

**A DIGITAL CORDLESS  
TELEPHONE SERVICE IN CANADA**

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**A Digital Cordless  
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**Department of Communications  
Canada**

**May 1992**

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## A Digital Cordless Telephone Service for Canada

### I. INTRODUCTION

In November, 1989 the Department of Communications issued a Canada Gazette Notice (Notice No. DGTP-014-89) and accompanying Discussion Paper entitled Provision for Field Trials of Public Cordless Telephone Service in Canada and Public Consultation for Policy Direction. In these documents, the Department announced a period for field trials to determine the future demand and market viability, determine spectrum requirements, develop a consensus on standards and other related matters, and identify appropriate licensing requirements for public cordless telephone service in Canada. The Department also invited written comments on several policy and regulatory issues from all interested parties and comments from the Industry Advisory Committee on Public Cordless Telephone Service established under the auspices of the Radio Advisory Board of Canada (RABC). The Industry Advisory Committee was chaired by Mr. Merrill Shulman of Winnipeg, Manitoba.

The Minister of Communications issued twenty-two radio authorizations and experimental radio licences to entities interested in undertaking field trials. These entities have filed quarterly reports detailing their findings on their technical and marketing experiments. Their final reports were filed on December 31, 1991.

In response to the above-mentioned Gazette Notice, twenty-seven submissions were received from interested parties in response to the Department's invitation for written comments on issues related to the establishment of a commercial public cordless telephone service. In addition, Mr. Merrill Shulman submitted to the Minister of Communications the Final Report of the Industry Advisory Committee on Public Cordless Telephone Service. The Final Report was filed in two parts; Part A filed in September 1991 made recommendations on all matters related to the commercial implementation of public cordless telephone service in Canada, except for a consensus recommendation on a single common radio technology; and Part B was filed in February 1992 on this latter recommendation.

Finally, in September 1991, the Department issued a Notice in the Canada Gazette announcing the beginning of a three phase selection/licensing process for Canadian public cordless telephone service. The first phase, filing of expressions of interest, ended on December 2, 1991. The Phase Two document, which will be issued shortly, provides the Phase One applicants with procedural information and the necessary topics to be covered in their detailed submissions. The third phase is the submission by the successful applicants of detailed application forms including site-specific information.

## II. OBJECTIVES

Digital cordless telephone technology represents a unique opportunity for Canadians to have increased personal communications capability at home, in the office and in public places. The implementation of this technology offers the possibility of numerous benefits including the prospect of increased productivity, industrial benefits to the Canadian telecommunications industry, an increased level of personal safety and security, and an enhanced quality of life by giving individuals the power to be more accessible to one another.

The Industry Advisory Committee on Public Cordless Telephone Service has reviewed the market potential of digital cordless telephones and has concluded that it represents a significant commercial opportunity for Canada. It has forecast, albeit based upon preliminary information, that hardware and service provider revenue may represent a sum of over three billion dollars during the five year period commencing from service introduction.

The purpose of this paper is to outline the major issues for the establishment of an ongoing commercial digital public cordless telephone service in Canada, having taken into consideration consultations with the public, most notably those with the Industry Advisory Committee. Throughout this paper, reference will be made to both the public and private (i.e. residential/business) uses of digital cordless telephones. Emphasis will be on the public service aspects, since only the public service will be licensed by the Department. Equipment for use in the residential and business environment will be exempt from the licensing requirement. However the inter-operability of digital cordless telephones in both public and private settings, and the fact that it is expected that widespread private usage will provide the basis for a viable public service, necessitates the following discussion on both private and public uses of digital cordless telephones.

The Department has several objectives in facilitating the implementation of a digital public cordless telephone service in Canada. These objectives include:

- to meet the consumer's need for a low cost, portable, personal communications device, based upon a common standard. Such a device will allow access by the Canadian public to the benefits of high quality service afforded by digital technology. This device will provide for enhanced personal safety, security and mobility, amongst other benefits;

- to provide Canadian business with a new tool to enhance productivity;
- to give Canadian industry the opportunity to participate in all facets of digital cordless telephone service in order that it may be better able to address and respond to subsequent generations of personal communications services in Canada and abroad;
- to respond positively to the largest industry led initiative to implement a new personal communications service (i.e. digital public cordless telephone service) since the advent of cellular mobile radiotelephone service;
- to provide public digital cordless telephone service on a competitive basis across the country, hence stimulating competition in the provision of personal communications services; and
- to increase the accessibility to and stimulate the use of the public switched telephone network by all parties, including persons with physical disabilities.

It is anticipated that the introduction of digital public cordless telephone service networks will most likely occur first in more populated centres where supporting markets would be found. Thus, the Department foresees authorizing a limited number of competitive service providers. Upon the granting of authorizations for this service, a major objective will be to ensure the availability of service in a coordinated and integrated manner across Canada wherever feasible.

### III. SERVICE ISSUES

#### a. Service Description

In Part A of its Final Report, the Industry Advisory Committee on Public Cordless Telephone Service defined basic and enhanced features for public cordless telephone service.

While in general agreement with these recommendations, there are two issues upon which the Department wishes to further elaborate. Firstly, the Department requires that magnetic coupling with hearing aids be available as an option on handsets in order that these personal telephones may be used by the hard of hearing community. The Department will ask the Terminal Attachment Program Advisory Committee (TAPAC) to determine the universal applicability of its hearing aid compatibility

requirements in CS-03, or any necessary modifications including the timing aspects, to digital cordless telephone handsets. Secondly, the Department requires that digital cordless telephone handsets and network equipment have the technical capability to provide for full two-way calling from the outset.

**b. Service Coverage**

The Department favours a public cordless telephone service which will provide the benefits of productivity gains, mobility and security to the largest number of Canadians possible. At this time, the Department considers that this service would be available in most urban centres in Canada within the first five years.

Although each public cordless telephone service provider will operate competitively with other service providers in any given locale, each service provider will, however, be expected to increase capacity in areas of heavy traffic use and to extend coverage to unserved areas to the maximum extent practicable.

Service providers may wish to construct their own specialized radio or other telecommunications facilities in order to operate their public cordless telephone services. For such needs, new service providers may draw upon existing departmental policies.

**c. Inter-System Access**

The Department requires that subscribers of one service provider be afforded access, without a priori authorization, to other public cordless telephone service providers when service is not available on their own network for any reason. In such cases, the regulator of the service offering may authorize an incremental charge that may be added to the basic call handling charges. While it is acknowledged that this may provide for increased service coverage to the public at an early date, subscriber concerns relating to handling charges may result. At least in the early stages of implementation, the Department is of the view that the market acceptability of public cordless telephone service in any given area will be more a function of service coverage than the actual number of operators providing competitive service in that area i.e. wide availability of coverage will be a prime factor for the success of the service.



#### IV. SPECTRUM ISSUES

The November 1989 Discussion Paper identified four options for consideration for the allocation of frequency spectrum for cordless telephones in Canada. A fifth option dealt with the issue of spectrum for a "call-back paging" feature associated with cordless telephones.

The Industry Advisory Committee on Public Cordless Telephone Service recommended the use of Option 1, the band 944-948 MHz, which could be expanded to 952 MHz depending upon demand. The Industry Advisory Committee made this proposal with the full knowledge that this spectrum is currently used in the United States for broadcasting auxiliary services and studio-transmitter links.

##### a. Band Selection

The Department has allocated the band 944-948 MHz for use by all of the various components (public access, residential and business systems e.g. PBX, centrex, etc.) of digital cordless telephone service. The Department does not believe that the band 948-952 MHz needs to be opened at this time. The Department expects that private and public uses of cordless telephone service can co-exist and share the designated four MHz wide band (944-948 MHz). Also, the public access stations of the various service providers at any particular location can use the frequencies in the four MHz band on a dynamic channel allocation basis and this spectrum should be sufficient for the near to medium term. The band 948-952 MHz is reserved for future expansion of digital cordless telephone use, should it be warranted. An amendment to the document entitled Spectrum Utilization Policy for the Fixed, Mobile, Radiolocation and Amateur Services in the Band 896-960 MHz was issued in September 1991. Readers should refer to the amendment for further details.

##### b. Fixed Point-to-Point 900 MHz Systems

Systems in the 900 MHz band previously licensed under the provisions for the fixed system channelling plan, including operations in the band 944-948 MHz, have been notified for removal under the conditions of the spectrum policy for the band 896-960 MHz (SP 896 MHz) and its predecessor (SP 300.89). It is anticipated that at the date of the introduction of cordless telephone systems, there will be few remaining fixed systems operating in these bands and these systems will be primarily in

remote areas of Canada. For any interference situations between these existing systems and digital cordless telephone systems, the provisions for reassignment of fixed systems given in the document entitled General Information Related to Spectrum Utilization and Radio Systems Policies (SP-GEN), issued in January, 1991 will apply.

c. Canada-U.S. Common Service/Spectrum

The Industry Advisory Committee on Public Cordless Telephone Service has strongly recommended steps be taken to establish a common Canada-U.S. digital cordless telephone service if possible, citing the benefits of common spectrum for North America to support a sizeable equipment market, and to facilitate use along the border of Canada and the United States. The Committee has, however, also indicated that a Canada-only market for digital cordless telephone service is large enough to permit its development. It is on the basis of this latter recommendation that the Department is proceeding with its authorization process.

d. Medium to Long Term Designation of Spectrum

The Industry Advisory Committee has recommended that in the short to intermediate term, Canada should implement digital cordless telephone service below 1 GHz in the 900 MHz range. In the longer term, it suggested spectrum provisioning for personal communications services above 1 GHz.

The Department is of the view that it is premature to respond to recommendations on medium to long term service at this time. The International Telecommunication Union (ITU) World Administrative Radio Conference 1992 (WARC-92) on frequency allocations recently dealt with the provision of spectrum for a number of radio services in the 1-3 GHz range including personal communications. There are a number of issues that will need to be addressed domestically in this regard including the designation of spectrum by WARC-92 for the Future Public Land Mobile Telecommunications System (FPLMTS) and the endorsement of the development of an international standard by the ITU. A domestic public review process throughout this frequency range will begin shortly. The impact on existing radio services will be a major consideration in this review.



## V. TECHNICAL ISSUES

### a. Technology Selection

The Industry Advisory Committee considered two technologies, namely CT2Plus and CT3. In Part B of the Final Report, it recommended the adoption of CT2Plus Class 2 as the best overall choice of technology for Canadian implementation of public digital cordless telephone service. Furthermore, it recommended that CT2Plus Class 1 (which is the United Kingdom version of the technology operating in the Canadian allocation of 900 MHz) be adopted as an interim technology for Canada.

The RABC recommendation of CT2Plus technology was based on a number of factors. Some of these factors included suitability of the technology to meet the three markets from a technical viewpoint, timely availability of equipment for the three markets, provision of equipment by a large number of equipment suppliers, development of Canadian industry, and experience available from other countries and field trials in Canada.

In Part A of the RABC Final Report to the Department, the features required for the service are described in detail, including contiguous coverage, handoff, call reception and roaming. Also, in the RABC balloting process, a number of comments suggested the need for features beyond those which were tested with Class 1 technology. Therefore, on balance, based on the RABC recommendation and the above mentioned comments, the Department has decided to adopt CT2Plus Class 2 technology which encompasses the service features identified as necessary. Work will begin immediately to develop a Canadian standard based on this technology.

### b. Equipment Certification

1. Radio Requirements - The procedures of RSP-100 will be used for the certification of radio equipment for both public and private systems. Furthermore, a Radio Standards Specification (RSS) will be developed based on the decision by the Department to adopt CT2Plus Class 2 technology. The development of this RSS will follow the normal Department process with industry participation through the Radio Advisory Board of Canada.

2. **Terminal Equipment Requirements** - Equipment will be certified by the Department of Communications according to CP-01 and labelled accordingly. The applicable standard is CS-03 as amended from time to time to reflect technological changes and new service demands. For those designed with a hearing aid magnetic coupling feature, technical requirements will be determined by TAPAC.

**c. Terminal Attachment Requirements**

The Department agrees with the Industry Advisory Committee's recommendation to apply existing TAPAC technical requirements where appropriate, to residential and business digital cordless telephone base station equipment intended for interconnection to the public switched telephone network.

**d. Interconnection to Telecommunications Networks**

It is the responsibility of the CRTC (or in areas not under federal jurisdiction, the appropriate regulatory authority) to approve the terms and conditions of interconnection for access to the public switched telephone network by public base stations. For public cordless telephone service, the CRTC may choose to augment the provisions of Telecom Decision CRTC 84-10, Radio Common Carrier Interconnection With Federally Regulated Telephone Companies, dated March 22, 1984, which contains the basic terms and conditions for radio common carrier interconnection with federally regulated carriers.

As public cordless telephone service develops, there will be a need for interconnection standards similar to IS-01 (interconnection of cellular radio systems and common carrier systems) to facilitate the interconnection of base stations, and their control centres with the public switched network. Attestation to meet the signalling format of the public switched telephone network also may be required.

**e. Shared Allocation and Co-coverage of Systems**

The band 944-948 MHz will be fully shared among public and private users using equipment that will conform with the technical standards of the Department.

Sharing in the band 944-948 MHz between users may result, as the service expands, in cases where systems, both public and private, will provide radio coverage in the same areas. This will eventually entail co-coverage overlay by different public systems only (eg. several public service providers' systems in an airport) and by different private systems only (eg. different cordless PBX systems) on the same floor of a building. It has been recommended that private systems should be exempted from licensing, and the Department is in agreement with the intent of this recommendation. Without some form of oversight, however, any coordination of private systems that might be required as new systems are added in the same area would be virtually impossible. An alternative could be to rely upon the intelligence of cordless telephone systems to detect the utilization of radio channels of other like systems in the same area and operate in a manner to share the common spectrum among the various systems.

Since the Department will exempt from licensing handsets or private cordless telephone base stations as discussed elsewhere in this document, manufacturers and systems operators must take all the necessary steps, including the appropriate technical measures, to ensure that their equipment can operate on a non-coordinated but compatible basis with other equipment meeting the technology standard for digital cordless telephones. This will be an important issue to be addressed and resolved in the RABC standards forum.

## VI. AUTHORIZATION ISSUES

For further reference with respect to authorization, please consult Canada Gazette, Part 1, Notice No. SMRR-004-91--Public Cordless Telephone Service in the Band 944-948 MHz, dated September 24, 1991, issued September 28, 1991, and subsection 5. (1) of the General Radio Regulations Part 1.

### a. Requirements for Authorization

As proposed in the Discussion Paper accompanying Canada Gazette Notice No. DGTP-014-89, it is anticipated that a limited number of competitive public cordless telephone service providers will be authorized. Authorization will be required under the Radiocommunication Act for public service providers who own and operate radio facilities necessary for the provision of this service, provide public cordless telephone service to any third party, and charge a fee or toll (regulated by the Canadian Radio-television and Telecommunications Commission (CRTC) or other regulatory authority).

**b. Licensing of Base Stations**

The Industry Advisory Committee recommended that the Department license public cordless telephone service providers, not each of their base stations providing public cordless telephone service. The Department sees the merit of this approach and is currently reviewing the options open to it under the Radiocommunication Act to effect this change. Only those digital cordless telephone base stations providing access directly or via intermediate networks to the public switched telephone network will be licensed.

Consistent with the Industry Advisory Committee's recommendation, the Department will exempt from licensing all handsets and private business and residential (i.e. non-public service provider) base stations.

**VII. INSTITUTIONAL ISSUES**

**a. Number of Service Providers**

Four nation-wide service providers were proposed in the Discussion Paper accompanying the November 1989 Canada Gazette Notice. The Industry Advisory Committee recommended that initially a minimum of two (2) licensees be awarded by the Department in designated service areas.

Consistent with Part A of the Industry Advisory Committee's Final Report, the Department continues to support an industry structure based on a limited number of competitive service providers in any given serving area. The Department foresees authorizing three to five competitive service providers in any given serving area but is not bound by this expectation. The final number authorized will depend upon the number and quality of detailed submissions it receives. In selecting service providers, in order to foster competition, it would be essential to ensure that intercorporate links among holders of authorizations be minimized.

While a limited number of public cordless telephone service providers will be authorized by the Minister of Communications to operate competitively in any given serving area, the appropriate regulatory authority (CRTC etc.) will approve the conditions relating to the offering of public cordless telephone service and the necessary interconnection arrangements.

**b. National, Regional and Local Service Providers**

The Industry Advisory Committee recommended that the initial licences be granted to both regional and national service providers, and that there should be provision to allow local/regional operators to offer service on a regional or national basis. The Industry Advisory Committee did not define the terms "national" or "regional".

The Department sees great merit in the coordinated provision of public cordless telephone service throughout the country. Local, regional and national companies will be fully eligible to participate equitably in the competitive licensing process. Note should be taken of the following two matters. The Department will require inter-system access - i.e. that subscribers of one service provider must be given automatic access/service on other service providers' systems if for one reason or another they are unable to get service from their "home" provider. In carrying out its selection process, the Department will also give preference to companies providing intra-system access - i.e. companies that give evidence of arrangements with affiliated companies to provide service to each others' subscribers when they roam on a coast-to-coast basis.

**c. Future Licensing of Additional Service Providers**

The Industry Advisory Committee on Public Cordless Telephone Service has suggested licensing additional service providers after a period of two years following the granting of initial licences.

Once the initial authorization of service providers is completed, however, the Department considers that no further authorizations should be issued for the near to intermediate term for public cordless telephone service in the 900 MHz band, with the possible exception of authorizations for new providers to replace those that have failed to proceed. Authorization of additional service providers in this frequency range may be entertained after five years as interest from the public and industry warrants.

d. Transfer of Authorizations

Consistent with the Department's general policy on this matter, no transfer of a public service providers' radio authorization to another party will be allowed without the full review of the application and subsequent approval of the Minister. This will only be considered in exceptional circumstances, and only when service has been implemented.

VIII. OTHER ISSUES

a. Canadian Ownership Guidelines

Canadian ownership and control guidelines, as described in the Telecommunications Policy Framework announced in July 1987, will be considered in authorizing public cordless telephone service providers.

Furthermore, once the successful applicants have been selected, prior approval will have to be given by the Minister for any change that would have the effect of reducing the level of Canadian ownership or control below the eighty percent level.

b. Research and Development

As it is the Government of Canada's policy to encourage research and development (R&D) in Canada in its effort to maintain and enhance competitiveness of Canadian industry, the Minister of Communications will consider prospective applicant's commitments to communications R&D to be an important criterion in the licensing of public cordless telephone service providers.

c. Numbering Plan Considerations

In Canada, a Canadian Steering Committee on Numbering (CSCN) has been established composed of telephone, cellular, paging and other carriers. The CSCN will liaise with the North American Numbering Plan Forum to ensure a consistent numbering scheme for public cordless telephone service, and other similar services for Canada, the United States and other areas served by the North

American Numbering Plan Forum. Regarding the future direction of personal communications services and numbering plans, the CSCN would be in a position to monitor the situation with respect to digital cordless telephone implementation as it evolves within the Canadian context.

**d. Additional Copies**

Additional copies of this document may be obtained from the Information Services Branch of the Department in Ottawa, or from the Department's regional offices in Moncton, Montréal, Toronto, Winnipeg and Vancouver.

**IX. RELATED DOCUMENTS**

Canada Gazette, Part 1, Notice No. SMRR-004-91--Public Cordless Telephone Service in the Band 944-948 MHz - September 1991

Provision for Field Trials of Public Cordless Telephone Service In Canada and Public Consultation for Policy Direction - November 1989

SP 896 MHz - Spectrum Utilization Policy for the Fixed, Mobile, Radiolocation and Amateur Services in the Band 896-960 MHz (excluding certain portions of the band) - February 1990. and the amendment to SP 896 MHz dated September 1991

SP-GEN - General Information Related to Spectrum Utilization and Radio Systems Policies - January 1991

RP 009 Introduction of Very Low-Power Wireless Communications into the Workplace - March 1987, and the addendum to RP 009 dated September 1989

RP 010 Policy Guidelines Concerning the Transfer of Radio Licences - June 1988

RSP 100 - Certification of Radio Equipment Procedure, Issue 6 Provisional - January 25, 1987



CP-01 - Certification Procedure, Issue 7, March 15, 1991

CS-03: Standard for Terminal Equipment, Systems,  
Network Protection Devices, Connection Arrangements  
Systems and Hearing Aid Compatibility, Issue 7,  
February 1990

IS-01 - Interconnection Standard for Interfaces between  
Cellular Radio Systems and Other Common Carriers  
(Provisional), November 16, 1985