject to a pre-distribution authorization process (government testing or certification)[8]. A substantial impediment to the establishment of detailed technical standards was that during the first half of the twentieth century, the various governmental regulators of radiocommunication did not have access to high levels of radio engineering expertise[9]. Thus, for the most part, Canadian technical radio rules

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[7] Despite the fact that many technical matters were specified within subordinate legislation, treaties and international agreements; the actual technical requirements were very general in nature. Legislation left much discretion with the minister of the day as to the specific technical parameters to be met for particular categories of radio licence.

[8] The closest thing to pre-distribution authorization would have been the military procurement process in effect for radio equipment during the two world wars.

[9] Two exceptions to this assertion should be noted. First, following the establishment of the Interference Section in 1926 the government set up the radio "Test Room" in Ottawa. This facility and a few other regional workshops worked on technical fixes to interference problems caused by industrial and consumer electrical appliances and equipment. Considerable expertise in this area was acquired but, with the exception of electrical power line problems, the institutions or manufacturers who built or maintained the equipment were not involved in finding solutions. Second, the Canadian Broadcasting Act, 1936 vested the technical responsibility for radio broadcasting transmitters with the newly established Department of Transport. The small broadcasting engineering group within the Department's Radio Division did acquire substantial engineering expertise, while implementing the elaborate technical provisions involving the sharing of AM frequencies in the Americas. These provisions were contained within three international broadcasting agreements implemented during 1937 and 1938. This engineering subgroup performed technical evaluation of engineering plans and proposals, and they produced the Department's first published mandatory radio standards.

merely documented the established technology of the day.

With the end of the Second World War a new era of radiocommunication regulation in Canada commenced and, within a relatively short span of years, the technical policy matters related to managing the radio frequency spectrum became almost overwhelming for a number of reasons. The war effort had significantly advanced both radio technology and the level of radio engineering expertise in the populous. Discharged radio operators began building their own equipment, mass amounts of military surplus radio equipment became available[10]. Canadian radio equipment manufacturers, which had supplied the military during the war years, now looked for industrial and civilian markets during a period of economic stimulation. Consumers and industries purchased electrical equipment in record numbers, and much of it emitted electromagnetic energy which caused interference to radio equipment[11]. The number of interference complaints logged by DOT staff tripled within the three year period between fiscal year 1944-45 and 1947-48[12]. In the decade following cessation of the war the use of radio literally took off. While there were some commercial

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[10] Information obtained from a telephone interview conducted 15 February 1991 with Ottawa-based consulting engineer, Bill Wilson. According to Mr Wilson, military issue "No. 19" was a mobile radio transceiver which flooded the war surplus market. Citizens began modifying and installing this equipment for use in residences, cars, boats and aircraft.

[11] Under the enabling authority contained within section 23 of the Canadian Broadcasting Act, 1936 the first regulations concerning the control of interference from electrical devices had been made by Order in Council on January 22, 1941. Regulations covering the electromagnetic emissions of Industrial, Scientific and Medical (ISM) equipment were proclaimed on January 1, 1948.

[12] Department of Transport, Annual Report, 1947-48, Radio Division; King's Printer, Ottawa: 1948 (at p. 196)

radio services established during this period, near exponential growth in radio stations surrounded federal, provincial and municipal government use of radiocommunications; and marine installations.

Another important phenomenon which followed the war was the dramatic increase in international technical committee work related to radiocommunications. International committees, which had made little or no progress during the war years, now attempted to rationalize the peacetime use of radio as quickly as possible through a much revitalized, International Telecommunication Union (ITU)[13]. Canada participated actively in the areas of civil aviation[14], marine navigation[15] and broadcasting regulation[16]; and, to a lessor

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[13] Between May and October of 1947, three ITU conferences were held to attempt to reorganize the use of the radio spectrum in the post-war era, while taking into account technological advances (especially those facilitating the exploitation of higher frequencies). The May Conference in Atlantic City made general technical revisions to the international Radio Communication Regulations which had been annexed to the International Telecommunication Convention in Madrid, 1932 (as revised in Cairo, 1938). Also, the International Frequency Registration Board (IFRB) was established to register the Frequency Lists to be co-ordinated by specialized ITU conferences.

[14] Within fiscal year 1946-47 meetings of the technical divisions of the Provisional International Civil Aviation Organization (PICAO) were held in Montreal and Washington, D.C. The technical planning and standardization of aeronautical radiocommunication and aids to air navigation were the key agenda items. In April of 1947 the International Civil Aviation Organization was constituted and one year later, the International Administrative Aeronautical Radio Conference began in Geneva and lasted for about one month.

[15] International standardization activities for marine radio and aids to navigation commenced almost immediately following the war. The first conference was the International Meeting on Radio Aids to Marine Navigation (IMRAMN) held in London. These meetings studied the aids and systems which had evolved over the war period and began planning for the technical standardization of such equipment. In June of 1948 the Safety of Life at Sea (SOLAS) Conference was convened in London. These meetings revised and updated the minimum safety requirements set at the International Convention for the SOLAS as set in 1929 and, in recognition of technological advances, new

degree, in conferences dealing with the control of electromagnetic emissions from electrical equipment[17]. In conjunction with aeronautical conferences, in 1946, Canada established its first two radio equipment authorization processes with pre-published standards. Using the enabling authority addressing "airworthiness" contained in the Aeronautics Act, the Radio Division of the Department of Transport instituted technical standards and an equipment type-certificate program for certain classes of aeronautical radio equipment[18]. The second equipment authorization program, more informal than formal, resulted in an

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requirements were struck for radiotelephone equipment, life boat radio apparatus and the use of radio direction finding equipment.

[16] In August of 1947 the High Frequency Broadcasting Conference was convened in Atlantic City to plan the international sharing of the AM band, to facilitate frequency sharing and to reduce interference. The work of this conference was carried over to the HF Conference held in Mexico City in October of 1948. From these meetings a Technical Plan Committee was struck and this committee continued to meet and co-ordinate frequency sharing into the 1950's. In the 1950's the focus of broadcasting regulation moved from being international to regional and, following difficult negotiations between the U.S.A. and Mexico, the North American Regional Broadcasting Agreement was signed in November of 1950.

[17] In 1946 the International Special Committee on Radio Interference (C.I.S.P.I.R.), then affiliated with the International Electrotechnical Committee (IEC) was convened in London to co-ordinate efforts to measure and reduce the interference from electrical equipment.

[18] The technical standards and other requirements were published within departmental circular, "Radio Division Circular C.R. 1" and information regarding the type-certificate program was contained within, "Requirements for Type Certificates of Airworthiness for Aircraft Radio Equipment, Radio Division Circular, C.R. 2". The type certificate program applied to manufacturers of the various models of aeronautical radio equipment and each piece of equipment was certified for conformance by an "Inspection Release Certificate". Enforcement for this certificate program was achieved at the airfield. Pilots for scheduled airlines had to produce these certificates as a condition precedent for clearance to fly. For non-scheduled flights, pilots had to obtain an airworthiness certificate which attested that their radio equipment was suitable (certified equipment was encouraged by DOT inspectors). This information was obtained from, Department of Transport, Annual Report, 1946-47 King's Printer, Ottawa: 1948 (at pp. 187-188).

approved-listing of industrial and consumer electrical heating equipment which conformed to the Industrial, Scientific and Medical (ISM) equipment requirements enacted in January of 1948[19].

By the early 1950's, international technical committee work intensified as ITU members within Region 2 (the Americas) started to focus upon the technical detail of regional implementation of ITU decisions of global application. The U.S.A. started pressing for regional allocation of frequencies, equipment standards and operational rules for a number of radio services. These activities, coupled with the dramatic increase in interference complaints caused to, or caused by, early television receivers tapped the Department of Transport's radio engineering expertise to its limits. Also, new forms of radio services, requiring particular engineering expertise, began emerging[20]. A dramatic response had to be made.

4. Responding Under Pressure, 1954-1969

When considering this nation's 90 year history of technical regulation of radiocommunications, the period from 1954 to 1969 is the most critical to understanding

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[19] In 1948, this approval scheme was structured in a very ad hoc manner around the interference regulatory power contained within section 23 of the Canadian Broadcasting Act, 1936. The very first radio interference regulations under this section were enacted on 22 January 1941. During the late 1940's the Interference Section of the Radio Division worked closely with a committee of the Canadian Standards Association to create standards for inclusion within Part IV of the Canadian Electrical Code for ISM generators.

[20] Emerging services in the early 1950's included terrestrial microwave, community cable television, and radar-based aids to marine and air navigation.

present-day technical standards issue which currently face the Department of Communications. It was during this fifteen year period that Canadian radio engineering regulation came into is own and important technical features and rules, significantly distinct from those which developed in the U.S.A., emerged.

In the 1954-55 fiscal year, the Telecommunication Division of the Department of Transport began a number of initiatives which set a foundation for the technical regulation of radiocommunications. That foundation is still very much evident today. In 1954, the Radio Regulations section at DOT Headquarters in Ottawa was divided into three sub-sections. One of these sub-sections, called "Radio Regulations - Engineering", formed this country's first radio engineering bureau. The chief responsibilities of this bureau were to create and to promote the use of radio engineering standards, and to plan the future use of the spectrum so that radio in Canada would develop in an orderly manner. The Department of Transport and this engineering group undertook a number of standards related initiatives which are deserving of enumeration because they reveal a great amount about the nature and content of current technical rules and practices:

(i) Due to the growing number and nature of radio apparatus, the Department realized that it could no longer count upon the personal client contact by radio inspectors to inform and direct the activities of radio

licensees. A new and strong emphasis[21] was placed upon regulation by binding technical standards premised upon international radiocommunication standards, but modified to suit the Canadian context.

(ii) New standards and technical regulations were created in direct consultation with radio manufacturers, service providers and user groups. Principally, consultations involved an association called the Canadian Radio Technical Planning Board[22]. It was felt that the most relevant, reliable and respected standards would result from direct industry involvement in their creation[23].

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[21] The new emphasis upon technical standards was a definite sector policy which was set out within the Department of Transport, Annual Report, 1954-55. For example, for the first time, the enumerated activities of the Telecommunication Division listed standards creation as one of the principal means of managing the radio spectrum. (See especially: Annual Report at page 35).

[22] The Canadian Radio Technical Planning Board (CRTPB), an association of radio equipment manufacturers, service providers and users was formed in 1944. This group became the Radio Advisory Board of Canada (RABC) in 1983. It was the Department of Transport which re-established contact with this group in the mid-1950's for the purpose of sharing the task of making radiocommunication standards. The word "re-established" is used above because the CRTPB and the DOT had a falling out soon after the war. A counterpart organization of manufacturers and users in the United States had been successful in convincing American radio regulators to allocate spectrum by public or private user-type, rather than by radio service-type. In other words, U.S. officials were licensing spectrum by common user characteristic rather than by common spectrum characteristic (for example, AT&T as a very large common carrier was give its own piece of radio spectrum). When the telephone representatives within the CRTPB could not convince Canadian officials to do likewise, a falling out occurred. (Information from interview with consulting engineer, Bill Wilson, 15 February 1991.)

[23] Some consultations resulted in agreements with manufacturers to improve the spectrum related characteristics of their products. In 1955 an agreement was made with the Electronics-Television Manufacturers Association of Canada (ETMAC) to suppress the

(iii) Mandatory technical rules required a government equipment authorization (testing and certification) process, and a type-certification process was created and set out in procedural documents. A "Standards Laboratory" was created in 1955 for equipment conformance testing and for spot audits of equipment in the field. Canadian manufacturers were permitted to test their own products so long as the conformance testing was done under the signature of a Canadian-registered professional engineer and the test data were sent to the Department of Transport for confirmation[24].

(iv) Except in the area of broadcasting[25] and aeronautical standards[26],

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conducted noise level of television receivers manufactured from 1956 (and thereafter) to a level of 200 millivolts. As a direct result of this agreement, the number of interference complaints related to radio frequency emissions from television receivers dropped from 400 to 500 per year to an average to 10 per year by the 1958-59 fiscal year.

[24] Test data from outside of Canada were not accepted, thus foreign manufacturers had to use a Canadian agent who would secure the services of a Canadian engineer.

[25] Standards for broadcasting receivers were almost dictated from below our border due to American dominance over the technical aspects of consumer broadcasting equipment. While a substantial number of TV receivers were manufactured in Canada during the 1950's (see below), no manufacturer would have been prepared to create receivers with unique Canadian technical characteristics. (Dominion Bureau of Statistics data for January of 1953 establish that Canadian producer domestic sales of television sets as early as 1952 amounted to over $60 million dollars.) It is noted that unique spectrum engineering features related to radio broadcasting transmission developed in Canada to meet the policy objectives of the national broadcasting system.

[26] From 1953 onward, the creation of aeronautical radio standards in Canada amounted to little more than a 'rubber stamping' of standards created in the U.S.A. Principally, this was because aeronautical equipment manufacturers were not located in Canada (with a few exceptions related to the manufacture of aeronautical aids to navigation). Without a manufacturing base, Canada did not have the interest or the expertise to create 'Canadian' aeronautical standards. Almost all aircraft came into Canada from the U.S.A., and the radio

the Department of Transport attempted to use international standards as the base document for their standards creation activities. This policy produced some distinct differences between Canadian licensing and standards policies, and those in the United States. For example, receiver performance standards were regarded as fundamental to good spectrum efficiency and planning by Canadian regulators and, from the 1954 forward, such were made part of the mandatory elements of Canadian radio standards[27].

(v) During the mid-1950's the initial Radio Standards Specifications (the RSS's) and Radio Standards Procedures (the RSP's) were created. One of the first activities of the new engineering group was to create RSS's for the

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equipment was already installed. Aircraft which was certified as "airworthy" by U.S. federal aviation authorities was licensed in Canada without further certification of the radio system by means of a Canada/U.S.A. reciprocal agreement. (From: Canadian Radio Inspector Manual (circa 1950) "Instructions to Inspectors - Aircraft Stations - General, June 1, 1949 (at p. 9)).

[27] Radio receivers of the day were notorious for their poor sensitivity, selectivity, frequency stability and spurious response. In the U.S.A., receiver performance standards were not normally part of the mandatory elements of radio standards because the enabling legislation to regulate the radio spectrum, the Communication Act of 1934, provided authority to regulate the emissions from radio and non-radio devices, but not the receiving characteristics of radio equipment. A limited amendment was created to permit the creation of receiver standards for domestic television receivers, but this jurisdiction was not used extensively. For the FCC the lack of mandatory receiver standards has always reflected philosophical as well as jurisdictional factors. Commission staff have regarded receiver performance characteristics as the type of quality of performance features which were best left to the consumer to determine.

marine mobile service[28].

The technical regulatory foundation laid in the 1950's permitted the Department of Transport to respond to the challenges of the 1950's and 1960's. One of the most important contributions to the collection of technical documents of the 1960's, came in the form of Standard Radio System Plans (SRSP's)[29]. Such plans were, and continue to be, especially useful for the planning and co-ordination of terrestrial microwave equipment and services.

5. First Decade of the Department of Communications, 1969-1979

With a great deal of foresight, Canada was one of the first nations in the world to establish a separate government ministry for the regulation of wire and wireless telecommunications and other communication-related matters. During the early years of the existence of the Department of Communications, technical regulatory matters continued much as they had at the Department of Transport with the exception that senior managers of the new

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[28] Maritime traffic in the Great Lakes had grown rapidly since the end of the war and radiocommunication had become very congested. The only solution was to create standards for marine equipment which would operate in the VHF spectrum, which suffered few interference problems at the time. A five year plan was created for the phasing in of this new equipment. This was to accord with a Canada/U.S.A. treaty called, The Agreement for the Promotion of Safety on the Great Lakes by means of Radio, entered into November 13, 1954. As foundational standards documents, Department of Transport staff modified for Canadian use existing Electronic Industries Association (EIA) standards for marine radio.

[29] In the early 1960's a "Systems Engineering Group" was created in the engineering sector. This group began planning the use of certain radio apparatus within categories of radio systems. Manufacturers were required to send their engineering briefs to the department so that new services could be evaluated and planned at the design stage. In the mid-1960's, approximately 200 engineering briefs were examined each year.

department did not demonstrate the same benign indifference towards the radio spectrum employees as their DOT counterpart. One of the first things with which the radio spectrum bureaucrats had to adjust was a more intensive level of management[30].

The biggest challenges of the 1970's surrounded the regulatory requirements presented by the rapid increase in the number and nature of radio licensees, the dramatic increase in interference complaints caused by GRS (General Radio Service) equipment (commonly known as Citizen Band (CB) Radio) and spectrum planning the use of higher frequencies. Accommodating more uses and users of the radio spectrum, especially in larger urban centres such as Toronto, Montreal and Vancouver, became an engineering challenge. Increased attention had to be paid to technical standards and to electromagnetic compatibility. In 1975, the Department began developing a computer-based automated spectrum management system to assess better and co-ordinate sharing of the radio spectrum. This system assessed spectrum usage using transmitter and receiver technical parameters, which were compatible with published mandatory engineering standards.

The problems related to GRS radio were of serious engineering concern. By March of 1979, 67 per cent of all radio licenses (almost 1 million GRS licensees) were for citizen

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[30] During the 1950's Canada experienced an unprecedented economic boom. The Department of Transport was called upon to plan and construct much of the transportation infrastructure for the nation. For the most part, these activities kept DOT's senior managers too busy to concern themselves with what the spectrum management group was up to. Consequently, the staff of the Telecommunication Division enjoyed a great deal of independence and flexibility in their daily decision making.

band radio, and a very large number of the sets in operation were unlicensed[31]. At the time, GRS units had to be type-approved for use in Canada but many citizens were purchasing cheaper models in the United States. These units were "grey market" models of radios which sold lawfully in Canada. These imported GRS units were, for the most part, approved by the Federal Communication Commission for sale in the U.S.A. and bore an attesting FCC approval label. FCC and DOC technical standards for citizen band equipment were close but not identical. For example, DOC standards had receiver performance requirements. Because these CB units were technically compatible with those in operation in Canada no prosecutorial action was take in regard to such equipment, but it caused considerable frustration throughout the late 1970's and early 1980's.[32]

While the CB craze had passed by the mid-1980's, it was at this point that the DOC changed its GRS equipment authorization rules. So much equipment was operating in Canada without a licence that the department considered it inappropriate to refuse a licence to those who wished to obtain an authorization and operate legitimately in all other respects. In response, the Department of Communications modified its approval rules so as to license any GRS equipment which bore a valid FCC approval label.

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[31] While the very first GRS licenses were issued by the DOT during fiscal year 1962-63, the use of citizen band did not become a 'craze' in Canada until the middle to late 1970's.

[32] The regulatory problems caused by these grey market units were both political and technical. The U.S. approved equipment could not be licensed in Canada and that represented a large amount of foregone revenue. Also, without equipment and operator's licenses, those who purchased this equipment often operated their equipment in total disregard to other users, and modified the power output of the equipment such that its operation interfered with the reception of VHF television channels.

Another phenomenon of the late 1970's; but one which did not appear to impact directly upon radio standards related activities, was constitutional wrangling between the federal and provincial governments about the regulation of wire-based telecommunications. A number of telecommunications bills were tabled in the House of Commons but they made little progress.

6. The Standards Environment in Flux, 1980-Present

Radiocommunication standards related matters at the Department of Communications progressed with mixed success during the decade of the 1980's for a myriad of legal, political (domestic and international), technical, and radio industry structural reasons:

(i) Legal complications

During the 1980's a number of legal changes occurred which impacted upon the pace and nature of standard-making at the Department of Communications. Most significant was the change in the level of legal scrutiny applied to subordinate legislation in Canada, both when it was created and when it was used to support prosecutions for non-compliance. Initiatives which had begun in the early 1970's, to increase parliamentary oversight over government regulation-making, were enhanced with formal rulemaking policies and requirements in 1986 and 1987[33]. During the past decade, Canadian judges began examining subordinate

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[33] In 1986, the first comprehensive regulation and rulemaking requirements were applied to the federal government. Through the work of the Nielsen Task Force, these requirements were enhanced in 1987. These changes called for increased administrative and political scrutiny surrounding the making of subordinate legislation and rules, and participatory rights in the process by the private sector. Prior to these changes, a degree of parliamentary

legislation much more closely[34] to ensure that it was properly enabled, and they interpreted these legislative provisions much more strictly.

The outcome of these changes was that the nature and scope of all mandatory technical rules, standards or equipment approval processes had to be authorized expressly, and specifically, by the statute which enabled their making. This legal scrutiny was applied by the legal service personnel within the Department of Communications; by the Office of Privatization and Regulatory Affairs (OPRA); by the Standing Joint Committee on Regulations and Statutory Instruments; and by provincial and superior courts when departments attempted to prosecute non-compliance with their regulations. In this regard, the engineering branch of the DOC was at a particular disadvantage. Until the new Radiocommunication Act was proclaimed in October of 1989, the enabling authority for technical regulations was contained within the former Radio Act, which had not been altered a great deal since it was proclaimed in 1938. Repeatedly throughout the 1980's, technical regulatory projects were delayed, curtailed or sidelined due to the fact that the Radio Act contained insufficient authority for the enabling of particular technical regulations. For this reason also, prosecutions for non-compliance with technical standards

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oversight was provided through the Standing Committee on Statutory Instruments as authorized by the Statutory Instruments Act of 1972.

[34] Judges were reacting to changes in the common law which required closer scrutiny in both the statutory enabling authority for subordinate legislation and stricter readings of the scope and nature of government powers set within the body of such legislation. The common law changes were supported greatly by the various rights of private persons (human and corporate) set out within the Charter of Rights and Freedoms which was proclaimed into force in April of 1982.

or equipment authorization processes were not attempted[35].

(ii) Political Changes - Domestic

While significant political change occurred in Canada during the 1980's, three changes which impacted upon standard-making at the Department of Communication are deserving of specific discussion. At the beginning of the decade the very mandate of the Department was expanded. In July of 1980, the Arts and Culture program from the Department of the Secretary of State was transferred to the DOC. The stated purpose of this transfer of responsibility was to blend communication technology issues with domestic cultural policy, such that each might be more sensitive to the directions and objectives of the other. At the same time, the leadership role over space policy and research was transferred to the Ministry of State for Science and Technology[36]. Many within and without the Department of Communications have asserted that these shifts in program responsibilities have not produced the desired blending of cultural and technical policy[37].

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[35] Criminal prosecution for non-conformance with the equipment authorization scheme was attempted in only one case during the 1980's. The judge dismissed the case because, in his opinion, critical aspects of the equipment authorization rules (equipment certification and labelling requirements) were not specifically contained within Part II of the General Radio Regulations. The provisions which the judge required could not have been supported by the enabling authority within the Radio Act. (See: R. v. Four Seasons Marine Mobile Electronics Ltd. and Jack Sedlack, Unreported decision of Judge K. Smith of the Provincial Court of British Columbia, November 30, 1982.)

[36] The very first space policy and research group had been formed with the Radio Division of the Department of Transport in December of 1961.

[37] Radio industry representatives often assert that the cultural portfolio consumes an inordinate amount of the ministry's resources and attention, some of which might better be applied to the creation of technical policy development. During consultations for this project, certain members of the radio industry complained about the attention paid to

For the purposes of this analysis, the most important political changes within the 1980's involved changes to the very political philosophies and structure of governance in Canada. Firstly, the rise in regional (over federal) power in this country found fuller expression. During the decade, the development of all telecommunications policy was delayed or sidelined by regional opposition to change by certain provinces which had come to regard that the technical characteristics of telecommunication equipment were tied, in an integral manner, to their regional policy objectives. This trend, coupled with the fact that technological and service delivery changes, occurring within the telecommunication industry in Canada, have linked wire and wireless policy development much more closely together, may impact upon technical policy in each area of telecommunications in the very near future[38]. This, despite the fact that most regional political activity to date has been directed at wire line services and technology.

Secondly, and most significantly, in the latter half of the previous decade, the very nature of the federal governance underwent a significant alteration which changed, and continues

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cultural issues. A few asserted that concern for cultural sovereignty was causing engineering staff within the Department of Communications to support the continued existence unique technical features, such as radio receiver standards, within our technical rules so as to make them (culturally) distinct from the counterpart standards in the U.S.A.

[38] For example, the Ontario Ministry of Culture and Communications recently has become quite interested in radiocommunication policy matters. Over the past few years, this department has been actively involved in controversies involving radio licence fee increases, and the political and technical problems associated with the siting of radio antennae within municipal boundaries. Also, at the point of writing this report, the Ontario MCC was preparing to respond, in a detailed manner, to DOC's call for consultation on its broad review of radio spectrum-related policies.

to affect, all regulatory policy. Throughout Canada's history a distinct feature of our federal government has been the benign nature of its regulatory rules and policies, relative to the legal rules and programs in the United States. For reasons of climate, geography, topography, population distribution, linguistic duality and regional disparity of resources, the federal government and private industry have tended to work in a symbiotic arrangement to advance the economic, cultural and security interests of all Canadians[39]. Generally, technical standards and equipment authorization rules have tended to serve this relationship. For example, consumer features (physical safety, value for money and linguistic capacity) were added to product and service rules, and enforced by the federal government, in exchange for certain protection from competition from foreign and domestic products and services[40]. In addition to these 'partnership arrangements' the federal government engaged in expenditure politics[41] to induce industry to add the desired policy features, or the government itself entered the field and provided the service or product.

From about 1986, it became obvious that the federal government began moving away from expenditure politics due to its high cost and relative inefficiency. Instead, the government espoused the virtues of expenditure reduction, user-pay principles, cost recovery, elimination

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[39] Often referred to as "nation building".

[40] In consultations with representatives of the electrical equipment manufacturing industry, it was admitted that, on occasion, certain technical standards which had been incorporated into the Canadian Electrical Code (enacted provincially), contained technical features, unique to Canada, which were created as a way to keep U.S. producers from dominating the Canadian market in electrical products. For years those unique features had been justified publicly as being necessary to withstand the demands of Canadian winters.

[41] Through direct grants and subsidies or other forms of financial assistance.

of unfunded liabilities and reduction of the size of the federal civil service.[42] The economy was to become much more trade-based and it was to be directed by domestic and international competitive forces. The centrepiece of this new philosophy was the Canada/U.S.A. Free Trade Agreement which came into effect in January of 1989. The terms of this agreement delegitimized the use of many government/industry partnership arrangements, and encouraged the harmonization of the technical standards and equipment authorization processes in each country. Such policies were intended to facilitate the free flow of certain goods and services between the two nations. By the end of the 1980's, little demonstrative progress had been made toward the harmonization of Canadian and American technical rules[43], but there was considerable evidence that Canadian consumers were shopping in the U.S.A. for consumer goods at record levels (often in disregard of Canadian customs or other regulatory laws).

Despite the direction of the political changes discussed above, it is interesting to note that the Department of Communications re-committed itself to its historic and important roles of service provision and nation-building when it formulated a mission statement for the

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[42] The latest federal budget continues this trend. For the 1991-92 fiscal year, it calls for government departments to absorb higher salary budgets from collective bargaining, within existing salary budgets. Moreover, it requires that the total number of senior managers within the federal public service be reduced by ten percent.

[43] To its credit, the engineering staff at the Department of Communications maintained a dialogue, regarding technical harmonization, with their FCC counterparts throughout the entire decade. Pursuant to those discussions, a number of coordinating efforts were made to make certain engineering requirements and equipment approval rules as compatible as possible.

ministry at the turn of the century[44]. Considering the current political climate, the fulfilment of this mission will require the Department to manage the technical aspects of radio regulation more strategically, and to find creative ways of funding its various programs.

(iii) Political Changes - International

Throughout the late 1980's, and into this decade, domestic and international technical regulations and standards issues took on new dimensions nationally. Technical regulations and standards became issues of national interest, in the broadest sense. In fact, all nations became preoccupied with international trade, and national policy-makers realized that technical authorization rules (for access to certain resources or for marketing equipment or services) set the ground rules for global trade. Words like "harmonization", "national treatment" and "transparency" became part of most regulators' vocabulary.

Today, all information technology and telecommunication (IT&T) industries are growing and evolving at an unprecedented rate of speed. The services and equipment which these industries develop and provide are critical to the information-based economies of modern nations. The technical and commercial success of these services and equipment is dependent upon the development of technical standards which are both appropriate and timely.

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[44] See: Department of Communications, Annual Report 1988-98, Queen's Printer, Ottawa: 1989 (pp. 3-4)

Over the past few years, a number of global trends have greatly complicated the challenge of making appropriate and timely IT&T standards. For instance, long-standing institutional structures, which were used for decades to create international telecommunication standards, are being forced to re-evaluate their structure and functioning because they appear to compare so poorly to the responsive profile demonstrated by certain regional standards institutions like the European Telecommunications Standards Institute (ETSI). Regional trading blocks are being created which will require conformance testing to their IT&T standards as a precondition to access to their markets. In response, many equipment manufacturer, service provider and user groups have called upon their governments to respond to these challenges by harmonizing their IT&T technical standards and equipment authorization (certification and testing) rules with those of their principal trading partners. Many of those in Canada who advocate the harmonization of Canadian and American technical radiocommunication policy cite, as the principal justification for such action, the need to create a regional trading block to protect North American commercial interests if the EC trading zone adopts protectionist policies and practices.

(d) Technological and Service Factors

Without doubt, in telecommunications, the most significant technological trend of the 1980's was the blending of telecommunication and information technology (the digitalization of telecommunications). It has resulted in rapid changes in system capacity and cost; and a convergence of equipment, systems and services. In radiocommunications, the increasing convergence of telecommunication (wire and wireless) and information technologies is

driving the development of information networks and is changing the application, operation, and markets of those networks, and their associated infrastructure. Radio service and equipment user groups now demand that systems and networks inter-connect and inter-operate with one another. Digitalization has dramatically increased the capacity of radio systems and the capability to operate despite the presence of harmful interference. Also, certain radio equipment now presents economically viable alternatives to use of the Public Switched Telephone Network (PSTN).

The digitalization of radiocommunications will complicate post-design, or post-production, accommodation to unique Canadian technical requirements. Units containing silicon components which cannot be modified, in an economical manner, once the unit has been produced. The consequence of insisting upon unique Canadian technical requirements in such circumstances may be that the equipment could not be introduced into this country. And, the software design and production costs of such digital equipment may be such that no Canadian manufacturer would make the units (to Canadian specifications).

Another important phenomenon of the 1980's and 1990's is the globalization of business. This growing trend has impacted upon radio service requirements, especially within land/mobile services. There is little doubt that Canada must harmonize standards for radio products or services with transnational roaming or networking requirements. These service

requirements are now continental, but soon they may be global[45]. Networking within categories of radio services and interoperability with other telecommunication services, such as the Public Switched Telephone Network, will require harmonized standards.

(e) Industry Structural Changes

Over the years, the industrial structure of the radio equipment industry in Canada has changed considerably. In the 1950's and 1960's a substantial amount of the radio equipment used in Canada was manufactured here. At present, a very modest percentage of all radio equipment in this country is Canadian designed or manufactured[46]. As is the case in many other countries, due to a series of buy outs, transnational mergers and international joint ventures, the ownership and market of the radio equipment industry in Canada is far more global than national in nature. One suspects that, to a certain extent, the equipment industry in Canada now consists of a number of importers and distributors of East Asian equipment, and of American-based branch plants which distribute their line of products within Canada. The Canada distribution rights of the foreign-based manufacturers of this

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[45] Motorola's proposed "Iridium" radio system will be global in nature. Clearly, for such a system to be practical and economically viable, the applicable technical standards and equipment authorization rules will have to be harmonized internationally.

[46] There are notable exceptions to this statement. One of most significant is the development of subscriber radio. This cross between cellular and cordless telephone service, has offered a low cost alternative to the installation of traditional wireline telephone service in the Canadian prairies, and these systems are selling well internationally. The development of subscriber radio, a system designed for unique Canadian public policy requirements, is often proffered as one good reason why this nation must maintain it's sovereignty in the area of technical radiocommunication regulation.

radio equipment have been secured through private sector contracts and through the Department of Communication's equipment certification scheme. It must be remembered that equipment authorizations are particular to the applicant - it is not a general authorization of the equipment per se.

7. Conclusions from the Historical Material

Canadian government officials have been managing the technical aspects of radiocommunication equipment and services for almost 90 years. Since about 1906, they have appreciated that some of the most important public policy issues related to exploiting the radio frequency spectrum, as a precious and limited national resource, are tied integrally to the technical characteristics of the equipment itself. Accordingly, radio standards and other technical requirements for radio equipment have increased steadily in number, in application and in detail (content), over the previous nine decades.

Since the mid-1950's, the pace of these changes has increased dramatically. The technical expertise within the bureaucracy, related to radio engineering, has grown constantly from 1954, when the first radio engineering group was created within the Department of Transport, to the mid-1980's. Related directly to that expertise, the amount and extent of forward planning of technical radio matters has increased steadily since the middle of the 1960's. Also, Canadian regulators of technical radio issues, have for the past 35 years, consulted actively with Canadian radio manufacturers, service providers and users, in order to create the most relevant, reliable and respected standards and technical requirements

possible.

The historical section of this study also reveals that there are a number of interesting parallels between the uncertain and challenging environment which faced the Radio Division of the Department of Transport during the ten year period following immediately after World War II, and the environment which now challenges the Engineering Bureau of the Department of Communications. The Department of Transport created the first engineering bureau in 1954 in an effort to respond to such post-war problems as: rapid advancement in radio technology; dramatic growth in radio use; emerging new categories of radio services; highly stimulated international activity at the bilateral and multilateral level; new mass (in relative terms) markets in radio and non-radio, interference-causing consumer equipment; and serious spectrum congestion for certain radio services.

Of significant interest is the fact that the Engineering Programs directorate of the 1990's faces an information age equivalent to each of these problems, but the challenges of today go far beyond those of the post-war era. In addition to the modern parallel problems, to those historic matters set out above, the Department of Communications must respond to: the high level of political and legal scrutiny which is applied to subordinate legislation; changes to the role and functions of the federal government; the evolving changes in the structural profile of the radio industry in Canada, and globally; the trend toward regional and global radio services which must network with other radio services, or with the Public Switched Telephone Network (PSTN); trade-based pressure from within and without Canada

to structure technical radio policies so as to harmonize them with the equivalent policies of major trading partners; and the spectre of demands by Canadian provinces for more control over spectrum utilization plans and decisions which may impact upon provincial economies.

The Department of Transport responded to the challenges of the 1950's and 1960's by forming a separate engineering bureau, by creating the forerunners of the RSS's, SRSP's and SP's which exist today, and by establishing the radio equipment certification process which continues today, as cast within RSP - 100 (Issue 6: 25 July 1987)[47].

As matters stand, the Department of Communications must respond to the challenges of the 1990's with technical standards documentation and an equipment authorization scheme which were created 30 to 35 years ago. Without doubt, it is time for the Department to consider the creation of a nation standards policy which will contain strategies to help to it respond the spectrum management issues, and larger environment, it now faces; and inform the radio industry, Canadian provinces and the public about the future directions of radio engineering matters for this decade. An integral aspect of that standard's policy will be to provide direction on the harmonization of Canadian and American technical standards and equipment authorization rules for radio spectrum related equipment. The competitiveness of the Canadian radio industry will depend upon finding an appropriate response.

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[47] As noted within the body of this study, the DOC was in the process of creating an "Issue 7" to RSP - 100 as this study was being written up.