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Canada

Communications Policy Branch

Proposed Spectrum Allocations in the HF Band 3 to 30 MHz

15 May 1993

Spectrum and Orbit Policy

Canada

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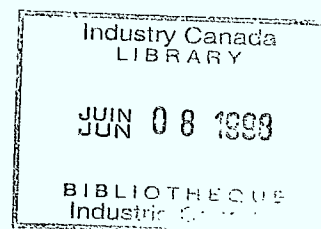
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Preface

As a consequence of the new frequency allocations made by the 1992 World Administrative Radio Conference (WARC-92) convened by the International Telecommunications Union (ITU) in Spain, and the ongoing demand for new and existing radio services, the Department has undertaken a comprehensive Spectrum Policy Review covering a wide range of spectrum allocation and utilization issues. This document forms part of the Review and addresses specific proposals for

- o **spectrum allocations in the HF band 3-30 MHz;**

Other documents being released for public comment separately address and propose:

- o **spectrum allocations and spectrum utilization in the range 30-960 MHz;**
- o **spectrum allocations in the 1-3 GHz range;**
- o **spectrum allocations above 3 GHz;**
- o **spectrum utilization for certain services above 1 GHz.**

Based on the public comments received on these documents, revisions will be made to the Canadian Table of Frequency Allocations, to the relevant Spectrum Utilization Policies and, eventually to the Standard Radio System Plans.

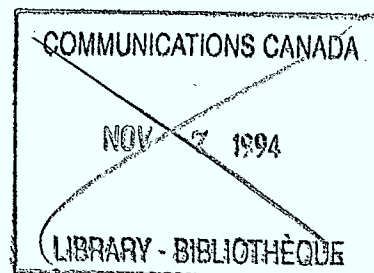


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**Proposed Spectrum Allocations
In The HF Band 3-30 MHz**

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1 Intent

This Proposals Paper reviews the changes to the frequency allocations made by the 1992 World Administrative Radio Conference (WARC-92) in the HF frequency range 3 MHz to 30 MHz, and proposes a number of changes to the Canadian Table of Frequency Allocations (hereinafter called the Canadian Table).

The Canadian Table is generally consistent with Article 8 of the ITU Radio Regulations, except where it is necessary to reflect a Canadian requirement that is different from that of the ITU as a whole.

This Paper contains background information on the HF frequency band, the preparations for the WARC-92 Conference, Canadian proposals to the Conference, the results of the Conference and proposed spectrum allocation changes to the Canadian Table in the High Frequency (HF) Band (3-30 MHz).

The public is invited to submit written comments to the Director General, Telecommunications Policy Branch, 300 Slater Street, Ottawa, Ontario K1A 0C8 by 1 October 1993. All replies should reference Canada Gazette Notice No. DGTP-001-93 (see Annex 1), by Notice No. and title. In addition, at this time, any other issues related to the use of the 3-30 MHz frequency band may be addressed. The Department will study all public comments and take them into consideration in the revision of the Canadian Table which is planned to be released in early 1994.

**2 General -
The HF Frequency
Band**

The High Frequency band or "shortwave" band refers to frequencies in the 3-30 MHz portion of the radio spectrum. The HF band is suitable for communications over long distances, and communications in this band became popular due to its technical simplicity and relatively low cost (lower transmitter power and cheaper antenna systems). However, due to the need for the use of the ionosphere, with its changing characteristics, more than one frequency is required for effective continuity of communications over a period of time. As these high frequencies are used for long-distance communications, their potential interference range is large, and the number of radio transmission links which can use the same frequency is limited.

Initial development in the HF spectrum was for long-distance fixed service which has become the dominant use. Numerous other users occupy the spectrum, including amateur radio, the broadcasting service and the maritime, aeronautical and land mobile services.

In industrialized countries, HF radio systems for domestic communications and overseas communications have to a large extent been replaced by satellite, microwave radio relay and fibre-optic communication systems. There continues to be a strong demand for the provision of international HF broadcasting services through Voice of America, BBC World Services, Deutsche Welle, Radio Canada International and others. Canada continues to require overseas HF radio circuits with high reliability for government operations. On the other hand, developing countries continue to use HF radio systems for domestic point-to-point communications primarily due to its low cost.

The planning and use of the HF bands for broadcasting have been contentious for many years. These bands have been studied on a number of occasions: Mexico City (1947-48), Florence Rapallo (1950), Geneva (1951 and 1959) and during the 1980s, Geneva at WARC-HFBC-84 and WARC-HFBC-87. The reviews have highlighted the complexity and the problems involved in attempting to ensure satisfactory operations for the international community. An analysis of the test plans carried out in WARC-HFBC-87 showed that it was not possible to include all the needs submitted by the administrations in the HFBC Planning System (a complex computer algorithm for the submission and recording of broadcasting assignments) and there were numerous cases of frequency discontinuity. The primary contentions relate to the requirements for HF broadcasting spectrum exceeding the spectrum available and the use of the HF band for different uses by different countries. There has been a reluctance to accept a lower quality of service in the interest of accommodating a greater number of broadcasters. For these reasons and others, the ITU abandoned the development of the HFBC Planning System. In its place, the ITU was asked to consider various options for a simplified regulatory procedure.

An added controversy relates to the use of single-sideband (SSB) broadcasting which would require less bandwidth, and allow greater use of the spectrum. The use of SSB has already been mandated by the ITU by the year 2015 in Resolution No. 517 at the WARC for the Planning of the HF Bands Allocated to the Broadcasting Service at Geneva in 1987. Recommendation 519 at WARC-92 is to consider the advancement of the date of transition to SSB.

Other more effective and efficient spectrum utilization techniques have been considered such as the use of minimum transmitter power to achieve the required service, the use of the minimum number of frequencies to achieve the required service and the elimination of out-of-band operation.

The agenda for the 1992 WARC Conference included the Recommendation No. 511 from WARC-HFBC-87 to consider the possible extension of the frequency bands allocated exclusively to HF broadcasting.

**3 Canadian
Proposals for the
1992 WARC**

In the proposals for the Conference,⁽¹⁾ Canada considered the possibility of identifying additional spectrum in the HF bands for the exclusive use of the broadcasting service under the conditions specified (see Annex 2). This was in recognition that the amount of spectrum allocated to the broadcasting service was inadequate to meet both domestic and international requirements. However, the legitimate needs of existing users of the HF bands, particularly fixed and mobile service providers, needed to be recognized.

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- (1) Department of Communications, Proposals for the World Administrative Radio Conference, Spain 1992 (WARC-92), October 1991.

Moreover, it was Canada's view that more effective and efficient techniques should be used in the delivery of broadcast programming services, such as reduced-carrier sideband modulation (SSB). Therefore, in this regard, Canada indicated that it could support the advancement of the date for the introduction of SSB emissions to the year 2007 from the previous date established for the year 2015.

With regard to the use of the 7 MHz band (6 900-7 400 kHz), Canada subscribed to the position that the allocations to the amateur and broadcasting services in this range should be aligned worldwide. Canada indicated it could support the re-alignment of spectrum in the following manner: the allocation of the 6 900-7 200 kHz band on an exclusive primary basis to the amateur service; and the allocation of the 7 200-7 400 kHz band on an exclusive primary basis to the broadcasting service. It was further proposed that the re-alignment process be implemented over a period of 15 years, i.e. until 1 January 2007.

**4 Results
of the 1992
WARC Conference**

At the 1992 WARC a number of compromises were reached regarding HF (shortwave) broadcasting.⁽²⁾ Canada's position was to consider a modest proposal for additional spectrum for HF broadcasting and to strive to obtain an effective compromise between the requirements of the HF broadcasting and fixed services.

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- (2) Report of the Canadian Delegation to the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92), May 1992

A total of 790 kHz of additional spectrum in the range 5 900 kHz to 19 020 kHz was allocated to HF broadcasting: 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 13 570-13 600 kHz, 13 800-13 870 kHz,

15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz. The split of the spectrum provides 200 kHz below 10 MHz and 590 kHz between 11 and 19 MHz, which represents a compromise between those proposing no change below 10 MHz (which is the most congested portion of the HF bands) and those requesting a substantial increase.

Note: The majority of industrialized countries wanted new spectrum allocations below 10 MHz, primarily to accommodate growth in their broadcasting system requirements. It was apparent that the HF broadcasting bands could only be extended at the expense of the fixed and land mobile services, due to the special nature of the bands already allocated to amateur, amateur-satellite, aeronautical and maritime mobile, standard frequency and time-signal and radio astronomy services and the difficulties of sharing with those services. However, there has also been significant growth in the use of the fixed and mobile services in various administrations for government, security, commercial and economic activities, emergency and basic communications. Most developing countries supported no allocations below 10 MHz. These extended bands are allocated on a world-wide basis to HF broadcasting, subject to planning (per footnote 521B), and are reserved for single-side band emissions (per footnote 521A).

These allocations will become available for broadcasting from 1 April 2007 (per Resolution No. 21). After that date, existing fixed and mobile services could continue to use the extended bands on a non-interference basis, providing they do not cause harmful interference to broadcasting stations. The conditions of use of frequencies in the tropical bands (2.5, 3 and 5 MHz) remain unchanged.

With respect to the use of SSB techniques, Recommendation No. 519 was accepted to place on the agenda of the next competent WRC the possibility of advancing as much as possible the date of 31 December 2015 for the general introduction of SSB and putting an end to the use of double-side band in all bands. Some administrations have recommended advancing the date by up to ten years.

Resolution No. 523 was adopted to convene as soon as possible a WRC for the planning of HF bands allocated to the broadcasting service. In this Resolution, the Conference also resolves that no broadcasting stations can be put into service in the extended bands until the planning process has been completed. As well, Recommendation No. 520 urging administrations to take practical steps to eliminate HF broadcasting outside the HF bands allocated to this service was adopted.

With respect to the realignment of spectrum between broadcasting and amateur services around 7 MHz, the Conference agreed that no action could be taken unless it were consequential to a decision to reallocate spectrum to the broadcasting service in this spectrum range. While

Canada supported the 7 MHz realignment proposals, it was concluded that no action could be undertaken at WARC-92. Accordingly Recommendation No. 718 (Alignment of Allocations in the 7 MHz Band Allocated to the Amateur Service) was adopted recommending that a future competent world administrative radio conference should consider the realignment issue.

In addition, a number of resolutions were made regarding aeronautical mobile (OR) service in the HF band:

- o Resolution No. 410 - Development of an Arrangement for the Allotment of Frequencies for the Aeronautical Mobile (OR) Service in the Exclusive Bands Between 3 025 kHz and 18 030 kHz (relating to improving use by the aeronautical mobile (OR) service and adding allotment arrangements).
- o Resolution No. 411 - Implementation of New Provisions Applicable in the Frequency Bands Allocated Exclusively to the Aeronautical Mobile (OR) Service Between 3 025 kHz and 18 030 kHz (relating to the new arrangements for the aeronautical mobile (OR) service).
- o Resolution No. 412 - Transfer of Frequency Assignments of Aeronautical Stations Operating in the Frequency Bands Allocated Exclusively to the Aeronautical Mobile (OR) Service Between 3 025 kHz and 18 030 kHz (relating to the transfer of frequency assignments to conform to the new frequency plan).

The use of the aeronautical mobile (OR) service is primarily of interest to the Department of National Defence.

5 Implications of the Results for Canada

Overall, the results of the Conference are quite satisfactory for Canada. However, support for the convening of another HFBC planning conference should be measured against the prospect of such a conference achieving only limited success.

As well, the extended bands for HF broadcasting are subject to the planning procedures to be drawn up by a competent conference and would become available for broadcasting on 1 April 2007. Even though there is a substantial number of operational HF fixed services in Canada, these existing services will continue to be able to use the extended bands on a no-protection, non-interference basis i.e. the existing and potential users of the existing services in the affected bands may use the bands for 15 years or more unhindered by the changes made by WARC-92. There will be adequate warning of the planning Conference, if one takes place, to consider any action that may be required after the 2007 date.

The WARC also recommended that administrations make every effort to find replacement frequencies for these "displaced" fixed and mobile assignments. Therefore, licensees would be asked if replacement frequencies are to be needed or if they intend to continue their operations within Canada on a no-protection, non-interference basis after 1 April 2007.

According to the Technical and Administrative Frequency List (TAFL), at December 1992, the approximate number of Canadian fixed assignments in each of the extended frequency bands is as follows:

<u>BANDS KHZ</u>	<u>NUMBER OF ASSIGNMENTS</u>
5 900- 5 950	92
7 300- 7 350	51
9 400- 9 500	64
11 600-11 650	26
12 050-12 100	39
13 570-13 600	17
13 800-13 870	4
15 600-15 800	64
17 480-17 550	40
18 900-19 200	32

With regard to aeronautical mobile (OR) service, the use of these frequencies are governed by Article 12 (Notification and Recording in the Master International Frequency Register of frequency Assignments to Terrestrial Radiocommunication Stations). These frequencies are used primarily by the Department of National Defence and by the other military agencies of the world. Because of the advent of single sideband and the emergence of many countries which wished to use these frequencies but which had no allotments in the plan, the IFRB (now the Radiocommunications Bureau) was instructed to revise the plan. Regarding Appendix 26 (Aeronautical Mobile Service (OR) Allotment Plan), the Conference decided that the final allotment arrangement would be based on the procedure contained in the Report of the IFRB to the Conference as modified during the WARC. The work to be undertaken is described in Resolution No. 412. It also decided in Resolution No. 410 that the IFRB shall immediately add to its report, allotments to accommodate the needs of countries unsatisfied with the allotment arrangements submitted by the IFRB to the conference. Therefore, provisions applying to the new assignments begin 12 October 1993, existing assignments are grandfathered until 15 December 1995, and double sideband (DSB) use shall cease by 15 December 1997 (per Resolution No. 411).

**6 . . . Proposals and
Future
Considerations**

The objective of this section is to provide observations on the results of the 1992 WARC as well as proposals and future considerations for comment.

These considerations and proposals in sections 6.1 to 6.3 are raised in the context of the following decisions taken at WARC-92 related to the extension of the spectrum allocated to HF broadcasting:

- (a) no change in the use of the Tropical Zone bands;
- (b) extension bands are reserved for SSB only;
- (c) extension bands are subject to planning;
- (d) the extension bands will become available for the broadcasting service on 1 April 2007;
- (e) the extension bands will continue to be used by the existing services (i.e. the fixed services and, where appropriate, the land mobile or the mobile except aeronautical mobile (R) service) on a non-interference basis, even after 1 April 2007;
- (f) the next competent WRC is invited to consider advancing the date for the cessation of DSB emissions;
- (g) the protection of the existing services will be assured;
- (h) no changes were made to the allocations of the amateur service in the 7 MHz band.

**6.1 Planning
of the Bands**

Planning of the bands involves the submission by administrations of requirements, with assignments of frequencies being made according to equitable criteria to include the maximum number of assignments in the plan. Attempts at planning have never been successful--the last attempts being the 1984 and 1987 HFBC Conferences where agreements on a workable planning system could not be reached, as the broadcasting requirements exceeded the spectrum available. The 1987 HFBC Conference recommended (Recommendation No. 511) that additional spectrum be allocated for HF broadcasting at a future WARC. The extension of the spectrum allocated to HF broadcasting at WARC-92 is subject to footnote 521A which specifies that use of the bands by the broadcasting service shall be subject to the planning procedures to be drawn up by a competent world radio conference. Resolution No. 523 was adopted to convene as soon as possible a WRC for the planning of HF bands allocated to the broadcasting service. In this Resolution, the conference also resolved that no broadcasting stations can be put into

service in the extended bands until the planning process has been completed.

At the final meeting of the 47th Session of the Administrative Council in December 1992, the Council requested the Radiocommunications Assembly, to convene in November 1993, to include any future work on HF broadcasting taking account of any report from the IFRB on the application of Resolution No. 523 of WARC-92.

Canada has been an active participant in the previous attempts at planning of the HF bands. However, in the past, administrations have commenced use in the expanded bands or operated out-of-band in advance of any planning system being developed. This has inhibited any attempt to come to a conclusion on the appropriate planning system.

Any future consideration of a planning conference should be critically measured against the degree of success of such a conference and the future implementation and need for these expanded bands. There are two options which Canada can pursue:

- (a) support a planning conference and participate actively, or
- (b) oppose any planning conference, based on previous experience.

What role and position, if any, should Canada take with regard to planning of the extended bands for HF broadcasting?

6.2 Future Implementation of Single-Sideband Operation

In single-sideband operation, the sideband of the signal transmitted and the information contained therein can be sent in one-half of the bandwidth for double-sideband operation. However, SSB transmitters and receivers are more sophisticated and more expensive. Any change to SSB operations will have to take into account the replacement costs of existing equipment and the availability of receivers for the public. An administration would necessarily be reluctant to move to a SSB system unless there was an assurance of an audience.

Single-sideband transmission is seen as one of the methods available to increase the spectrum available for HF broadcasting. However, "changing to SSB transmission and reception will probably only give an increase in the spectrum capacity of 30 to 50% and not the 100% which the simplistic view would suggest".⁽³⁾

(3) K.J. Hunt, HF Broadcasting, ITU Telecommunication Journal, Vol. 58-IX, 1991.

At WARC-92, there was the proposition to use only SSB transmission in any of the extended bands and to move up the date of implementation, to promote spectrum efficiency and enhance spectrum utilization. The early implementation of SSB services has been opposed by developing countries primarily on the basis of the number of existing DSB receivers in the field and the high cost of new receivers.

Recommendation No. 519 was accepted at the WARC to place on the agenda of the next competent WRC, the possibility of advancing as much as possible the date of 31 December 2015 for the general introduction of SSB and putting an end to the use of DSB in all bands. This follows on the resolutions and recommendations made at WARC HFBC-87 that:

- o new HF broadcasting transmitters installed after 31 December 1990 should as far as possible be capable of operating either in both SSB and DSB, or in SSB mode alone;
- o the date of cessation of DSB emissions shall be periodically reviewed; and
- o complete statistics should be available on the worldwide distribution of SSB transmitters and synchronous demodulator receivers.

The early introduction and implementation of SSB equipment and service will assist all administrations in achieving better HF transmission and spectrum utilization.

Should Canada continue to actively pursue the early introduction of SSB equipment taking into account the need for amortization of existing systems and the availability and cost of receivers?

Should Canada promote the use of other spectrum-efficient techniques, with proposed dates for implementation?

6.3 Existing Services in the HF Band

The extended bands as a result of the 1992 WARC are to become available for broadcasting on 1 April 2007, subject to a number of conditions associated with planning and SSB operation. Existing services will be allowed to continue to operate on a non-interference, no-protection basis.

Even though there are conditions associated with the use of these extended bands, previous experience subsequent to other conferences indicates that administrations will commence broadcasting in these extended bands prior to the effective date of reallocation. This may

cause interference to existing operations within the extended bands. Administrations are recommended to find replacement frequencies.

With the proposed reallocation, there are a number of alternatives available with regard to the Canadian Table and existing services:

- (a) Existing services in the extended bands could be indicated as co-primary with broadcasting with footnotes to indicate the reallocation to broadcasting effective 1 April 2007.
- (b) Existing services in the extended bands could be retained in the Canadian Table after 1 April 2007 as secondary with a Canadian footnote. Essentially existing services could continue to operate for an indefinite period of time on a no-protection, non-interference basis.
- (c) Existing services could continue to operate within the designated bands until such time as the reallocation is to commence and interference is expected.
- (d) Existing services could request replacement frequencies in other bands designated for their type of service.

The proposals indicated in the following section 7.0 designate in the Table that the extended bands have been allocated to HF broadcasting service after 1 April 2007 with a Canadian footnote allowing fixed and mobile services with associated conditions of operation. Are there any other conditions which should be added to the Table?

7 Proposed Spectrum Allocation Changes

Proposed changes to the Canadian Table of Frequency Allocations are made in this section, based on the decisions of WARC-92. These proposals are made on a band-by-band basis in separate parts. In many cases proposed changes in one band are related to the proposed changes in another; the connections between these are made in the accompanying text related to those proposals.

Each part has a proposed change to the Canadian table in a specific band. It includes:

- o a description of the Region 2 and Canadian allocations before the WARC;
- o a description of the decisions at the WARC relating to the band;
- o the proposed change to the Canadian allocation table.

The method of presentation is as follows:

1. Services shown in all capital letters (e.g. FIXED) are services with primary status.
2. Services shown with an initial capital letter and the remaining letters in lower case (e.g. Fixed) are services with a secondary status.
3. Footnotes are not repeated after their first occurrence in the table modifications.
4. New Canadian footnotes have the notation "CnnnL", the normal notation "Cnnn" for a Canadian footnote, followed by a letter A, B, etc., as is done in the ITU Table for new footnotes.
5. Table entries or footnotes in the WARC Final ACTs but not in the pre-WARC table **are typed in bold**.

5 730-6 200 kHz

Existing Canadian Allocations

The band 5 730-5 950 kHz is currently allocated on a co-primary basis to the FIXED and MOBILE except aeronautical mobile (R) while the band 5 950-6 200 kHz is currently allocated on an exclusive basis to BROADCASTING.

kHz 5 730-6 200 Allocation to Services

5 730-5 950	FIXED MOBILE except aeronautical mobile (R)
5 950-6 200	BROADCASTING

WARC-92 Decision

Additional allocations for the broadcasting service were proposed in the band 5 900-5 950 kHz, but only on the basis of SSB, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition, footnote 521C allows for fixed and mobile operations within the country and encourages operations to use minimum power and antenna directivity.

**Proposed Canadian
Table Change**

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 521C adopted. Also Canadian footnote CAAA is proposed in addition to 521C to indicate the intention of the Department with respect to existing services.

The change to the Canadian table would be as follows:

kHz
5 730-6 200
Allocation to Services

5 730-5 900	FIXED MOBILE except aeronautical mobile (R)
5 900-5 950	BROADCASTING 521A 521B FIXED MOBILE except aeronautical mobile (R) 521C CAAA
5 950-6 200	BROADCASTING

Related footnotes are:

- 521A** The use of the bands 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 13 579-13 600 kHz, 13 800-13 870 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz by the broadcasting service is limited to single-sideband emissions with the characteristics specified in Appendix 45 to the Radio Regulations.
- 521B** The use of the bands 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050 12 100 kHz, 13 570-13 600 kHz, 13 800-13 870 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz by the broadcasting service shall be subject to the planning procedures to be drawn up by a competent world administrative radio conference.
- 521C** The band 5 900-5 950 kHz is allocated, until 1 April 2007, to the fixed service on a primary basis, as well as to the

following services: in Region 1 to the land mobile service on a primary basis, in Region 2 to the mobile except aeronautical mobile (R) service on a primary basis, and in Region 3 to the mobile except aeronautical mobile (R) service on a secondary basis, subject to application of the procedure referred to in Resolution No. 21. After 1 April 2007, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations.

CAAA Within Canada, after 1 April 2007, existing services may continue to operate, providing that harmful interference is not caused to existing or planned broadcasting services.

7 300-8 100 kHz

Existing Canadian Allocations

The band 7300-8100 kHz is currently allocated to the FIXED service on a primary basis and the Land Mobile service on a secondary basis.

kHz

7 300-8 100

Allocation to Services

7 300-8 100	
	FIXED
	Land Mobile
	529

WARC-92 Decision

Additional allocations for the broadcasting service were proposed in the band 7 300-7 350 kHz, but only on the basis of SSB, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition footnote 528A allows for fixed and land mobile operations within the country and encourages operations to use minimum power and antenna directivity.

Proposed Canadian Table Change

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 528A. Also Canadian footnote CAAA is proposed.

The change to the Canadian table would be as follows

kHz
7 300-8 100
Allocation to Services

7 300-7 350	BROADCASTING 521A 521B FIXED Land Mobile 528A CAAA
7 350-8 100	FIXED Land Mobile 529

Related footnotes are **521A, 521B, CAAA** - see above.

528A The band 7 300-7 350 kHz is allocated, until 1 April 2007, to the fixed service on a primary basis and to the land mobile service on a secondary basis, subject to application of the procedure referred to in Resolution No. 21. After 1 April 2007, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations.

9 040-9 900 kHz

Existing Canadian Allocations

The band 9 040-9 500 kHz is allocated to the **FIXED** service on a primary basis. The band 9 500-9 900 is allocated to **BROADCASTING** on a primary basis subject to footnote 531 (HFBC-87), which provides for the broadcasting service in the band 9 775-9 900 kHz after the completion of satisfactory transfer of all assignments in the fixed service.

kHz
9 040-9 900
 Allocation to Services

9 040-9 500	FIXED
9 500-9 900	BROADCASTING
	530 531

WARC-92 Decision

An additional allocation for broadcasting service was proposed in the band 9400-9500 kHz, but only on the basis of SSB use, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition, footnote 529B allows fixed operations within the country and encourages operations to use minimum power and antenna directivity.

Proposed Canadian Table Change

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 529B. Also Canadian footnote CAAA is proposed.

The change to the table would be as follows:

kHz
9 040-99 00
 Allocation to Services

9 040-9 400	FIXED
9 400-9 500	BROADCASTING 521A 521B FIXED 529B CAAA
9 500-9 900	BROADCASTING
	530 531

Related footnotes are:

521A, 521B, CAAA - see above

529B The bands 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz are allocated to the fixed service on a primary basis until 1 April 2007, subject to application of the procedure referred to in Resolution No. 21. After 1 April 2007, frequencies in these bands may be used by stations in the fixed service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies in the fixed service, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting services published in accordance with the Radio Regulations.

11 400-12 230 kHz

Existing Canadian Allocations

The band 11 400-11 650 kHz is currently allocated to the FIXED service on a primary basis, the band 11 650-12 050 kHz is allocated to the BROADCASTING service on a primary basis with footnote 531 and the band 12 050-12 230 kHz is allocated to the FIXED service on a primary basis.

kHz

11 400-12 230

Allocation to Services

11 400-11 650	FIXED
11 650-12 050	BROADCASTING
	531
12 050-12 230	FIXED

WARC-92 Decision Additional allocations for the broadcasting service were proposed for the bands 11 600-11 650 kHz and 12 050-12 100 kHz, but only on the basis of SSB use, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition, footnote 529B allows for fixed operations within the country and encourages operations to use minimum power and antenna directivity.

Proposed Canadian Table Change It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 529B adopted. Also the Canadian footnote CAAA is proposed.

The change to the Canadian table would be as follows:

kHz
11 400-12 230
Allocation to Services

11 400-11 600	FIXED
11 600-11650	BROADCASTING 521A 521B FIXED 529B CAAA
11 650-12 050	BROADCASTING 530 531
12 050-12 100	BROADCASTING 521A 521B FIXED 529B CAAA
12 100-12 230	FIXED

Related footnotes are:

521A, 521B, 529B, CAAA - see above

13 410-14 000 kHz**Existing Canadian
Allocations**

The band 13 410-13 600 kHz is currently allocated on a primary basis to the FIXED service and on a secondary basis to the Mobile except aeronautical mobile (R) service, with footnote 534 which allows industrial, scientific and medical (ISM) applications in the band 13 553-13 567 kHz. The band 13 600-13 800 kHz is allocated on an exclusive basis to BROADCASTING subject to footnote 531 and the band 13 800-14 000 kHz is allocated on a primary basis to the FIXED service and on a secondary basis to the Mobile except aeronautical mobile (R) service.

kHz**13 410-14 000****Allocation to Services**

13 410-13 600	FIXED Mobile except aeronautical mobile (R) 534
13 600-13 800	BROADCASTING 531
13 800-14 000	FIXED Mobile except aeronautical mobile (R)

WARC-92 Decision

Additional allocations for the broadcasting service were proposed in the bands 13 570-13 600 kHz and 13 800-13 870 kHz, but only on the basis of SSB use, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition, footnote 534A allows for fixed and mobile except aeronautical mobile (R) operations within the country and encourages operations to use minimum power and antenna directivity.

**Proposed Canadian
Table Change**

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 534A. Also the Canadian footnote CAAA is proposed.

The change to the Canadian table would be as follows:

kHz
13 410-14 000
 Allocation to Services

13 410-13 570	FIXED Mobile except aeronautical mobile (R) 534
13 570-13 600	BROADCASTING 521A 521B FIXED Mobile except aeronautical mobile (R) 534A CAAA
13 600-13 800	BROADCASTING 531
13 800-13 870	BROADCASTING 521A 521B FIXED Mobile except aeronautical mobile (R) 534A CAAA
13 870-14 000	FIXED Mobile except aeronautical mobile (R)

Related footnotes are:

521A, 521B, CAAA - see above

534A The bands 13 570-13 600 kHz and 13 800-13 870 kHz are allocated, until 1 April 2007, to the fixed service on a primary basis and to the mobile except aeronautical mobile (R) service on a secondary basis, subject to application of the procedure referred to in Resolution No. 21. After 1 April 2007, frequencies in these bands may be used by stations in the above-mentioned services, communicating within the boundary of the country in which they are located, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies in these

services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations.

15 100-16 360 kHz

Existing Canadian Allocations

The band 15 100-15 600 kHz is allocated exclusively to BROADCASTING on a primary basis and subject to footnote 531 and the band 15 600-16 360 kHz is allocated exclusively to FIXED on a primary basis subject to footnote 536.

kHz
15 100-16 360
Allocation to Services

15 100-15 600	BROADCASTING
	531
15 600-16 360	FIXED
	536

WARC-92 Decision

An additional allocation for the broadcasting service was proposed for the band 15 600-15 800 kHz, but only on the basis of SSB use, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition, footnote 529B allows for fixed operations within the country and encourages operations to use minimum power and antenna directivity.

Proposed Canadian Table Change

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 529B adopted. Also the Canadian footnote CAAA is proposed.

The change to the Canadian table would be as follows:

kHz
15 100-16 360
Allocation to Services

15 100-15 600	BROADCASTING
	531
15 600-15 800	BROADCASTING 521A 521B FIXED
	529B CAAA
15 800-16 360	FIXED
	536

Related footnotes:

521A, 521B, 529B, CAAA - see above

17 410-17 900 kHz

**Existing Canadian
Allocations**

The band 17 410-17 550 kHz is allocated exclusively to the FIXED service on a primary basis and the band 17 550-17 900 kHz is allocated to BROADCASTING on a primary basis subject to footnote 531.

kHz
17 410-17 900
Allocation to Services

17 410-17 550	FIXED
17 550-17 900	BROADCASTING 531

WARC-92 Decision

An additional allocation to the broadcasting service was proposed for the band 17 480-17 550 kHz, but only on the basis of SSB use, subject to planning procedures and reaccommodation of existing users as covered by additional footnotes and resolutions. In addition, footnote 529B allows for fixed operations within the country and encourages operations to use minimum power and antenna directivity.

**Proposed Canadian
Table Change**

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 529B adopted. Also Canadian footnote CAAA is proposed.

The change to the Canadian table would be as follows:

kHz
17 410-17 900
Allocation to Services

17 410-17 480	FIXED
17 480-17 550	BROADCASTING 521A 521B FIXED 529B CAAA
17 550-17 900	BROADCASTING 531

Related footnotes:

521A, 521B, 529B, CAAA - see above

18 900-19 680 kHz**Existing Canadian
Allocations**

The band 18 900-19 680 kHz is allocated exclusively to the FIXED service on a primary basis.

kHz
18 900-19 680
Allocation to Services

18 900-19 680	FIXED
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WARC-92 Decision

An additional allocation was proposed for the broadcasting service in the band 18 900-19 020 kHz, but only on the basis of SSB use, subject to planning procedures and reaccommodation of existing users as covered by

additional footnotes and resolutions. In addition, footnote 529B allows for fixed operations within the country and encourages operations to use minimum power and antenna directivity.

Proposed Canadian Table Change

It is proposed that the Canadian table be changed in line with the WARC-92 Final Acts including the footnotes 521A, 521B and 529B. Also Canadian footnote CAAA is proposed.

The change to the Canadian table would be as follows:

kHz
18 900-19 680
Allocation to Services

18 900-19 020	BROADCASTING 521A 521B FIXED 529B CAAA
19 020-19 680	FIXED

Related footnotes:

521A, 521B, 529B, CAAA - see above.

8 . . Implementation of Changes

8.1 Existing and Future Fixed and Mobile Services

Resolution No. 21 at WARC-92 provides for the transition of existing fixed and mobile assignments on a progressive basis from the reallocated bands to make way for broadcasting service. These assignments to be moved are termed "displaced assignments".

A transition period from 1 April 1992 until 1 April 2007 will be in effect from the previous assignments to those made at the conference.

Accordingly, as of 1 April 1992, notifications of assignments to stations in the fixed and mobile services in the reallocated bands can no longer be made. Administrations will notify replacement frequencies to the IFRB or request the IFRB's assistance in the selection of replacement frequencies.

The Department will continue to consult directly with fixed and mobile station licensees to determine if replacement frequencies are required.

**8.2 . . . Aeronautical
Mobile (OR) Services**

With regard to aeronautical mobile (OR) services, and Appendix 26, the IFRB has issued Circular letter No. 920 of 15 December 1992 regarding the implementation of Resolution No. 410 of WARC-92. This provides for the comparison of the Appendix 26 Plan and the assignments recorded at the IFRB.

Assignments which may result in sharing or compatibility difficulties have been identified. Canada is progressively working with the U.S. administration to resolve any difficulties which may arise. Any sharing difficulties which may arise are to be notified to the IFRB by 15 April 1993.

To minimize the possibility of any sharing difficulties, it is expected that Canada and the United States will enter into an operational agreement for the use of allotment channels shared between the two administrations.

DEPARTMENT OF COMMUNICATIONS**RADIOCOMMUNICATION ACT****NOTICE NO. DGTP-001-93****PROPOSALS ON THE SPECTRUM ALLOCATIONS IN THE HF BAND 3-30 MHz**

As a result of the 1992 World Administrative Radio Conference (WARC-92) a number of new frequency allocations were made which impact on existing radio spectrum users in the HF frequency band 3-30 MHz.

To assist the Department in the revisions to the Canadian Table of Frequency Allocations for this range of frequencies, an Allocation Proposals Paper has been prepared which provides background information on the HF frequency band, the preparations for the conference, a summary of Canadian proposals, the results of the conference and proposed spectrum allocation changes to the Canadian Table.

In addition, at this time, any other issues related to the use of the 3-30 MHz band may be addressed. As well, implementation proposals are presented for the transition within Canada for the movement of existing users within the frequency bands which were re-allocated to other services. Therefore, the Department of Communications invites interested and affected parties to provide their views and comments.

Copies of the Proposals Paper entitled Proposals on the Spectrum Allocations in the HF Band 3-30 MHz are available from Information Services, Department of Communications, 300 Slater Street, Ottawa, Ontario K1A 0C8, (Telephone (613) 990-4900) or from the Department's Regional Offices in Moncton, Montreal, Toronto, Winnipeg and Vancouver.

Submissions should be addressed to the Director General, Telecommunications Policy Branch, Department of Communications, 300 Slater Street, Ottawa, Ontario, K1A 0C8 to be received on or before October 1, 1993. All representations should cite the Canada Gazette Part I Notice publication date, title, and the Notice reference number.

Written comments received in response to this Notice will be made available for viewing by the public two weeks after the closing date of this Notice, during normal business hours, at the Department of Communications Library, 300 Slater Street, Ottawa and at the Regional Offices of the Department at Moncton, Montreal, Toronto, Winnipeg and Vancouver for a period of one year.

Also, approximately two weeks after the close of the comment period, copies of the comments may be obtained, by mail order or over-the-counter, from ByPress Printing and Copy Centre Inc., 300 Slater Street, Unit 101A, Ottawa, K1P 6A6 (Telephone (613) 234-8826). Reasonable costs of duplication will be charged.

Dated at Ottawa this 6th day of May, 1993.

Paul Racine
Assistant Deputy Minister
Communications Policy

**Conditions Governing the Possible Expansion of the HF Bands
Allocated Exclusively to the Broadcasting Service**

1. No additional allocations to the broadcasting service should be made below 4750 kHz.
 2. Considering the extensive use of the HF bands by existing fixed users and the needs of HF broadcasting service, the maximum amount of spectrum to be re-allocated to the broadcasting service should not exceed 700 kHz in the 4 750 to 13 900 kHz range.
 3. As far as possible, expansion of existing broadcasting spectrum should be sought on a worldwide basis.
 4. Any band considered for re-allocation to the broadcasting service should not be reduced by more than 50%.
 5. No intrusion should be made into any internationally planned bands including those services allocated to maritime mobile, aeronautical mobile(R), and aeronautical mobile(OR).
 6. No intrusion should be made into the standard frequency and time signal service bands at 2.5, 5 and 10 MHz.
 7. The re-alignment proposal at 7 MHz notwithstanding, no intrusion should be made into the amateur or amateur-satellite service bands at 3.5 and 10 MHz.
 8. Sharing techniques, such as dynamic frequency sharing⁽⁴⁾, should be explored as a means of providing communications circuits that are not otherwise possible because of interference constraints.
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- (4) Dynamic sharing implies operation on a secondary basis where there is no possibility of a claim for interference-free communication. This real-time frequency management tool is enhanced when one service operates with high power on known or published frequencies, and the dynamic service operates with low power involving two-way communications such as in the fixed and mobile services.