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PROPOSALS BY CANADA

ITU WORLD ADMINISTRATIVE RADIO CONFERENCE (1979)
FOR THE REVISION OF THE RADIO REGULATIONS

FEBRUARY 1979

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OTTAWA

FEBRUARY 1979

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GENERAL INTRODUCTION

The Canadian proposals to the ITU have taken into account a complete review of the present and future planned usage of the radio spectrum up to 275 GHz as well as all the associated Radio Regulations under the terms of the Conference agenda. Under the auspices of the Canadian Interdepartmental Committee (CIC) during the past four years two Canadian draft proposals and one Supplement to the Second Draft proposals have been circulated publicly for comments. In addition, four public meetings have been held to outline our proposals and to answer questions on the proposals. The CIC comprises government departments such as DND, DOT, NRC, EMR and crown corporations such as CBC, Telesat and Teleglobe, and regulatory agencies such as CRTC. Since our preparations began in 1974 over one hundred submissions have been received from radiocommunication entities and these generally have formed the basis for the Canadian proposals.

The main features of the Canadian proposals include planning the radio spectrum for the next twenty years taking into full account our present and future telecommunication requirements but fully considering that Canadian proposals must be compatible with the international use of the radio spectrum.

Our proposals have addressed the needs of many spectrum users such as radio amateur, broadcasting, maritime and aeronautical, remote sensing, defence, radio astronomy and telecommunication agencies both terrestrial and space oriented. There is a need to increase spectrum available for mobile services while recognizing that equitable distribution of the spectrum is of primary importance and suitable sharing provided for. The future frequency requirements of services in various bands have been reflected in the Allocation Table taking into account the use of new technology and associated spectrum utilization efficiency. Canada has been instrumental in gaining support from third world nations, and has been able to bring together leading nations into agreement on several issues such as maritime and aeronautical L band satellite allocations, HF broadcasting and to some extent satellite broadcasting.

Apart from some frequency allocation matters there are important satellite service coordination and regulatory aspects needing close attention. For example, countries located on the equator below satellite orbital positions are questioning the unrestricted use of the geostationary orbital positions without their permission or agreement. This subject is under discussion at the UN Conference on Peaceful Uses of Outer Space and hopefully agreements can be reached. The importance of updating coordination and regulatory procedures for present and future uses of the space services is recognized and under study. Some important users such as power line carrier operations and ISM have indicated a need for further provisions to fulfill their operations; however, the CIC believed that such new provisions could be more adequately be met on a national regulation basis and need not be injected in the ITU Regulations.

Some major issues that might be expected during the 1979 Conference include: the issues related to the New World Information Order which developing countries view as developed nations exploiting the electromagnetic spectrum without their ability to share and of course setting telecommunication patterns that they cannot take part in.

A large increase in high power shortwave broadcasting along with some jamming activities which leads to "out-of-band operation" needs serious consideration. Multi-channel broadcasting of the same programming also must be resolved.

Of course the problem of ever increasing use of the spectrum also increases the electromagnetic pollution as well as hazards to humans and the environment.

Canadian pre-WARC 79 activities internationally are very important to our final preparations. For example, we have distributed our second draft proposals to 154 nations and have received favourable comments on many proposals. As a result of this initiative, in return we have received some twenty proposals from nations such as France, Federal Republic of Germany, Japan, Sweden, Australia, UK, USSR, US, etc. Canada has met with Region 2 nations including the USA, countries of Latin America, European (Region 1) and NATO European nations. Further discussions will be held in Region 1, 2 and 3 nations during IFRB seminars in Panama, Nairobi and Sydney in early 1979. All these discussions have been useful in understanding the views and needs of other countries and identifying areas where we have full support or where there is opposition to Canadian proposals.

The recent CCIR Special Preparatory Meeting has brought forth some new areas of interest to WARC 79 preparations and items of interest have been taken into account where appropriate including the table of frequency tolerances, levels of spurious emissions, coordination areas of Appendix 28 and 29 .

The Canadian WARC 79 proposals will be submitted to the ITU early February - 1979. We should start to receive other countries' proposals from ITU in April of 1979. After full study, the Canadian positions on our own proposals as well as our positions on other member nations proposals will be developed. It is recognized that the Canadian proposals will have to be compatible with the need and aspirations of all ITU member countries and that in order to integrate these proposals within the International Regulatory framework, it may be necessary to amend our positions accordingly. However, care shall be exercised to ensure that existing or future Canadian requirements are not jeopardized by any such amendments.

A post WARC 79 report will be available early in 1980 which will report on the WARC and will address the question of implementation of the WARC 79 decisions.

Further ITU meetings related to WARC 79 or those which will be influenced by 79 decisions are as follows: Region 2 MF Broadcasting 1981, Region 2 RARC Broadcasting Satellite 1983 and Mobile WARC 1982. Preparations are underway for the MF 1981 and RARC 1983 and detailed plans and proposals will be generated in the next few years. The dates for the MF Broadcasting and Mobile Conferences have not yet been officially established.

INTRODUCTION TO ARTICLE 1 - TERMS AND DEFINITIONS

A thorough review of proposals to amend Article 1 has been carried out in light of the responses received pertaining to the Second Draft proposals and the Supplement to the Second Draft. This review also took into account the results of international meetings and public consultation.

Consequential to this overall review, and noting the rather large number of proposals developed to amend this part of the ITU Regulations, the final proposals have been streamlined and oriented to represent more fully the Canadian interest and to highlight important regulatory concerns.

Certain contributions which are editorial in nature or are of a general international interest have been deleted from the main proposals and, where appropriate, included in supporting reference documentation.

Proposals relating to technical definitions which were the subject of discussion at the recent Special Preparatory Meeting (SPM) of the International Consultative Committee on Radio (CCIR) held in Geneva, have been reviewed in light of the conclusions reached at this meeting, and adjustments have been made to the extent practicable in keeping with national interest and objectives. In some cases, the SPM report will be accepted in its entirety as reflecting our views.

INTRODUCTION TO ARTICLE 5 - 10 kHz TO 50 MHz

1. Introduction

Since the issuance of the Second Draft and Supplement of the WARC 1979 proposals, many comments have been received by DOC and reviewed by the Canadian Interdepartmental Committee. The views and suggestions received have been taken into account to the extent possible and are reflected in the Final Draft proposals and will be used to support the Canadian position to the WARC 1979.

2. Aeronautical Mobile Service

The proposed expansion of the aeronautical mobile (OR) services as contained in the Second Draft proposals at 3, 4, 6 and 8 MHz has been reconsidered and will not be presented in our WARC 1979 proposals. The allocation at 22 MHz for aeronautical mobile (R) services results from the recommendation of the 1978 WARC (AM) Conference.

3. Aeronautical Radionavigation Service

Additional spectrum has been requested by the aeronautical community due to current congestion and additional spectrum has been proposed at 190-200, 515-525 kHz for aeronautical radionavigation and at 405-435 kHz for radionavigation. The present allocation to aeronautical radionavigation in the 1605-1800 kHz has been deleted. (See para 10).

4. Amateur Satellite Services

The amateur community requested that all amateur bands include amateur satellite, however, concern has been expressed that sufficient support could only be given to those amateur bands which were allocated to amateur on a worldwide basis. Amateur satellite service will be proposed only where the allocation has been accepted on a worldwide basis.

5. Amateur Service

The 3500-3900 kHz band has been proposed as exclusively amateur to avoid the sharing with other services. A new band, 10.1-10.3 MHz is proposed as exclusively amateur which provides excellent relief to varying propagation conditions. Submissions from amateur fraternities have been useful and generally appropriate to Canada's WARC 1979 preparations. A careful review has been made and the request for low frequency amateur bands could not be accepted due to current congestion of safety-of-life radiobeacons now using this range of frequencies. The high powers employed by fixed services would not permit the useful sharing of low frequency bands. The majority of the amateur proposals as contained in the Second Draft and Supplement are the same as in the Final proposals. The point made by the amateur community in their submissions will be taken into account in developing positions for the WARC 1979. An international proposals whereby 10 kHz in each of the amateur bands would have been made available worldwide for communications during a natural disaster and which was advanced in the preamble of the Supplement will not be accommodated in the final proposals. Such usage in as sub-allocation question and may better be accommodated in spectrum allocated to the mobile service and on specific frequencies agreed to by most administrations.

6. Broadcasting Services

The Final proposals have not been revised since the Second Draft and Supplement issued in February and July 1978. One of the proposals is for a new 4 MHz frequency band which will permit more effective coverage of Northern Quebec, Southern Baffin Island and James Bay areas for Radio Canada northern broadcasts. There has been strong reaction to increasing the broadcast spectrum especially where many illegal out of band broadcasts now exist. Stricter international regulations including power limitations will be supported which will not be detrimental to our Canadian broadcast needs. The proposal to implement more efficient spectrum techniques such as SSB have also been put forth. There is a proposed extension to the AM broadcast bands up to 1705 kHz, to provide for needed expansion in many parts of the country.

7. Fixed Service

The developing countries have a continuing need for HF Fixed spectrum and we must find a compromise where fixed bands have been reduced. Concerns were expressed that the loss of spectrum by fixed services was excessive and as a result the proposed increase to the aeronautical (OR) services has been retained for fixed services. No surplus LF, MF or HF spectrum exists and therefore increased utilization must be achieved by new techniques and more efficient spectrum management activities. Satellite usage in the long term will somewhat decrease the needs for fixed services, however the importance of well managed LF, MF and HF fixed service operations is certainly a requirement for many years to come.

8. Maritime Mobile Services

The needs of maritime mobile users have been expressed strongly by IMCO members and supported fully by Canada. Increased maritime mobile allocations are proposed at 4, 6, 8, 12 and 16 MHz. It is envisaged that the maritime mobile satellite service will relieve the congestion in many parts of the HF spectrum and adequate increases have been proposed for maritime mobile services to cater for the foreseeable future.

9. Radio Astronomy

The radio astronomy allocation in the 21850-21870 kHz band has been replaced by the proposal in the 23350-23550 kHz band and radio astronomy has been added to the 37.50-38.25 MHz band.

10. Radiodetermination Service

No changes have been made in our Final proposals, however, international support has been expressed for a dual band radiolocation system in MF bands and further consideration will be given to such proposals but currently radiodetermination services are proposed in the 1705-1800 and 1900-2000 kHz bands.

11. Standard Frequency and Time Service

No changes have been made to the Canadian Second Draft or the Supplement and it is believed that all pertinent comments have been taken into account. A footnote in the 7100-7400 MHz band draws attention to the wide use of the standard frequency and time station CHU and urges administrations to avoid causing interference to this service.

12. Related Issues

Concern was expressed by users of power line carrier equipment that increasing demands in the low frequency bands by radionavigation services would impose severe restrictions to important protection and control systems operated in the lower frequency bands. Although the PLC's are acknowledged as important users of spectrum they are not considered to be a radio service by the ITU. In Canada's opinion, suitable protection can be given by domestic coordination arrangements.

50-960 MHz

1. Proposals have been changed to reflect comments made on the Supplement to the Canadian Second Draft. However, many comments were directed to that portion of the spectrum which will be directly affected by the 406-960 MHz policy. In these instances, the public consultation process initiated in August 1976 and augmented by the public comments on items contained in the First and Second draft proposals have been reviewed and taken into account. The domestic policy decision with suitable adjustment to reflect international interest has been directly incorporated in the Canadian final proposals.

2. Some inputs which were addressed are presented below:

a) An international proposal whereby 10 kHz in each of the amateur bands would have been made available worldwide for communications during a natural disaster and which was advanced in the preamble of the Supplement will not be accommodated in the final proposals. Such usage in a sub-allocation question and may better be accommodated in spectrum allocated to the mobile service and on specific frequencies agreed to by most administrations.

b) A proposals to have radio astronomy added to Region 1 and 3 in the 73 to 74.6 MHz band has been incorporated in order to permit the expanded use of very long baseline interferometer on an intercontinental basis.

ABOVE 960 MHz

1. The proposals have gone far toward meeting concerns and the stated requirements for spectrum. There were a number of areas, however, where this was not considered possible. The details are included in the following sections on the proposals for specific services.

2. Fixed

Concern was expressed over the addition of Radio Astronomy to the band 4950-4990 MHz. However, it was considered that the additional sharing restraint in a 40 MHz portion of the band 4400-4990 MHz allocated to the Fixed service was justified.

It was not considered possible to accommodate a request to add the Fixed service in the region 10.0-10.55 GHz, because of the long term and extensive use of the spectrum for a wide variety of applications, both military or otherwise, in the Radiolocation Service.

The addition of the Broadcasting-Satellite service to the band 12.2-12.5 GHz reflected a potential long term need. Decisions on the ultimate utilization of the band will have to be taken on the basis of the relative requirements and priorities for the Broadcasting-Satellite and the Fixed services as they evolve.

3. Fixed-Satellite

The Fixed-Satellite (Space-to-Earth) service was added to only a part of the range 4700-4990 MHz as originally requested, in order to provide additional protection to the Radio Astronomy service. Similarly, the service was added to only 6925-7125 MHz, rather than up to 7250 MHz, in order to protect important Fixed operations above 7125 MHz.

As an alternative to the band 14.5-15.0 GHz, which is required for other uses, the Fixed-Satellite needs would be met elsewhere, through the additions of 12.75-13.25 GHz and 17.2-17.7 GHz.

4. Broadcasting-Satellite

It has not been considered possible to give the service a preferred status in the band 12.2-12.5 GHz. As the best compromise, it has been added on a basis of sharing with the terrestrial services, supplemented by the addition of footnote 3787A.

Two new footnotes, 3789AB and 3789AC, specify use of the bands 14.0-14.5 GHz and 17.2-17.5 GHz, allocated to the Fixed-Satellite service, for uplinks to Broadcasting satellites.

5. Maritime Mobile Satellite

The proposed up-link at 1625-1645 MHz was considered preferable to an alternative of 1636.5-1656.5 MHz; since it gives a stronger position for Aeronautical Mobile Satellite and also encompasses the existing allocation, so conversion can be gradual if required.

Allocations to the Maritime Mobile Satellite service in the L-band have been expanded to meet traffic projections. This has been accomplished through a reduction in the allocation to aeronautical radionavigation. Separate allocations for the two space services have been proposed for this part of the spectrum, in the interest of efficiency of system planning and operations. Additional allocations to the general Mobile-Satellite service were proposed for the 7-8 GHz range of spectrum, but only for those bands allocated exclusively to the Fixed-Satellite service.

Existing Allocations above 40 GHz, with the exception of reductions in the region of 50 GHz and 100 GHz, have been retained.

6. Inter-Satellite

It was considered necessary to maintain the new footnote 3807A as protection for the Aeronautical Radionavigation service.

7. Auxiliary-Satellite

Concern was expressed over the addition of the Auxiliary-Satellite Service to the bands 3500-3700 MHz and 6425-6625 MHz. It was considered that, given the concept of this new Service, the additions would result in a more efficient utilization of the spectrum-orbit resource. This new service was added to a number of bands below 10 GHz.

8. Earth Exploration

A new Service, entitle the Earth Exploration Service, was added as the terrestrial counterpart of the Earth Exploration Satellite Service to meet the need for sensing from airborne and surface-based platforms.

Because of the high level utilization of this part of the spectrum, allocations below approximately 20 GHz for active sensors could be proposed only by footnote, on a non-interference basis. Similarly, certain allocations for passive sensors in this range of spectrum could be proposed only on a secondary basis, or on the basis of footnotes. Other allocations to both classes of sensor service, and for both space and terrestrial operations, have been proposed on a primary basis for a number of bands above 20 GHz. In the majority of cases the allocations for passive sensors have been proposed for bands already allocated to one or more of the passive services, ie., either the Radio Astronomy or the Space Research (Passive) services. The modified Footnote 4815/412J would provide protection to all Passive Services in a band allocated to any one of those services. The band 34.2-35.2 GHz was chosen for the allocation to Active sensors on the basis that it was already allocated to the Radiolocation service.

9. Radionavigation Satellite

The revised proposals are for operations of the Aeronautical Radionavigation Service in the band 1590-1624 MHz. Additional allocations in the range 1215-1240 MHz and 1565-1590 MHz were proposed in the Second Draft.

Existing allocations above 40 GHz, with the exception of reductions in the region of 50 GHz and 100 GHz, have been retained.

10. Radionavigation

A number of allocations were proposed for below 40 GHz. As stated in Section 5, allocations to the Aeronautical Radionavigation Service in the region of 1500-1660 MHz were reduced. Additional allocations were proposed by footnote for the bands 1240-1300 MHz and 1350-1365 MHz. New allocations for the Maritime Radionavigation Service were proposed for the regions of 2300 MHz and 9000 MHz, and for the Radionavigation service in the regions of 3100 MHz and 9500 MHz.

For bands above 40 GHz, in which space services related to radionavigation were proposed, the corresponding terrestrial services were added.

11. Mobile

For certain bands below 40 GHz, the restriction except aeronautical mobile has been added to the Mobile service as protection to the Radio Astronomy Service. The Service was suppressed in the band 11.7-12.2 GHz to assist the development of the Space services. In general, above 40 GHz, the Service was added to bands containing either the Fixed-Satellite or the Inter-satellite service. In addition, for those bands above 40 GHz in which Space services related to Mobile are proposed, the corresponding terrestrial services were added.

12. Amateur

For a number of bands throughout the spectrum, and particularly below approximately 10 GHz, the added Footnote 3644/320A would permit Amateur Satellite operations on a non-interference basis.

Above 40 GHz, the Amateur and the Amateur Satellite services were added in combination on an exclusive basis in 73-74 GHz and 162-165 GHz. Other allocations to the Amateur service were added on a secondary basis.

13. Radio Astronomy

The position of the service was strengthened throughout the spectrum in a number of ways - by the addition of cautionary and other footnotes, eg. 4815/412J, by the addition of the restriction "except aeronautical mobile" to the Mobile service, by increasing the bandwidth of existing allocations, such as near 15 GHz and 31 GHz, by a shift in the allocation, such as from 130 GHz to 105 GHz, and from near 2700 MHz to 3300 MHz, and by the suppression of the Meteorological Aids service in the band 1664.4-1668.4 MHz.

This service is one of the small number with extensive and increasing operations above 40 GHz.

ARTICLE N11, N12 and N13 - FORMERLY ARTICLES 9 AND 9A

A complete review has been made of the Canadian proposals which deal primarily with the coordination, notification and recording of stations in the space radiocommunication services and with appropriate terrestrial stations which share identical bands with the space services.

The Canadian objectives associated with these proposals were outlined in the second Draft proposals dated February 11, 1978 (pages 31 and 32).

Resulting from comments which have been received and a general review by the CIC, some amendments to the Second Draft have been introduced. Of particular significance is the withdrawal of MOD 639AK c) on page 183 of the Second Draft and the addition of MOD 4118/639AL and 4120/639AM.

FOREWORD

Proposals by Canada to the 1979 WARC

The Canadian proposals for spectrum allocations and reallocations have attempted to take account of the pressures for the growth of radiocommunications services, the nascent demands for new services, and such advances in technological innovations which have already occured, but which have not yet been exploited, in the provision of communication services.

In developing these proposals, Canada has taken into account the crucial impact that the 1979 WARC will have on the development of radiocommunication services, both now and for many years ahead. Care has been taken to minimize, to the extent possible, the effect that the revised Radio Regulations will have on radiocommunication facilities which now operate, or are planned to operate in the near future.

While the Canadian proposals identify the need for some spectrum reallocation, it has not been possible to identify all future requirements. Canada believes that the new Frequency Allocation Table should remain in force for as long as possible to ensure the stability necessary for long-term radiocommunication planning. Therefore, for the foreseeable future, it will be necessary to systematically take advantage of current and planned technological procedures and systems to achieve better resource sharing of the allocations decided on at the 1979 WARC. In this way, the needs of all nations for radio frequencies can be met within the framework of the Table of Frequency Allocations.

It will be noted that a number of Conference agenda items has not been addressed in these proposals. Additional proposals pertaining to these items may be forthcoming as our studies progress.

INTERNATIONAL TELECOMMUNICATION UNION

ADMINISTRATIVE COUNCIL

32nd SESSION GENEVA MAY/JUNE 1977

Document No. 5151-E
(CA32-140)
10 June 1977

RESOLUTION

(adopted at the 8th Plenary Meeting)

R No. 801 WORLD ADMINISTRATIVE RADIO CONFERENCE, 1979

The Administrative Council,

in view of the result of the consultations following Circular-telegrams Nos. A 72 dated 18 June 1976 and A 125 dated 27 May 1977,

resolves

1. that the Conference shall be convened in Geneva on 24 September 1979 for a duration of ten weeks,

2. that the agenda of the Conference shall be as follows:

2.1 to review and, where necessary, revise the provisions of the Radio Regulations relating to terminology, the allocation of frequency bands and the directly-associated regulations (Articles 1 to 6 and Sections I, II, III, VI, VII, VIII and IX of Article 7 and related Appendices not applying to a single Service*);

2.2 to review and, where necessary, revise the provisions applicable to the co-ordination, notification and recording of frequency assignments except those Articles relating to a single Service (Articles 9 and 9A, and related Appendices, but not Articles 9B and 10*);

2.3 to review and, where necessary, revise the other Articles applicable to more than one Service (Articles 12 to 20 and related Appendices not applying to a single Service*) and provisions applicable to miscellaneous stations and Services (Articles 41 to 44 and related Appendices*);

2.4 to make any necessary consequential editorial amendments to other provisions of the Radio Regulations and the Additional Radio Regulations resulting from the action taken under agenda items 2.1, 2.2 and 2.3;

2.5 to review the report on the activity of the IFRB and revise, where necessary, the provisions relating to its methods of work and internal regulations (Articles 8 and 11);

2.6 to study the technical aspects for the use of radiocommunications for marking, identifying, locating and communicating with the means of medical transport protected under the 1949 Geneva Conventions and any additional instruments of these Conventions;

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*) The Secretary-General will revise the numbering of Articles to conform with the new numbering in the version of the Radio Regulations to be published in September 1977 in accordance with Resolution No. Sat-10.

XIII

2.7 to take account of Resolution No. Sat-10 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva 1977, on the possible re-arrangement of the Radio Regulations and Additional Radio Regulations, to make such consequential changes as may be necessary to harmonize the Radio Regulations as well as the Additional Radio Regulations and to undertake any further necessary refinement and deletion of superfluous or redundant provisions;

2.8 to consider the proposals based on the CCITT studies carried out in accordance with Resolutions Nos. Mar2 - 22 and 23 and to take appropriate decisions;

2.9 to consider the Resolutions and the Recommendations adopted by Administrative Radio Conferences, to take such action as may be considered necessary and to adopt such new Resolutions and Recommendations as may be necessary;

2.10 to propose to the Administrative Council and to the next Plenipotentiary Conference a programme for convening future Administrative Radio Conferences to deal with specific Services;

2.11 to provide, for the benefit of future Administrative Radio Conferences, such guidelines as may be found necessary for optimum use of the frequency spectrum.

This Resolution replaces Resolution No. 783.

EDITORIAL PRESENTATION

The following generally conforms with the ITU recommended editorial presentation.

ADD: indicates an entire addtional new provision; no underlining of the text is employed.

MOD: indicates an amendment to an existing provision; text proposed for deletion is dashed out whereas text proposed for addition is underlined.

SUP: indicates the entire deletion of an existing provision; only the the number of the provision or regulation is shown and not the text.

NOC: indicates that no changes are proposed.

NOTES

1. Insofar as modifications to the Table of Frequency Allocations are concerned, all amendments pertaining to the frequency blocks are dealt with utilizing the procedure described for MOD. Where frequency bands are not shown in the proposals, this indicates that no amendments to these particular bands are considered necessary. The footnotes associated with the Table employ any of the symbols and procedures above, as required.

2. The proposals herein have been prepared in the form of the "Re-Arrangement of the Radio Regulations" as endorsed by the World Broadcasting-Satellite Administrative Radio Conference, Geneva 1977 (Resolution No. Sat-10). All references to a particular Radio Regulation in the proposals utilizes the new serial number allocated in the "Re-Arrangement" as well as the old number shown in the existing Regulations; all proposed ADD utilizes only a new serial number taken from the number series 3000 upwards.

3. Primary services are shown in capital letters: BROADCASTING

Permitted services are shown in capital letters between oblique strokes: /BROADCASTING/

Secondary services are shown in normal type: Broadcasting

ARTICLE N1/1

Terms and Definitions

Section I. General Terms

ADD 3023A Industrial-Scientific-Medical (ISM) Operations: Industrial, Scientific and Medical operations involving apparatus designed to produce radio frequency energy for non-telecommunication purposes.

Reason: ISM is referred to in footnotes 3455/161, 3513/217, 3522/335, 3670/340, 3709/357, 3760/391, and 3803/410C and consequently needs to be defined since certain parts of the spectrum have been designated for ISM and since these operations could affect other services.

Section II. Radio Systems, Services and Stations

MOD 3024 21C Space Radiocommunication: Any radiocommunication involving the use of one or more space stations ~~the use of one or more passive satellites or other objects in space~~.

Reason: Consequential to SUP 3127/84BAD Passive Satellite.

MOD 3033 21B Earth Station: A station located either on the Earth's surface or within the major portion of the Earth's atmosphere intended for communication~~:~~ with one or more space stations.

-- ~~with one or more space stations; or~~

-- ~~with one or more stations of the same kind by means of one or more passive satellites or other objects in space.~~

Reason: Consequential to the proposal to SUP 3127/84BAD.

ADD 3033A Transportable Earth Station: An earth station located on the Earth's surface intended to be used for indeterminate periods of time at unspecified fixed points.

Reason: Consequential to MOD 4139/639AR, MOD 4578/639BD and to differentiate between transportable and mobile earth stations.

Section III. Terrestrial Radio Systems, Services and Stations

MOD 3040 28 Broadcasting Service: A radiocommunication service in which the ~~transmission~~ emissions are intended for direct reception by the general public. This service may include sound ~~transmissions~~, television ~~transmissions~~ or other types of ~~transmissions~~ emissions.

Reason: The use of the word "transmission" in the sense of emissions in radiocommunication is deprecated and further this is to align this definition to the French version and according to CCIR Recommendation 325.

ADD 3043A Earth Exploration Service: A terrestrial radiocommunication service for the purpose of:

-- collecting, from instruments on airborne or earth-based platforms, information relating to the characteristics of the earth, its natural phenomena, and its atmospheric environment;

-- operating airborne or earth-based active and passive sensors to obtain the information;

-- platform interrogation.

Reason: To provide a term and definition to accommodate the identified terrestrial aspects of earth exploration.

MOD 3054 52 Aeronautical Radionavigation Service: A radionavigation service intended for the benefit and safe operation of aircraft.

Reason: To update the definition to provide recognition that the Service is intended to provide for the safe operation of aircraft.

MOD 3076 33 Aeronautical Mobile Service: A mobile service between aeronautical stations and aircraft stations, or between aircraft stations. ~~in which~~ Survival craft stations and emergency position indicating radio beacon stations may also participate in this service.

Reason: To update the definition in order to provide for the participation of emergency position indicating radio beacon stations in this service.

MOD 3077 34 Aeronautical Station: A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be placed for example on board a ship, a platform at sea, or an earth satellite.

Reason: To clarify the definition and to add an important example as to where an aeronautical station, in certain instances, may be located.

Section IV. Space Radio Systems, Services and Stations and Radio Astronomy

MOD 3102 84AG Fixed-Satellite Service: A radiocommunication service:

-- between earth stations at ~~specified~~ fixed points when one or more satellites are used; in some cases this service includes satellite to satellite links, ~~which may also be effected~~ when it is not possible to provide these in the bands allocated to the inter-satellite service;

-- for connection between one or more earth stations at ~~specified~~ fixed points and satellites used for a service other than the fixed-satellite service (for example, the mobile satellite service, ~~broadcasting-satellite-service etc.~~) where it is not possible to provide these connections in the bands allocated to the auxiliary-satellite service;

-- for earth-to-space connections from one or more earth stations at fixed points to satellites used for the broadcasting-satellite service.

Reason: The modification to sub-paragraph 1 is to permit the use of transportable earth stations in this service, and to direct satellite-to-satellite links to the inter-satellite service bands.

The added sentence to the second sub-paragraph is intended to direct the user to the new Auxiliary-Satellite Service but not to exclude the use of the Fixed-Satellite Service when absolutely necessary.

The new third sub-paragraph is somewhat consequential to the modification of the second sub-paragraph and explicitly defines uplinks to the Broadcasting-Satellite Service as falling within the Fixed-Satellite Service.

ADD 3102A Auxiliary-Satellite Service: A radiocommunication service for connection between one or more earth stations at fixed points and one or more satellites used for other than the fixed-satellite service or the broadcasting-satellite service (for

example, the mobile-satellite service). Connections between earth stations at fixed points via one or more satellites for communications related to that other service are also permitted. This service is subject to the same regulations as the fixed-satellite service.

Reason: This new service is intended to provide for feeder links associated with the Mobile-Satellite Services, the Radionavigations Satellite Service or any other satellite services which requires small bandwidth connections in either direction. This new service should ease the pressure on the standard high-capacity fixed-satellite allocations by promoting efficient use of the geostationary satellite orbit and of the radio frequency spectrum.

MOD 3103 84AP Broadcasting-Satellite Service: A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception‡ by the general public.

Reason: Results from the proposed definition of "direct reception".

ADD 3103A Direct Reception (in the broadcasting-satellite service): The reception of emissions from a space station in the broadcasting-satellite service encompassing both individual and community reception.

Reason: This is considered preferable to footnote 3103.1/84AP.1.

MOD 3104 84APA Individual reception (in the broadcasting-satellite service): Direct reception ~~The reception of emissions from a space station in the broadcasting satellite service~~ by simple domestic installations and in particular those utilizing small antennae.

MOD 3105 84APB Community reception (in the broadcasting satellite service): Direct reception ~~The reception of emissions from a space station in the broadcasting satellite service~~ by receiving equipment, which in some cases may be complex and have antennae larger than those used for individual reception, and intended for use:

-- by a group of the general public at one location; or

-- through a distribution system covering a limited area.

Reason: Consequential to ADD 3103A.

SUP 3103.1 84AP.1

Reason: No. 3103.1/84AP.1 is no longer required as a result of ADD 3103A

MOD 3106 84ASA Earth Exploration-Satellite Service: A radiocommunication service between earth stations and one or more space stations, or between space stations, in which:

-- information relating to the characteristics of the Earth, its natural phenomena, and its atmospheric environment, is obtained from instruments on earth satellites;

-- similar information is collected from airborne or earth-based platforms;

-- such information may be distributed to earth stations within the system concerned;

-- space-borne active and passive sensors are operated to obtain the information;

-- platform interrogation may be included.

Reason: To update the definition to accommodate the identified requirements of the Earth Exploration-Satellite Service.

MOD 3115 84AGA Mobile-Satellite Service: A radiocommunication service:

-- between mobile earth stations and one or more space stations; or between space stations used by this service;

-- or between mobile earth stations by means of one or more space stations;

-- and if the system so requires, for connection between these space stations and one or more earth stations at ~~specified~~ fixed points.

Reason: To allow for the operation of transportable earth stations.

ADD 3115A Mobile Earth Station: An earth station in a mobile-satellite service primarily intended to be used while in motion and during halts at unspecified points.

Reason: To indicate the general conditions under which earth stations in this service operate.

Section V. Space, Orbits and Types of Objects in Space

SUP 3126 84BAC

SUP 3127 84BAD

Reason: Term "Passive Satellite" has outlived its usefulness and the deletion of the term "Active Satellite" is consequential.

MOD 3128 84BB Orbit:

1. The path, relative to a specified frame of reference, described by the center of mass of a satellite or other object in space subjected ~~solely~~ primarily to natural forces, mainly the force of gravity.

~~2.--By-extension,-the-path-described-by-the-center-of-mass-of-an object-in-space-subjected-to-natural-forces-and-occasional-low energy-corrective-forces-exerted-by-a-propulsive-device-in-order to-achieve-and-maintain-a-desired-path.~~

Reason: To more appropriately define the term orbit; to delete text which appears to be explanatory rather than definitive in nature and to broaden the term as to not exclude other artificial means of achieving or maintaining orbit.

MOD 3133 84BG Geostationary Satellite: A geosynchronous satellite, the circular orbit of which lies in the plane of the Earth's equator and which turns about the polar axis of the Earth in the same direction ~~and with the same period~~ as ~~those of~~ the Earth's rotation.

The orbit on which a satellite should be placed to be a geostationary satellite is called the "geostationary satellite orbit".

Reason: To make use of 3132/84BFA.

Section VI. Technical Characteristics

MOD 3134 85 Assigned Frequency: ~~The centre of the frequency band assigned to a station.~~ The nominal frequency used for notification and registration purposes. It can either:

-- be the centre of the frequency band assigned to a station, or;

-- bear a stated relationship to a known reference frequency.

Reason: The assigned frequency is no longer the center of the frequency band assigned to a station in all cases. The modification reflects the situation in the Maritime Mobile Service as stated in 8045/445A of the Radio Regulations and in the Aeronautical Mobile (R) Service by Appendix 27 (see Final Acts of A/WARC 1978) MOD 27/7.

ADD 3136A Carrier: An electromagnetic wave that is available for modulation and is characterized by its frequency, phase and amplitude.

Reason: To define a term used extensively in the Radio Regulations (Art. N3, RR 3493/200, 8043/444B etc.)

ADD 3136B Modulation: The process by which certain characteristics of a carrier are modified in accordance with certain characteristics of another wave or signal.

Reason: To define a term extensively used in Radio Regulations (see ADD 3136A/87A).

MOD 3138 89 Assigned Frequency Band: The frequency band within which the emission of a station is authorized; ~~the centre of which coincides with the frequency assigned to the station and~~ the width of the band ~~which~~ equals the necessary bandwidth plus twice the absolute value of the frequency tolerance.

Reason: Consequential to MOD 3134/85.

MOD 3139 90 Occupied Bandwidth: The frequency bandwidth such that below ~~its~~ the lower and above ~~its~~ the upper frequency limits, the mean powers ~~radiated~~ emitted are each equal to ~~0.5% of the total mean power radiated by a given emission. In some cases, for example multi-channel frequency division systems, the percentage of 0.5% may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful.~~ a specified percentage $\beta/2$ of the total mean power of a given emission. For the appropriate class of emission, the value of $\beta/2$ should be taken as 0.5% and in cases where this is not practicable, the Recommendations of the CCIR may be used as a guide.

Reason: For clarity and precision; text as suggested by CCIR SPM.

ADD 3140A Emission: The electromagnetic energy which emanates from a source in a radio system.

Reason: To define a term extensively used in Radio Regulations (See MOD 3141/92, ADD 3141C, ADD 3141D), and as requested by Administrative Conference of the ITU in Rec. 8, 1959.

MOD 3141 92 Spurious Emissions: Emissions on a frequency or frequencies which are outside the necessary band, and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions and intermodulation products, but exclude out-of-band emissions. ~~in the immediate vicinity of the neeessary band, which are a result of the modulation proeess for the transmission of information.~~

Reason: Consequential to ADD 3141A.

ADD 3141A Out-of-band Emission: Emission on a frequency or frequencies in the immediate vicinity of the necessary band, which results from the modulation process.

Reason: In accordance with CCIR Recommendation 328-3.

ADD 3141B Unwanted Emission: Spurious emission and out-of-band emission.

Reason: In accordance with CCIR Recommendation 328-3.

ADD 3141C Interference: The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misrepresentation, or loss of information which could be extracted in the absence of such unwanted energy.

Reason: Required by MOD 3142/93. In accordance with latest Draft Recommendation 516 of the CCIR.

ADD 3141D Permissible Interference: Observed or predicted interference which complies with quantitative interference and sharing criteria contained in the Radio Regulations or in Recommendations of the CCIR or in regional arrangements as provided for in the Radio Regulations.

Reason: The term "harmful interference", by itself, is not sufficiently adequate to cover all cases of intereference particularly in those instances where a relatively small degradation in system performance; ie, a degradation beyond a given value, may or may not be tolerable. In accordance with CCIR Recommendation 506.

MOD 3142 93 Harmful Interference: Any interference ~~emissions, radiation or induetion~~ which endangers the functioning of a radionavigation service or of other safety services or seriously degrades,

obstructs or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.

Reason: To utilize ADD 3141C.

ADD 3142A Protection Ratio: The minimum value of the wanted to unwanted signal ratio such that under specified conditions, a specified impairment of the wanted signal at the output of a receiver is not exceeded.

Reason: Used in RR 8040/443, 6477/434, Recommendation 3.

MOD 3143 94 Power: Whenever the power of a radio transmitter, etc. is referred to, it shall be expressed in one of the following forms, according to the class of the emission:

-- peak envelope power (P_p);

-- mean power (P_m);

-- carrier power (P_c).

For different classes of emissions, the relationships between peak envelope power, mean power and carrier power, under the conditions of normal operation and of no modulation, are contained in Recommendations of CCIR which may be used as a guide.

Reason: For clarity and precision because not all emissions can be expressed in all the forms indicated.

MOD 3145 96 Mean Power of a Radio Transmitter: The average power supplied to the antenna transmission line by a transmitter during ~~normal operation, averaged over~~ a time sufficiently long compared with the period of the lowest frequency encountered in the modulation, taken under conditions of normal operation. A time of 1/10 second during which the mean power is greatest will normally be selected ~~normally~~.

Reason: The definitions for peak envelope power, mean power and carrier power should use similar phraseology, as is done in the French versions of these definitions. Theoretically, there is no difference between average and mean power as each is equal to the time integral of the instantaneous power divided by the time interval. In the interest of uniformity, only one expression should be used.

MOD 3146 97 Carrier Power of a Radio Transmitter: The average power supplied to the antenna transmission line by a

transmitter during one radio frequency cycle under conditions of no modulation. ~~This definition does not apply to pulse modulated emissions.~~

Reason: It is unnecessary to specifically identify pulse modulated systems in the light of MOD 3143/94.

MOD 3147 98 Effective Radiated Power: The product of the power supplied to the antenna and ~~multiplied by~~ the relative gain (Gd) of the antenna in a given direction.

MOD 3148 98A Equivalent Isotropically Radiated Power (e.i.r.p.): The product of the power ~~of an emission~~ as supplied to ~~an~~ the antenna and the absolute ~~antenna~~ gain (Ga) of the antenna in a given direction. ~~relative to an isotropic antenna.~~

Reason: To improve the precision of definitions 3147/98 and 3148/98A and remove ambiguity associated with the term isotropic.

MOD 3149 99 Gain of an Antenna: The ratio of the power required at the input of a reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength at the same distance. When not specified otherwise, the figure expressing the gain of an antenna refers to the gain in the direction of ~~the~~ maximum radiation ~~main lobe~~ intensity. ~~In services using scattering modes of propagation the full gain of an antenna may not be realizable in practice and the apparent gain may vary with time.~~

Reason: The addition of the term "strength" clarifies that this is a measured quantity. The deletion of the last sentence is proposed because gain is an intrinsic property of the antenna and not of the propagation mode.

MOD 3150 100 ~~Isotropic or~~ Absolute Gain of an Antenna: The gain ~~(Gis)~~ (Ga) of an antenna in a given direction when the reference antenna is an isotropic loss free antenna isolated in space.

Reason: The expression "isotropic gain" may be considered to be misleading because an "isotropic radiator" by definition has no gain. So the use of the term "isotropic gain" is deprecated and should be replaced by "absolute gain". The term "loss free" has been inserted because in all antenna gain definitions a loss free reference antenna is used.

ADD 3158 Coverage Area (associated with a space station): The area on the surface of the Earth delineated by a contour of constant power flux density, e.i.r.p. or antenna gain which will permit the wanted quality of service in the absence of interference.

Reason: To fulfill the need for a term and concept which is applicable to all space services. It may be noted that while this definition is based upon the definition adopted by the WARC-BS (77), it has been generalized to suit other space services. The explanatory notes to the broadcasting satellite definition have not been retained since they are not generally applicable to all space services and tending to confuse the issue by introducing quasi-regulatory issues in a definition.

ADD 3159 Service Area (associated with a space station): That portion of the coverage area within which the agreed protection and operating conditions for the earth stations are provided.

Reason: It is felt that a definition, based on the Final Acts of the WARC 1977 on Broadcasting Satellites, but applicable to all space services, would be useful since the term is frequently used in the Radio Regulations.

ARTICLE N2

Nomenclature of the Frequency and Wavelength Bands
Used in Radiocommunication

MOD 3183 112 §1. The radio spectrum shall be subdivided into ~~nine~~ twelve frequency bands, which shall be designated by progressive whole numbers in accordance with the following table. Frequencies shall be expressed:

-- in hertz (Hz) up to and including 3000 Hz

-- in kilohertz (kHz) thereafter up to and including 3000 kHz

-- in megahertz (MHz) thereafter up to and including 3000 MHz

-- in gigahertz (GHz) thereafter up to and including 3000 GHz.

However, where adherence to these provisions would introduce serious difficulties, for example in connection with the notification and registration of frequencies, the lists of frequencies and related matters, reasonable departures may be made.

Nomenclature	Band Number	Frequency Range (lower limit exclusive upper limit inclusive)	Corresponding Metric Subdivision
ELF	1	3 to 30 Hz	Decamegametric waves
ELF	2	30 to 300 Hz	Megametric waves
ELF	3	300 to 3000 Hz	Decamyriametric
VLF	4	3 to 30 kHz	Myriametric waves
LF	5	30 to 300 kHz	Kilometric waves
MF	6	300 to 3000 kHz	Hectometric waves
HF	7	3 to 30 MHz	Decametric waves
VHF	8	30 to 300 MHz	Metric waves
UHF	9	300 to 3000 MHz	Decimetric waves
SHF	10	3 to 30 GHz	Centimetric waves
EHF	11	30 to 300 GHz	Millimetric waves
HHF	12	300 to 3000 GHz or 3 THz	Decimillimetric waves

Note 1. "Band Number N" extends from 0.3×10^N to 3×10^N Hz.

Note 2. Symbols and prefixes:

Hz = Hertz
k = kilo (10^3), M = mega (10^6), G = giga (10^9),
T = tera (10^{12}).

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~~Note 3.--Abbreviations for adjectival band designations:~~

~~Band 4---VLF~~	~~Band---8---VHF~~
~~Band 5---LF~~	~~Band---9---UHF~~
~~Band 6---MF~~	~~Band--10---SHF~~
~~Band 7---HF~~	~~Band--11---EHF~~

Reason: To include the ELF bands below 10 kHz, in accordance with Annex 1 of URSI Recommendation VIII.8 (Warsaw, 1972) and with CCIR Rec 431-2 note 4. HHF (hyper-high frequencies) is suggested to designate band 12. To identify bands for possible allocations to services.

ARTICLE N3

Designation of Emissions

SUP Nos. 3209/104 to 3216/111 inclusive together with associated headings.

Reason: Major changes in format and content.

ADD 3209 §1. Emissions are designated according to their necessary bandwidth and their classification. Whenever the full designation of an emission is required, the classification for that emission shall be preceded by an indication of the necessary bandwidth.

ADD Section I. Necessary Bandwidth

ADD 3210 §2. The necessary bandwidth shall be expressed by four characters consisting of three numerals and one letter which shall occupy the position of the decimal point. The first numeral shall not be a zero.

The letter character shall be H,K, M or G to designate Hz, kHz, MHz or GHz respectively.

EXAMPLES

Necessary Bandwidth	Symbol	Necessary Bandwidth	Symbol	Necessary Bandwidth	Symbol
25 Hz	25HO	36 kHz	36KO	27 MHz	27MO
400 Hz	400H	180 kHz	180K	200 MHz	200M
6 kHz	6KOO	1.25 MHz	1M25	5.6 GHz	5G60
12.5 kHz	12K5	6.25 MHz	6M25		

Reason: To accommodate automated data processing and to reduce the number of characters.

ADD 3211 Necessary bandwidth of various classes of emissions and examples of the designation of emissions are given in Appendix 5.

ADD Section II. Classification

ADD 3212 §3. Emissions are classifed and symbolized according to the following characteristics. Modulation used only for short incidental periods such as identification, calling, etc., should be ignored.

There are three basic characteristics, each represented by a symbol as follows:

1) Nature or type of modulation of the main carrier.

2) Nature or composition of signal modulating the main carrier.

3) Type of information transmitted.

Additional details of an emission are represented by two further symbols as follows:

4) Details of signal (s).

5) Nature of multiplexing.

The use of symbols 1), 2) and 3) is obligatory whereas the use of symbols 4) and 5) is optional for the purpose of classifying emissions, unless otherwise stated in these Regulations.

ADD 3213 §4. First Symbol - Nature or type of modulation of the main carrier

4.1 Emission of unmodulated carrier ..... N

4.2 Emission in which the main carrier is predominantly amplitude modulated (including cases where sub-carriers are angle modulated).

4.2.1 Double sideband ..... A

4.2.2 Single sideband full carrier ..... H

4.2.3 Single sideband reduced carrier ..... R

4.2.4 Single sideband suppressed carrier ..... J

4.2.5 Independent sideband ..... B

4.2.6 Vestigial sideband C

4.3 Emission in which the main carrier is angle-modulated.

4.3.1 Frequency Modulation ..... F

4.3.2 Phase modulation ..... G

4.4 Emission in which the main carrier is amplitude and angle modulated either simultaneously or in a pre-established sequence ..... D

4.5 Emission of pulses*

4.5.1 Unmodulated sequences of pulses ..... P

4.5.2 A sequence of pulses

4.5.2.1 Modulated in amplitude ..... K

4.5.2.2 Modulated in width/duration L

4.5.2.3 Modulated in position/phase ..... M

4.5.2.4 In which the carrier is angle-modulated during the period of the pulse ..... Q

4.5.2.5 Which is a combination of the foregoing or is produced by other means V

4.6 Cases not covered above in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse ..... W

4.7 Cases not otherwise covered X

ADD 3214 §5. Second Symbol - Nature of signal (s) modulating the main carrier

5.1 No modulating signal 0

5.2 A single channel containing quantized or digital information without the use of a modulating sub-carrier 1

* Emissions, where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g. pulse code modulation), should be designated under 4.2 or 4.3.

5.3 A single channel containing quantized or digital information with the use of a modulating sub-carrier 2

5.4 A single channel containing analogue information 3

5.5 Two or more channels containing quantized or digital information 7

5.6 Two or more channels containing analogue information.... 8

5.7 Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information 9

5.8 Cases not otherwise covered X

ADD 3215 §6. Third Symbol - Type of information to be transmitted.

6.1 No information transmitted ..... N

6.2 Telegraphy - for aural reception ..... A

6.3 Telegraphy - for automatic reception ..... B

6.4 Facsimile C

6.5 Data transmission, telemetry, telecommand ..... D

6.6 Telephony (including sound broadcasting) ..... E

6.7 Video (including television) ..... F

6.8 Combination of the above ..... W

6.9 Cases not otherwise covered X

ADD 3215A §7. Fourth Symbol - Details of signal(s)

7.1 Two-condition code with elements of differing numbers and/or durations ..... A

7.2 Two-condition code with elements of the same number and duration without error-correction ..... B

7.3 Two-condition code with elements of the same number and duration with error-correction C

7.4 Four-condition code in which each condition represents a signal element (of one or more bits) ..... D

7.5 Multi-condition code in which each condition represents a signal element (of one or more bits) ..... E

7.6 Multi-condition code in which each condition or combination of conditions represents a character ..... F

7.7 Sound of broadcasting quality-monophonic ..... G

7.8 Sound of broadcasting quality-stereophonic or quadraphonic ..... H

7.9 Sound of commercial quality (excluding categories given in sub paragraphs 7.10 and 7.11) ..... J

7.10 Sound of commercial quality with the use of frequency inversion or band splitting ..... K

7.11 Sound of commercial quality with separate frequency modulated signals to control the level of demodulated signal L

7.12 Monochrome ..... M

7.13 Colour ..... N

7.14 Combination of the above ..... W

7.15 Cases not otherwise covered X

ADD 3215B §8. Fifth Symbol - Nature of multiplexing

8.1 None ..... N

8.2 Code division multiplex ..... E

8.3 Frequency-division multiplex ..... F

8.4 Time-division multiplex ..... T

8.5 Combination of frequency division multiplex and time division multiplex ..... W

8.6 Other type of multiplexing X

ADD 3216 The classification of typical emissions is tabulated in Appendix 5. Additional examples may be found in appropriate recommendations and reports of the CCIR.

Reason: To update, using CCIR Rec 507 as reference, modified as deemed appropriate.

SUP New Appendix B

Reason: Consequential to the foregoing proposals; New Appendix B would now be obsolete.

Note: Any reference to 3210.1/105.1 on the designation of damped wave has purposely been omitted from the above proposals in order to satisfy the provisions of 3251/677.

ARTICLE N4/12

Technical Characteristics

MOD 3245 670 §3. To the maximum extent possible, amplitude modulation systems should use single sideband emissions. ~~having~~ The characteristics should be in accordance with the relevant CCIR Recommendations.

Reason: To clarify the text.

MOD 3251/677 §7. The use of ~~class-B~~ damped wave emissions is forbidden in all stations.

Reason: As a result of the suppression of No. 3210.1/105.1 in Article N/3.

ARTICLE N5/3

General Rules for the Assignment and Use of Frequencies

MOD 3280 116 §4. The frequency assigned to a station of a given service shall be separated from the limits of the band allocated to this service in such a way that, taking account of the frequency band assigned to a station, no harmful interference is caused to services to which frequency bands immediately adjoining are allocated. If a service allocated to an immediately adjoining frequency band is reportedly subject to harmful interference caused by a station whose occupied bandwidth is not wholly contained within the band allocated to the Service within which the station is operating, that station shall be regarded as not complying with this provision.

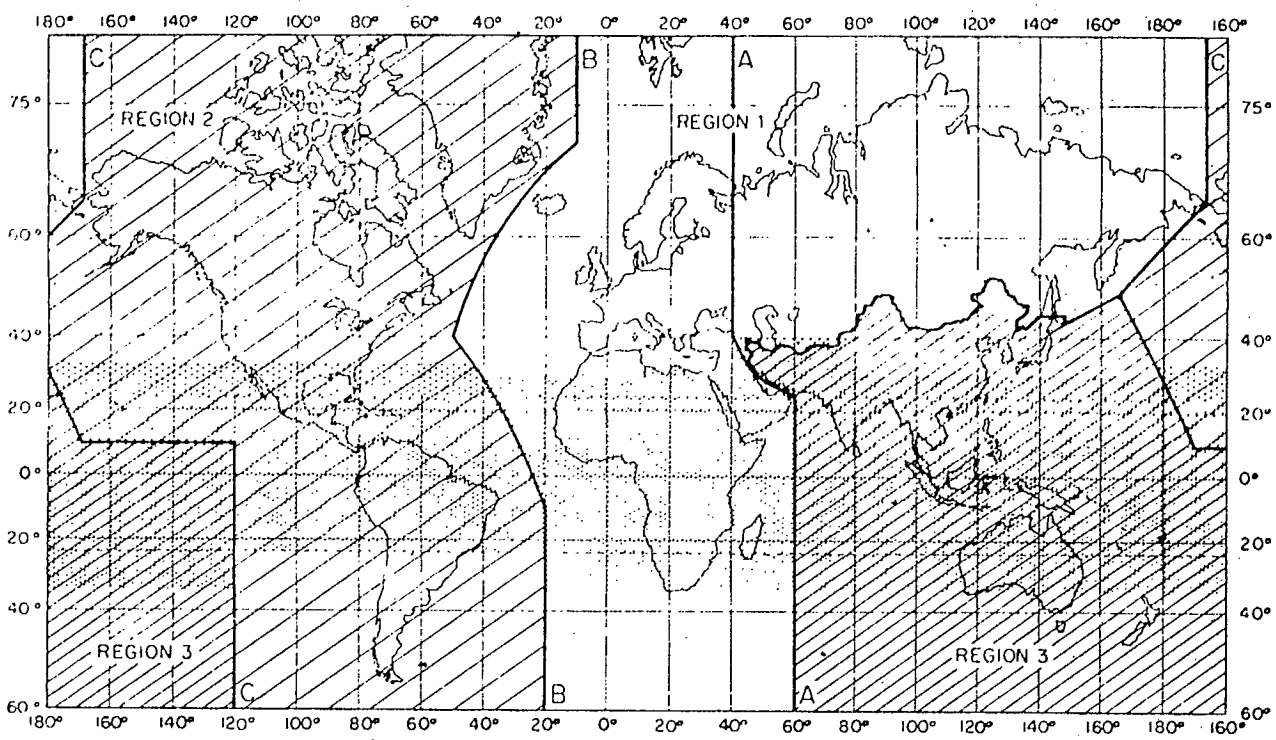
Reason: To strengthen the provisions in order to provide more appropriate regulatory protection for stations operating in adjacent Service bands.

ARTICLE N7/5

MOD Frequency Allocations[1] 10 kHz to 275 GHz

Section I. Regions and Areas

MOD 3415/125 §1. For the allocation of frequencies[2] the world has been subdivided into three Regions ~~(see Appendix 24)~~ as shown in the following chart.



The shaded part represents the Tropical Zone as defined in Nos. 3425/135 and 3426/136.

Reason: The chart of the Regions as defined in Nos. 3415/125 to 3422/132 and the Tropical Zone as defined in No. 3425/135 would be better placed and would be more easily referred to under Section 1 of Article N7/5.

SUP A.N7/5[1]

SUP APPENDIX 24

Section II. Categories of Services and Allocations

ADD 3441A Wherever used in the documents of the Union the terms listed below shall be expressed in the appropriate working language of the Union as indicated in the following table:

Frequency Distribution to:	French	English	Spanish
Services	Attribution (attribuer)	Allocation (to allocate)	Atribucion (atribuir)
Areas or Countries	Allotissement (allotir)	Allotment (to allot)	Adjudicacion (adjudicar)
Stations	Assignation (assigner)	Assignment (to assign)	Asignacion (asignar)

Reason: The contents of Resolution No. 6 relating to Frequency Terminology would be more appropriately placed under the section of Article N7/5 immediately preceeding the description of, and the Table of Frequency Allocations. Resolution No. 6 could then be suppressed.

SUP Resolution No. 6

Section III. Description of the Table of Frequency Allocations

ADD 3446A In the case where there is a parenthetical attachment to an allocation in the Table, the intent is to restrict that service allocation to the type of operation so indicated.

Reason: To clarify the intent of the parenthetical attachment to a service allocation in the Table. This clarification will obviate the need for regulatory clarification in the definition of services or the addition of footnotes to serve this purpose.

Section IV. Table of Frequency Allocations - 10 kHz to 275 GHz

kHz

Region 1	Region 2	Region 3
Below 10 (Not Allocated) 3451/157		

MOD 3451/157 Administrations authorizing the use of frequencies below 10 kHz ~~for special national purposes~~ shall ensure that no harmful interference is caused thereby to the services to which the bands above 10 kHz are allocated (see also Art. N16/14 No. 5003/699).

Reason: To broaden the application of the footnote.

kHz

Region 1	Region 2	Region 3
10-14 RADIONAVIGATION ~~Radiolocation~~		

Reason: The expected use of Radiolocation in this band did not materialize and therefore it is appropriate to suppress Radiolocation to protect the worldwide OMEGA navigation system.

kHz

Region 1	Region 2	Region 3
70-72 RADIONAVIGATION 3456/162 3455/161	70-90 FIXED MARITIME MOBILE 3452/158 MARITIME RADIO-NAVIGATION 3456/162 Radiolocation	70-90 FIXED MARITIME MOBILE 3452/158 RADIONAVIGATION 3456/162
72-84 FIXED MARITIME MOBILE 3452/158 RADIONAVIGATION 3456/162 3455/161 3457/163 3460A		
84-86 RADIONAVIGATION 3456/162 3457/163 3460A		
86-90 FIXED MARITIME MOBILE 3452/158 RADIONAVIGATION 3456/162 3457/163 3460A	3458/164 3460A	3459/165 3460A
90-110 ~~FIXED~~ ~~MARITIME MOBILE 3452/158~~ RADIONAVIGATION 3457/163 3460/166 ~~3461/167~~	90-110 RADIONAVIGATION ~~Fixed~~ ~~Maritime Mobile -3452/158-~~ 3460/166 ~~3461/167~~	90-110 ~~FIXED~~ ~~MARITIME MOBILE -3452/158-~~ RADIONAVIGATION 3460/166 ~~3461/167~~

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kHz

Region 1	Region 2	Region 3
110-112 FIXED MARITIME MOBILE RADIONAVIGATION 3456/162 3457/163 3461/167 3462/168 3460A	110-130 FIXED MARITIME MOBILE MARITIME RADIO-NAVIGATION 3456/162 Radiolocation	110-130 FIXED MARITIME MOBILE RADIONAVIGATION 3456/162
112-115 RADIONAVIGATION 3456/162 3457/163 3460A		
115-126 FIXED MARITIME MOBILE RADIONAVIGATION 3456/162 3457/163 3461/167 ~~3462/168~~ 3463/169 3460A		
126-129 RADIONAVIGATION 3456/162 3457/163		
129-130 FIXED MARITIME MOBILE RADIONAVIGATION 3456/162 3457/163 3461/167 ~~3462/168~~	3458/164 3461/167 ~~3462/168~~ 3460A	3461/167 ~~3462/168~~ 3464/170 3460A

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kHz

Region 1	Region 2	Region 3
130-150 MARITIME MOBILE 3465/172 /FIXED/ 3457/163 3461/167 3466/173	130-150 FIXED MARITIME MOBILE 3461/167	
150-160 MARITIME MOBILE 3461/167 3467/174 BROADCASTING 3468/175	150-160 FIXED MARITIME MOBILE 3461/167	

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ADD 3460A In authorizing new assignments in the bands 80-90 kHz and 110-120 kHz, administrations are urged to take all practical measures to protect Loran-C receiving stations operating in the band 90-110 kHz from harmful interference. Loran-C receiving stations should be of such a design that they are not unduly sensitive to interference from stations of other services operating in adjacent frequency bands.

Reason: Recently Loran-C systems have experienced interference from systems operating in adjacent frequency bands. Consequential to making the band 90-110 kHz exclusive Radionavigation, it is necessary to provide additional protection from adjacent bands.

MOD 3461/167 Only classes A1 or F1, A4 or F4 emissions are authorized in the band ~~90~~ 110-160 kHz for stations of the fixed and of the maritime mobile services. Exceptionally, class A7J emissions are also authorized in that band for stations of the maritime mobile service.

Reason: The proposed suppression of the Fixed and Maritime Mobile service in the band 90-110 kHz is to protect the world-wide operation of radionavigation systems such as Loran-C.

MOD 3461/167 and the deletion of 3452/158 is consequential to the above.

SUP 3462/168

Reason: The requirement for communication to aircraft in these frequency bands has not arisen.

kHz

Region 1	Region 2	Region 3
160-255 BROADCASTING 3469A 3469/176	160-~~200~~ 190 FIXED 3472/179 190-200 FIXED AERONAUTICAL RADIONAVIGATION ~~3472/179~~	160-200 FIXED Aeronautical radionavigation
255-285 MARITIME MOBILE 3467/174 BROADCASTING 3469A AERONAUTICAL RADIONAVIGATION 3469/176 3470/177 3471/178	200-285 AERONAUTICAL RADIONAVIGATION Aeronautical Mobile	

ADD 3469A In the band 190-285 kHz, the ERP of a station in the broadcasting service is limited to (10d (Mm)-20) decibels relative to one kilowatt in the direction of any previously notified radionavigation station.

Reason:

1) There is a need for increased allocation to the Aeronautical Radionavigation Service. The band 190-200 kHz will provide additional channels and it is compatible with existing equipment.

2) There is no continuing need for footnote 3472/179 between 190-200 kHz in Region 2.

3) ADD 3469A is to protect the service areas of radionavigation stations in North America.

kHz

Region 1	Region 2	Region 3
405-415 MOBILE except aeronautical mobile AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radio direction-finding) 3475/182 3476/183 3477/184	405-~~415~~ 435 ~~MARITIME~~ RADIONAVIGATION ~~(radio-direction-finding)~~ (radiobeacons) ~~/AERONAUTICAL RADIO-NAVIGATION/~~ Aeronautical mobile ~~3475/182~~	405-415 RADIONAVIGATION Aeronautical mobile 3475/182
415-~~490~~ 495 MARITIME MOBILE 3478/185 3479/186	~~415~~-~~490~~ 435-495 MARITIME MOBILE 3479/186	415-~~490~~ 495 MARITIME MOBILE 3479/186

Reason: To provide for increased allocation to the Radionavigation Service. Consideration was given to sharing the 415-495 kHz band between the Radionavigation and Maritime Mobile Services; however, due to the probability of long distance propagation at these frequencies, it was concluded that geographic sharing may not be possible. For this reason separate allocations are proposed for Region 2.

MOD 3475/182 In Regions 1 and 3 the frequency 410 kHz is designated for the Maritime Radionavigation Service (radio direction-finding). Other allocated services in the band 405-415 kHz shall not cause harmful interference to radio direction-finding. In the band 405-415 kHz no frequency shall be assigned to coast stations.

Reason: A consequential revision.

kHz

Region 1	Region 2	Region 3
~~490-510~~ 495-505 MOBILE (distress and calling) 3480/187		

Reason: Due to improved frequency stability, it is no longer necessary to have a 20 kHz bandwidth for international distress and calling frequency. Existing survival craft equipment may have some difficulty remaining within the 10 kHz bandwidth but this should not be a problem for new equipments. A future competent conference should set aside two adjacent 5 kHz bands for ship-to-ship and ship-to-shore calling (radiotelegraphy) including "digital" selective calling.

kHz

Region 1	Region 2	Region 3
~~510~~ 505-525 MARITIME MOBILE 3479/186 Aeronautical Radionavigation	~~510-525~~ 505-515 MARITIME MOBILE 3479/186 ~~MOBILE~~ ~~/AERONAUTICAL-RADIONAVIGATION/~~ ~~3481/188~~	~~510~~ 505-525 MARITIME MOBILE Aeronautical mobile Land mobile
	515-525 ~~/AERONAUTICAL RADIONAVIGATION/~~ ~~3481/188~~	
3478/185	AERONAUTICAL RADIONAVIGATION	3482/189

Reason: To retain provision for the Maritime Mobile Service and to improve the status of Aeronautical Radionavigation, it is proposed to provide two separate allocations, consequently No. 3481/188 would no longer be required in the band 510-525 kHz.

Note: Consequential amendments to Article N35/32 will be required.

kHz

Region 1	Region 2	Region 3
1605-2000 FIXED MOBILE except aeronautical mobile	1605-~~1800~~ 1705 ~~FIXED~~ ~~MOBILE~~ ~~AERONAUTICAL RADIONAVIGATION~~ ~~Radiolocation~~ BROADCASTING	1605-1800 FIXED MOBILE
	1705-1800 FIXED MOBILE RADIODETERMINATION	3491/197
	1800-~~2000~~ 1900 AMATEUR ~~FIXED~~ ~~MOBILE except aeronautical mobile~~ ~~RADIONAVIGATION~~ ~~3492/198~~	1800-2000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION
3485/192 3486/420 3487/193 3488/194 3489/195 3490/195A	1900-2000 RADIODETERMINATION ~~3492/198~~	3492/198

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MOD 3492/198 ~~In Region 2 the Loran system has priority. Other services to which the band is allocated may use any frequency in this band provided that they do not cause harmful interference to the Loran system.~~

In Region 3 the Loran system in any particular area operates either on 1850 or 1950 kHz, the bands occupied being 1825-1875 kHz and 1925-1975 kHz respectively. Other services to which the band 1800-2000 kHz is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1850 or 1950 kHz.

Reason: In Region 2, in the band 1605-1800 kHz there has been a reduced requirement for the Fixed, Mobile and Aeronautical Radionavigation Services and an increased requirement for Broadcasting. Loran A which operated in the 1800-2000 kHz band is being phased out allowing for an exclusive allocation to Amateur in the band 1800-1900 kHz, and a short term continuation of Loran A at 1900-2000 kHz. Also, there is a continuing need for radiodetermination systems to operate in the 1900-2000 kHz band. In order to accommodate the Fixed Service system currently operating in the band 1605-1705 kHz, it is possible to make domestic provisions for the duration of their operational life.

kHz

Region 1	Region 2	Region 3
2000-2045 MARITIME MOBILE ~~FIXED~~ Fixed ~~MOBILE-except-aero-nautical-mobile~~ Land Mobile 3487/193 3490/195A	2000-2065 MARITIME MOBILE ~~FIXED~~ Fixed ~~MOBILE~~ Land Mobile Aeronautical Mobile	
2045-2065 MARITIME MOBILE METEOROLOGICAL AIDS ~~FIXED~~ Fixed ~~MOBILE-except-aero-nautical-mobile~~ Land Mobile 3487/193 3490/195A		

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kHz

Region 1	Region 2	Region 3
2502-~~2625~~ 2575 FIXED MOBILE except aeronautical mobile (R) 3487/193 3490/195A	2505-~~2625~~ 2575 FIXED MOBILE	
2575-2625 ~~FIXED~~ ~~MOBILE except aeronautical mobile (R)~~ MARITIME MOBILE Fixed Land Mobile 3487/193 3490/195A	~~2625-2850~~ 2575-2650 MARITIME MOBILE ~~FIXED~~ Fixed ~~MOBILE~~ Land Mobile	
2625-2650 MARITIME MOBILE ~~MARITIME RADIONAVIGATION 3468/175-3490/195A~~		
2650-2850 FIXED MOBILE except aeronautical mobile (R) 3490/195A 3499/205	2650-2850 FIXED MOBILE	

Reason: The bands 2000-2065 kHz and 2575-2650 kHz are needed worldwide to provide common ship/shore and intership channels in accordance with Recommendation Mar 2-3.

kHz

Region 1	Region 2	Region 3
2000-2045 MARITIME MOBILE ~~FIXED~~ Fixed ~~MOBILE-except-aero-nautical-mobile~~ Land Mobile 3487/193 3490/195A	2000-2065 MARITIME MOBILE ~~FIXED~~ Fixed ~~MOBILE~~ Land Mobile Aeronautical Mobile	
2045-2065 MARITIME MOBILE METEOROLOGICAL AIDS ~~FIXED~~ Fixed ~~MOBILE-except-aero-nautical-mobile~~ Land Mobile 3487/193 3490/195A		

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kHz

Region 1	Region 2	Region 3
2502-~~2625~~ 2575 FIXED MOBILE except aero-nautical mobile (R) 3487/193 3490/195A	2505-~~2625~~ 2575 FIXED MOBILE	
2575-2625 ~~FIXED~~ ~~MOBILE except aero-nautical mobile (R)~~ MARITIME MOBILE Fixed Land Mobile 3487/193 3490/195A	~~2625-2850~~ 2575-2650 MARITIME MOBILE ~~FIXED~~ Fixed ~~MOBILE~~ Land Mobile	
2625-2650 MARITIME MOBILE ~~MARITIME RADIONAVIGATION 3468/175-3490/195A~~		
2650-2850 FIXED MOBILE except aero-nautical mobile (R) 3490/195A 3499/205	2650-2850 FIXED MOBILE	

Reason: The bands 2000-2065 kHz and 2575-2650 kHz are needed worldwide to provide common ship/shore and intership channels in accordance with Recommendation Mar 2-3.

kHz

Region 1	Region 2	Region 3
3500-3800 AMATEUR ~~FIXED~~ ~~MOBILE except aeronautical mobile~~	3500-~~4000~~ 3900 AMATEUR ~~FIXED~~ ~~MOBILE except aeronautical mobile (R)~~	3500-~~3900~~ 3800 AMATEUR ~~FIXED~~ ~~MOBILE~~ 3501/206 3502/207
3800-3900 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE		3800-3900 AMATEUR FIXED MOBILE 3501/206 3502/207
3900-3950 AERONAUTICAL MOBILE (OR)	3900- 3950 BROADCASTING FIXED ~~AMATEUR~~ ~~MOBILE except aeronautical mobile~~	3900-3950 AERONAUTICAL MOBILE BROADCASTING
3950-4000 FIXED BROADCASTING	3950-4000 BROADCASTING ~~AMATEUR~~ ~~FIXED~~ ~~MOBILE except aeronautical mobile (R)~~	3950-4000 FIXED BROADCASTING

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kHz

4063-~~4438~~ 4500 MARITIME MOBILE 3503/208 3504/209 3505/209A	
4500-4650 FIXED MOBILE except aero-nautical mobile (R)	4500-4650 FIXED MOBILE except aero-nautical mobile

MOD 3504/209 On condition that harmful interference is not caused to the maritime mobile service, the frequencies between 4063 and ~~4438~~ 4500 kHz may be used exceptionally by fixed stations communicating only within the boundary of the country in which they are located~~,-with-a-mean-power-not-exceeding-50-watts;-however,-in-Region 2-and-3,-between-4238-and-4368-kHz,-a-mean-power-not-exceeding-500-watts-may-be-used-by-such-fixed-stations~~.

Reason: The modifications to the band 3500-4650 kHz are intended to meet the following requirements:

a) Improvement of the amateur service by providing a worldwide exclusive allocation between 3500-3800 kHz.

b) Provision of an allocation below 4 MHz to the Broadcasting Service in Region 2.

c) Provision of additional spectrum allocation to the Maritime Mobile Service by extending the existing allocation 4063-4438 kHz to 4063-4500 kHz.

d) The power limitations in footnote 3504/209 have been deleted since the fixed service is already secondary to the maritime mobile service.

kHz

Region 1	Region 2	Region 3
5005-5060 FIXED BROADCASTING ~~3496/202~~		

Reason: In the band 5005-5060 kHz suppress footnote 3496/202 to make provision for worldwide broadcasting. Careful coordination of any use of this band by the Broadcasting Service should easily protect the current users of the fixed service.

kHz

Region 1	Region 2	Region 3
5950-~~6200~~ 6150 BROADCASTING		
~~6200~~ 6150-6525 MARITIME MOBILE 3507/211 3508/211A		

MOD 3507/211 On condition that harmful interference is not caused to the maritime mobile service, the frequencies between ~~6200~~ 6150 and 6525 kHz may be used exceptionally by fixed stations, communicating only within the boundary of the country in which they are located~~, with a mean power not exceeding 50 watts. At the time of notification of these frequencies, the attention of the International Frequency Registration Board will be drawn to the above conditions.~~

Reason: The maritime mobile service has an increased need for radiotelephone and direct printing radiotelegraph channels in the 6 MHz band, (see Rec. Mar 2-9). The additional spectrum proposed for the broadcasting service in the 4 MHz, 5 MHz and 7 MHz band should relieve some of the requirement for retaining all of the 5950-6200 kHz band for the broadcasting service. Consequentially, the band limits in footnote 3507/211 must be amended.

The power limitation in footnote 3507/211 limits the usefulness of this band for the fixed service and it is also not necessary as the fixed service is already secondary to the maritime mobile service.

kHz

Region 1	Region 2	Region 3
6765-~~7000~~ 6900 FIXED		
~~7000~~ 6900-7100 AMATEUR AMATEUR-SATELLITE		
7100-~~7300~~ 7400 BROADCASTING 3509/212 3509A	7100-~~7300~~ 7400 ~~AMATEUR~~ BROADCASTING 3509A	7100-~~7300~~ 7400 BROADCASTING 3509A
~~7300-8195~~ 7400-8100 FIXED		
~~8195~~ 8100-8815 MARITIME MOBILE 3495/201A 3510/213		

ADD 3509A In Canada the band 7330-7340 kHz is allocated on a primary basis to the Standard Frequency and Time Service. In authorizing the utilization of this band for broadcasting, administrations are urged to take all practical measures to avoid interfering with this service.

Reason: The unsatisfactory sharing experience by the Amateur and Broadcasting Services, will be obviated by the establishment of two exclusive bands. The proposals for the bands 6900-7100 and 7100-7400 are not separable. The broadcasting band is being proposed for expansion in order to alleviate the congestion in this band.

Canada CHU has been operating as a time and frequency standard on 7335 kHz for many years. CHU is used widely and it is proposed to provide international recognition to this service by providing a suitable footnote in the table.

The Maritime Mobile Service has an increased need for radiotelephone and direct printing radiotelegraph channels in the 8 MHz band. (See Rec. Mar 2-9)

kHz

Region 1	Region 2	Region 3
9040-~~9500~~ 9425 FIXED		
~~9500-9775~~ 9425-9875 BROADCASTING		
~~9775~~ 9875-9995 FIXED		

Reason: To provide additional spectrum to alleviate the congestion in the Broadcasting band.

kHz

Region 1	Region 2	Region 3
10100-~~11175~~ 10300 ~~FIXED~~ AMATEUR AMATEUR SATELLITE		
10300-11175 FIXED		

Reason: To provide an amateur band between 7 and 14 MHz in order to cope with varying propagation conditions.

kHz

Region 1	Region 2	Region 3
11400-~~11700~~ 11650 FIXED 3512/216		
~~11700~~ 11650-11975 BROADCASTING		
11975-~~12330~~ 12200 FIXED		
~~12330~~ 12200-13200 MARITIME MOBILE 3510/213		

Reason: The current congestion in the broadcast band 11700-11975 kHz and the maritime mobile band 12330-13200 kHz will be partly alleviated by the reallocation of small protions of the fixed bands. (See Rec. Mar 2-9)

kHz

Region 1	Region 2	Region 3
13360-~~14000~~ 13900 FIXED 3513/217		
13900-14000 ~~FIXED~~ RADIO ASTRONOMY ~~3513/217~~		

Reason: To provide a radio astronomy band between 10-15 MHz for reasons identified in CCIR Report 224-4 and in Report 699 and in compliance with Recommendation Spa 2-7 of the Radio Regulations.

kHz

Region 1	Region 2	Region 3
15100-~~15450~~ 15550 BROADCASTING		
~~15450-15762~~ 15550-16300 FIXED		
~~15762-15768~~ ~~FIXED~~		
~~15768-16460~~ ~~FIXED~~		
~~16460~~ 16300-17360 MARITIME MOBILE 3510/213		
17360-~~17700~~ 17600 FIXED		
17600-17900 BROADCASTING		

Reason: In order to alleviate the existing congestion in the Broadcasting and Maritime Mobile Services in this area of the spectrum.

kHz

Region 1	Region 2	Region 3
21750-~~21850~~ 21924 FIXED		
~~21850-21870~~ ~~RADIO-ASTRONOMY~~ ~~3517/221B~~		
21924-22000 ~~AERONAUTICAL-FIXED~~ AERONAUTICAL MOBILE (R)		

Reason: Pursuant to Recommendation No Aer 2-5 of the ITU WARC AM(R)S (Geneva 1978). An exclusive band conducive to long distance radiocommunications is required for the aeronautical mobile (R) service. Also since Radio Astronomy has been provided for in the band 23350-23550 kHz there is no longer a requirement for Radio Astronomy in the band 21850-21870 kHz.

kHz

Region 1	Region 2	Region 3
23350-~~24990~~ 23550 ~~FIXED~~ ~~LAND-MOBILE~~ RADIO ASTRONOMY 3518/222 ~~3519/222A~~		
23550- 24000 FIXED LAND MOBILE 3518/222 ~~3519/222A~~		
24000-24500 ~~FIXED~~ ~~LAND-MOBILE~~ AMATEUR AMATEUR SATELLITE ~~3518/222~~ ~~3519/222A~~		
24500-24990 FIXED LAND MOBILE 3519/222A		

Reason: 1) To provide an amateur band between 21 and 28 MHz in order to cope with varying propagation conditions.

2) The existing radio astronomy band 21850-21870 kHz is too narrow for reasons given in CCIR Report 224-3. Allocation of the wider band 23350-23550 kHz to Radio Astronomy would permit the release of the narrow band to another service.

3) The deletion of footnotes 3518/222 and 3519/222A in certain parts of the bands 23350-24500 kHz is consequential to the proposed modifications to the Table.

MHz

Region 1	Region 2	Region 3
27.5-28 METEOROLOGICAL AIDS 3524/227	27.5-28 ~~METEOROLOGICAL AIDS~~ FIXED MOBILE	

Reason: There is no longer a requirement for meteorological aids in Regions 2 and possibly in Region 3. The abrogation of Recommendation 33 is also being proposed.

MHz

Region 1	Region 2	Region 3
30.01-~~37.75~~ 37.50	FIXED 3525/228 3526/229 3527/230 3528/231 MOBILE 3530/233A	
~~37.75~~ 37.50-38.25	FIXED 3525/228 3526/229 3528/231 MOBILE ~~Radio Astronomy~~ RADIO ASTRONOMY 3531/233B	

MOD 3531/233B In making assignments to stations of other services to which the bands ~~37.75~~ 37.50-38.25 MHz, 150.05-153 MHz, 406.1-410 MHz, 608-614 MHz, ~~2690-2700 MHz~~, 3325-3360 MHz and ~~4700~~ 4950-5000 MHz, 10.6-10.68 GHz are allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

Reasons:

1) To make provision for Radio Astronomy in this band on a Primary basis.

2) The modification to footnote 3531/233B takes into account the various amendments throughout the allocation table.

MHz

Region 1	Region 2	Region 3
68-~~74.8~~ 73 FIXED MOBILE except aeronautical mobile 3546/248 3547/249 3548/250 3549/251	68-73 FIXED MOBILE BROADCASTING	68-70 FIXED MOBILE AERONAUTICAL RADIONAVIGATION 3553/254 3554/255 3555/256
		70-~~74.6~~ 73 FIXED MOBILE 3555/256 3556/257 3557/258
73-74.6 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 3549/251 3550/252	73-74.6 RADIO ASTRONOMY 3551/253A 3552/253B	73-74.6 FIXED MOBILE RADIO ASTRONOMY 3557/258
74.6-74.8 FIXED MOBILE except aeronautical mobile 3549/251 3550/252		

MOD 3551/253A In Region 2, fixed, mobile and broadcasting service operations previously authorized in the band 73-74.6 MHz may continue to operate until December 31, 1985 on a non-interference basis to the Radio Astronomy Service.

Reason: To strengthen the protection to the radio astronomy service in Region 2 and to permit the expanded use of very long baseline interferometry on an intercontinental basis.

MHz

Region 1	Region 2	Region 3
117.975-132		
	AERONAUTICAL MOBILE (R)	
	3495/201A 3572/273 ~~3573/273A~~ 3573A	
132-136		
	AERONAUTICAL MOBILE (R)	
	~~3573/273A~~ 3574/274 ~~3575/274A~~ 3576/274B 3577/275	

SUP 3573/273A and 3575/274A

Reason: Due to the extensive use of this band for terrestrial communications and the resulting congestion, it is not practical to permit the development of systems using space communication techniques and therefore No. 3573/273A has been suppressed.

Suppression of 3575/274A is editorial. The date has expired.

ADD 3573A Space system techniques may be used to receive emissions from emergency position-indicating radio beacon stations at the frequencies 121.5 MHz, 156.75 MHz and 243 MHz.

Reason: It is considered appropriate to add footnote 3573A to ease regulations associated with satellite-aided reception of emissions from emergency position-indicating radio beacon stations. This additional footnote would allow space system techniques to be used to receive emissions on emergency frequencies.

MHz

Region 1	Region 2	Region 3
136-137 ~~SPACE-RESEARCH-(Space-to-Earth)~~ AERONAUTICAL MOBILE (R) 3582A ~~3581/281A~~ 3582/281AA 3582AB		
137-138 ~~SPACE-OPERATIONS-(telemetering-and-tracking)~~ ~~METEOROLOGICAL-SATELLITE~~ ~~SPACE-RESEARCH-(Space-to-Earth)~~ AERONAUTICAL MOBILE (R) 3582A 3578/275A 3580/279A 3583/281C 3584/281E 3582AC		

SUP 3581/281A

ADD 3582A The 136-137 and 137-138 MHz bands are allocated to the Aeronautical Mobile (R) Service for use as of January 1, 1990.

ADD 3582AB Until January 1, 1990, the band 136-137 MHz is also allocated to the Space Research (Space-to-Earth) Service. As of January 1, 1990, no new stations in that service may be authorized. Stations authorized prior to January 1, 1990 may continue to operate on a secondary basis.

ADD 3582AC Until January 1, 1990, the band 137-138 MHz is also allocated to the Space Operation (telemetry and tracking) Meteorological Satellite and Space Research (Space-to-Earth) services. As of January 1, 1990, no new stations in these services may be authorized. However, stations authorized prior to January 1, 1990 may continue to operate on a secondary basis.

Reasons:

1) To alleviate critical shortage of VHF aeronautical mobile (R) channels in the 118-136 MHz band and to enable the development and use of more spectrum efficient techniques in this frequency range. The present use of 136-138 MHz band for space purposes is somewhat limited on a worldwide basis. Aeronautical mobile (R) service stations would not move into this band until 1990, when space operations will no longer be authorized.

2) Re SUP 3581/281A pertaining to the use of the band 136-137 MHz by the Fixed and Mobile Services, Recommendation Spa 7 has now outlived its usefulness and can be abrogated.

MHz

Region 1	Region 2	Region 3
150.05-151 FIXED MOBILE except aeronautical mobile (R) RADIO ASTRONOMY 3531/233B 3590/285 3594/286A	150.05-~~174~~ 156.7625 FIXED MOBILE	150.05-~~170~~ 156.7625 FIXED MOBILE
151-153 FIXED MOBILE except aeronautical mobile (R) RADIO ASTRONOMY /METEOROLOGICAL AIDS/ 3531/233B 3590/285 3594/286A		
153-154 FIXED MOBILE except aeronautical mobile (R) /METEOROLOGICAL AIDS/ 3590/285		
154-156 FIXED MOBILE except aeronautical mobile (R) 3590/285	3531/233B 3573A ~~3595/287~~ 3595A	3531/233B 3573A ~~3595/287~~ 3595A 3598/290
156-156.7625 FIXED MOBILE except aeronautical mobile 3590/285 ~~3595/287~~ 3573A 3595A		

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MHz

<table>
<tr><td colspan="3">156.7625-156.8375
MARITIME MOBILE (distress, safety and calling)
3495/201A 3590/285 3595/287</td></tr>
<tr><td>156.8375-174
FIXED
MOBILE except aero-nautical mobile

3590/285 ~~3595/287~~ 3595A 3596/288</td><td>156.8375-174
FIXED
MOBILE

3530/233A ~~3595/287~~ 3595A</td><td>156.8375-170
FIXED
MOBILE
~~3595/287~~ 3595A

170-174
FIXED
MOBILE
BROADCASTING</td></tr>
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MOD 3595/287 The frequency 156.8 MHz is the international distress safety and calling frequency for the maritime mobile VHF radiotelephone service. Administrations shall ensure that a guard band on each side of the frequency 156.8 MHz is provided. The conditions for the use of this frequency are contained in Article N35/35.

~~In the bands 156.025-157.425 MHz, 160.625-160.975 MHz and 161.475-162.025 MHz each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by that administration (see Article N57/35).~~

~~Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radio communication service.~~

~~However, the frequency bands in which priority is given to the maritime mobile service may be used for radiocommunications on inland waterways subject to agreements between interested and affected administrations and taking into account current frequency usage and existing agreements.~~

ADD 3595A In the bands 156.025-156.7625 MHz, 156.8375-157.425 MHz, 160.625-160.975 MHz and 161.475-162.025 MHz, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by that administration (see Article N57/35).

Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radio communication service.

However, the frequency bands in which priority is given to the maritime mobile service may be used for radio communications on inland waterways subject to agreements between interested and affected administrations and taking into account current frequency usage and existing agreements.

Reasons:

1) This proposal reflects the guard-band provided in Appendix 18 to provide exclusive status on a worldwide basis for the international distress safety and calling frequency 156.8 MHz and to make a consequential amendment to footnote 3595/287 by amending this footnote and adding a new footnote 3595A.

2) For the addition of footnote 3573A in the band 150.05-156.7625 MHz refer to the reason given under the band 117.975-132 MHz in these proposals.

MHz

Region 1	Region 2	Region 3
216-223 AERONAUTICAL RADIONAVIGATION BROADCASTING 3605/297 3606/298 3607/299 3608/300 3609/301	216-220 FIXED ~~MOBILE~~ MARITIME MOBILE ~~RADIOLOCATION~~ Radiolocation	216-225 AERONAUTICAL RADIONAVIGATION Radiolocation
223-235 AERONAUTICAL RADIONAVIGATION Fixed Mobile 3607/299 3608/300 3609/301 3610/302 3611/303 3612/304 3613/305	220-225 AMATEUR ~~RADIOLOCATION~~ Radiolocation	3615/306 3616/307 3617/308
	225-235 FIXED MOBILE	225-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION

Reason: In Region 2, the primary allocation to radiolocation in the band 216-225 MHz should be changed to secondary status. Also in Region 2, the primary allocation to Mobile in the band 216-220 MHz should be replaced by Maritime Mobile to provide needed spectrum for short-range ship/shore and intership communications.

MHz

Region 1	Region 2	Region 3
235-267 FIXED MOBILE 3495/201A 3613/305 3614/305A 3618/308A 3619/309 3573A		

Reason: For ADD 3573A, refer to the band 117.975-132 MHz.

MHz

Region 1	Region 2	Region 3
401-402	METEOROLOGICAL AIDS SPACE OPERATION (telemetering and tracking) ~~3630/315A~~ Earth Exploration-Satellite (Earth-to-Space) Fixed ~~Meteorological Satellite (Earth-to-Space)~~ Mobile except aeronautical mobile 3628/314 3629/315 3631/315B ~~3632/315C~~ 3633/316	
402-403	METEOROLOGICAL AIDS Fixed ~~Meteorological Satellite (Earth-to-Space)~~ Mobile except aeronautical mobile Earth Exploration-Satellite (Earth-to-Space) 3628/314 3629/315 ~~3632/315C~~ 3633/316	

SUP 3630/315A

SUP 3632/315C

Reasons:

1) The band 401-403 MHz is being used internationally in a wide variety of satellite data collection applications in the fields of meteorology, hydrography, oceanography, forestry, agriculture, volcanology, etc. Meteorological Satellite is deleted, and the Earth Exploration-Satellite Service is substituted. The definition of Earth Exploration-Satellite Service includesthose operations performed by the Meteorological Satellite Service.

2) The addition of 'tracking' associated with Space Operations under the Table 401-402 MHz obviatesthe need for footnote 3630/315A.

MHz

Region 1	Region 2	Region 3
403-406	403-406	403-406
METEOROLOGICAL AIDS	METEOROLOGICAL AIDS	METEOROLOGICAL AIDS
Fixed	Fixed	Fixed
Mobile except aeronautical mobile	Mobile except aeronautical mobile	Mobile except aeronautical mobile
3628/314 3629/315 3633/316	~~3628/314 3929/315~~ 3632A ~~3633/316~~	~~3628/314 3629/315~~ 3633/316
406.1-410	406.1-410	406.1-410
FIXED	FIXED	FIXED
MOBILE except aeronautical mobile	MOBILE except aeronautical mobile	MOBILE except aeronautical mobile
RADIO ASTRONOMY	RADIO ASTRONOMY	RADIO ASTRONOMY
	MOBILE SATELLITE except aeronautical mobile-satellite (Earth-to-Space)	
3531/233B 3628/314	3531/233B ~~3628/314~~ 3632B	3531/233B ~~3628/314~~

ADD 3632A In Canada, the band 405.5 to 406 MHz is also allocated to the Mobile-Satellite service (Earth-to-Space) except Aeronautical Mobile-Satelllite and on a secondary basis to the Aeronautical Mobile-Satellite Service (Earth-to-Space).

ADD 3632B In Canada, the band 406.1-410 MHz is also allocated to the Aeronautical Mobile-Satellite Service (Earth-to-Space) on a secondary basis. The use of the band by the Aeronautical Mobile-Satellite Service will be restricted to geographical areas remote from all radio astronomy observatories.

Reasons:

1) Canada plans to implement an operational multi-service satellite system to operate in the following frequency bands (earth-to-space link): 401-403 MHz, 405.5-406 MHz, 406-406.1 MHz and 406.1-410 MHz. Geographic sharing between the Mobile Satellite except Aeronautical Mobile-Satellite service and the existing Meteorological Aids and Radio Astronomy Services is therefore proposed in the 405.5-406 MHz band and in the 406.1-410 MHz band respectively.

2) Footnotes 3628/314, 3629/315 and 3633/316 do not apply to Region 2. Footnotes 3628/314 and 3629/315 do not apply to Region 3.

MHz

Region 1	Region 2	Region 3
420-430 FIXED MOBILE except aeronautical mobile Radiolocation 3636/318 3640/319	420-450 RADIOLOCATION Amateur 3644/320A	420-450 RADIOLOCATION Amateur 3644/320A
430-440 AMATEUR 3644/320A RADIOLOCATION 3636/318 3640/319 3642/319B 3643/320 3645/321 3646/322		
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 3636/318 3640/319 3641/319A	~~3636/318~~ 3641/319A 3642/319B ~~3648/324~~ 3644A	3636/318 3641/319A 3642/319B 3647/323 3648/324
450-460 FIXED MOBILE 3638/318B 3639/318C 3641/319A 3636/318	450-460 FIXED MOBILE 3638/318B 3639/318C ~~3636/318~~ 3641/319A	450-460 FIXED MOBILE 3638/318B 3639/318C 3636/318 3641/319A

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MOD 3644/320A In the bands 435-438 MHz, 1290-1300 MHz, 2300-2310 MHz, 3390-3400 MHz, 5650-5670 MHz, 10475-10500 MHz, and 240-250 GHz the Amateur-Satellite Service may be authorized, on condition that no harmful interference shall be caused to other services operating in accordance with the Table. Administrations authorizing such use shall ensure that any harmful interference caused by emissions from an amateur-satellite is immediately eliminated in accordance with the provisions of No. 6362/1567A.

ADD 3644A In Canada, the band 420-430 MHz is allocated on a primary basis to the fixed service and the mobile service except the aeronautical mobile service.

Reasons:

1) The provisions for radio altimeters under footnote 3636/318 are no longer necessary in Region 2.

2) ADD 3644A is to meet a need by Canada for low capacity fixed systems and for mobile systems in the 420-430 MHz band.

3) MOD 3644/320A is to provide additional spectrum in several bands for the operation of the Amateur-Satellite Service on a non-interference basis.

MHz

Region 1	Region 2	Region 3
470-582 BROADCASTING	470 ~~-890~~ 608 BROADCASTING 3655/329A ~~3661/332A~~	470-585 BROADCASTING 3664/335
582-606 BROADCASTING RADIONAVIGATION 3651/325 3652/327 3653/328 3654/329	608-614 RADIO ASTRONOMY ~~BROADCASTING~~ Mobile Satellite (earth-to-space) except aeronautical mobile satellite 3531/233B ~~3655/329A~~ ~~3660/332~~ ~~3661/332A~~	585-610 RADIONAVIGATION 3658/330B 3665/336 3666/337
606-790 BROADCASTING 3654/329 3656/330 3657/330A 3659/331 3660/332 3661/332A	614-806 BROADCASTING ~~3655/329A~~ 3661/332A	610-890 FIXED MOBILE BROADCASTING 3658/330B 3660/332 3661/332A 3667/338 3668/339
790-890 FIXED BROADCASTING 3654/329 3659/331 3662/333 3663/334	806-890 BROADCASTING MOBILE ~~3660/332~~ ~~3661/332A~~ ~~3655/329A~~ 3655A	

MOD 3660/332 In Region 1, except the African Broadcasting Area*, the band 606-614 MHz, and in Region 3, the band 610-614 MHz may be used by the radio astronomy service. Administrations shall avoid using the band concerned for the broadcasting service as long as possible, and thereafter, as far as practicable, shall avoid the use of such effective radiated powers as will cause harmful interference to radio astronomy observations.

~~In Region 2, the band 608-614 MHz is reserved exclusively for the radio astronomy service until the first Administrative Radio Conference after 1 January 1974 which is competent to review this provision; however, this provision does not apply to Cuba.~~

ADD 3655A In Region 2, the band 806-890 MHz is also allocated to the mobile satellite service for the use and development of systems using space radiocommunication techniques. Such use and development is subject to agreement and coordination between the administrations concerned and those having services operating in accordance with the Table which may be affected.

Reasons:

1) MOD 3660/332 is consequential to the allocation proposals.
2) For MOD 3531/233B refer to the band 37.5-38.25 MHz.
3) To accommodate terrestrial mobile and mobile satellite services in these bands.

MHz

Region 1	Region 2	Region 3
890-942 FIXED BROADCASTING Radiolocation	890 ~~-942~~ 902 FIXED ~~RADIOLOCATION~~ Radiolocation 3669/339A ~~3670/340~~	890-942 FIXED MOBILE BROADCASTING Radiolocation
	902-928 FIXED ~~RADIOLOCATION~~ Radiolocation Amateur 3669/339A 3670/340	
	928-942 FIXED ~~RADIOLOCATION~~ Radiolocation	
3654/329 3659/331 3662/333 3669/339A	3669/339A ~~3670/340~~	3668/339 3669/339A

Reasons:

1) The Radiolocation Service in the bands from 890 MHz to 942 MHz in Region 2 no longer seem to require primary category allocations; secondary category allocations would permit Radiolocation to operate as in Regions 1 and 3. This modification would then allow for the unihibited development of the Fixed Service in these bands.

2) The secondary category allocation to the Amateur Service at 902-928 MHz reflects the stated needs of this Service.

MHz

Region 1	Region 2	Region 3
1215-~~1300~~ 1240	RADIONAVIGATION-SATELLITE (Space-to-Earth) RADIOLOCATION Amateur 3672/342 3673/343 3674/344 3675/345 3675A	
1240-1300	RADIOLOCATION Amateur 3644/320A 3672/342 3673/343 3674/344 3675/345 3675A 3676A	
1300-1350	AERONAUTICAL RADIONAVIGATION 3676/346 Radiolocation 3677/347 3678/348	
1350-1400 FIXED MOBILE 3676/346 RADIOLOCATION 3676A 3679/349 3680/349A	1350-1400 RADIOLOCATION 3676/346 3676A 3679/349 3680/349A	

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ADD 3675A In the bands 1215-1300 MHz, 3100-3300 MHz, 8550-8650 MHz, and 13.4-14.0 GHz, radar operations may be authorized in the earth exploration-satellite (active sensor) and earth exploration (active sensor) services, providing they do not introduce constraints, and do not cause harmful interference to operations in the radiolocation service. Such use and development is subject to agreement and coordination between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

MOD 3676/346 The use of the bands 1300-~~1350~~ 1365 MHz, 2700-2900 MHz and 9000-9200 MHz by the aeronautical radionavigation service is restricted to ground-based radars and, in the future, to associated airborne transponders which transmit only on frequencies in these bands and only when actuated by radars operating in the same band.

ADD 3676A In Canada and the U.S.A. the bands 1240-1300 MHz and 1350-1365 MHz are also used by the aeronautical radionavigation service.

MOD 3679/349 In ~~Region 2 and~~ Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the existing installations of the radionavigation service may continue to operate, temporarily, in the band 1350-1400 MHz.

MOD 3680/349A Radio astronomy observations on the Hydrogen line displaced towards lower frequencies are carried out in a number of countries under national arrangements. Administrations ~~should bear in mind the needs of the radio astronomy service in their future planning of~~ are urged to give all practicable protection in the band 1350-1400 MHz for research in radio astronomy.

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Reasons:

1) To provide radio spectrum at 1215-1240 MHz on a world-wide basis for the Radionavigation-Satellite service and the development of a global position satellite system.

2) Footnote 3644/320A would allow Amateur-Satellite operations in the 1290-1300 MHz bands. (Refer to the band 435-438 MHz.)

3) The bands for the Earth Exploration (Active Sensor) and for the Earth Exploration-Satellite (Active Sensor) services mentioned in ADD 3675A were selected because of the similar characteristics of these services and that of the Radiolocation service and that this similarity would contribute to the compatible operation of these two new services in the bands indicated. These bands are required for multi-frequency radars used for the measurement of land features, ocean conditions such as wave height and wind speed and meteorological parameters such as rain and snow.

4) ADD 3676A is to provide flexibility for aeronautical radionavigation radars. In addition, the recent ICAO/COMDIV meeting also recognized this requirement for expanded radar use.

5) MOD 3676/346 and MOD 3679/349 is to provide additional spectrum required for the Aeronautical Radionavigation service.

6) MOD 3680/349A is to emphasize the ever-increasing importance of radio astronomy observations of the red-shifted Hydrogen line and the need for increased protection of these observations.

MHz

Region 1	Region 2	Region 3
1400-1427		
	EARTH EXPLORATION (Passive Sensor)	
	EARTH EXPLORATION-SATELLITE (Passive Sensor)	
	RADIO ASTRONOMY	
	3815/412J	

MOD 3815/412J All intentional emissions in the bands 1400-1427 MHz, 2690-2700 MHz, 10.68-10.7 GHz, 15.35-15.45 GHz, 23.6-24.0 GHz, 31.3-31.5 GHz, 31.5-31.8 GHz, 50-51 GHz, 51-52 GHz, 52-54.25 GHz, 54.25-58.2 GHz, 58.2-59 GHz, 64-65 GHz, 86-92 GHz, 100-101 GHz, 101-102 GHz, ~~130~~ 139-140 GHz, 182-185 GHz and 230-240 GHz are prohibited. The use of passive sensors by other services is also authorized in these bands and such use shall be protected from interference to the same extent as for the services to which these bands are allocated. In sofar as the bands 2690-2700 MHz, 23.6-24.0 GHz and the band 31.3-31.8 GHz, footnotes 3717/363, 3719/364A, 3720/364B, 3790/405C, 3792/407 and 3806/412A may take precedence.

Reason: To provide additional spectrum for passive sensors compatible with radio astronomy needs.

MHz

Region 1	Region 2	Region 3
1427-1429		
	SPACE OPERATIONS (Telecommand) 3680A	
	FIXED	
	MOBILE except aeronautical mobile	

ADD 3680A All space-to-earth transmissions are prohibited in this band.

Reason: The new footnote 3680A makes clear the need to eliminate space-to-earth transmissions in this band adjacent to the radio astronomy band 1400-1427 MHz. It is necessary to eliminate any ambiguity in the direction of transmission in the Space Operations (Telecommand) Service.

MHz

Region 1	Region 2	Region 3
1429-1525 FIXED MOBILE except aeronautical mobile	1429-1435 FIXED MOBILE	1429-1525 FIXED MOBILE
	1435-1525 MOBILE ~~Fixed~~ FIXED	

Reason: To provide additional spectrum for the Fixed Service on a primary basis to meet the growing demand of this service.

MHz

Region 1	Region 2	Region 3
1525-1535 SPACE OPERATION (Telemetering and Tracking) ~~3681/350A~> FIXED 3682/350B Earth Exploration-Satellite Mobile except aeronautical mobile 3683/350C	1525-1535 SPACE OPERATION (Telemetering and Tracking) ~~3681/350A~> Earth Exploration-Satellite Fixed Mobile 3684/350D	1525-1535 SPACE OPERATION (Telemetering and Tracking) ~~3681/350A~> FIXED 3682/350B Earth Exploration-Satellite Mobile

SUP 3681/350A

Reason: Consequential to the amendments in the Table since mention of tracking is more appropriate in the Table.

MHz

Region 1	Region 2	Region 3
1535-~~1542.5~~ 1550 MARITIME MOBILE-SATELLITE (Space-to-Earth) 3684A 3684B 3685/352 3688/352D 3689/352E		
~~1542.5-1543.5~~ ~~AERONAUTICAL MOBILE-SATELLITE (R)~~ ~~MARITIME MOBILE-SATELLITE~~ ~~3685/352 3688/352D 3690/352F~~		
~~1543.5~~ 1550-1558.5 AERONAUTICAL MOBILE-SATELLITE (R) (Space-to-Earth) 3685/352 3688/352D 3691/352G		
1558.5-~~1636.5~~ 1565 ~~AERONAUTICAL RADIONAVIGATION~~ AERONAUTICAL MOBILE-SATELLITE (R) (Space-to-Earth) 3685/352 ~~3686/352A~~ ~~3687/352B~~ 3688/352D 3691/352G ~~3695/352K~~		
1565-1590 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Space-to-Earth) 3685/352 ~~3686/352A~~ 3687/352B ~~3688/352D 3695/352K~~		
1590-1624 AERONAUTICAL RADIONAVIGATION AERONAUTICAL RADIONAVIGATION-SATELLITE 3685/352 ~~3686/352A~~ 3687/352B 3688/352D 3695/352K		

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1624-1625	~~AERONAUTICAL-RADIONAVIGATION~~ MOBILE-SATELLITE (Space-to-Earth) AUXILIARY-SATELLITE (Space-to-Earth) ~~3685/352 3686/352A 3687/352B 3688/352D~~ 3691A
~~1558.5~~ 1625-1636.5	~~AERONAUTICAL-RADIONAVIGATION~~ MARITIME MOBILE-SATELLITE (Earth-to-Space) 3684A 3685/352 ~~3686/352A 3687/352B~~ 3688/352D 3689/352E ~~3695/352K~~
1636.5-~~1644~~ 1645	MARITIME MOBILE-SATELLITE (Earth-to-Space) 3684A 3685/352 3688/352D 3689/352E ~~3692/352H~~
~~1644-1645~~	~~AERONAUTICAL-MOBILE-SATELLITE-(R)~~ ~~MARITIME-MOBILE-SATELLITE~~ ~~3685/352 3688/352D 3693/352I~~
1645-1660	AERONAUTICAL MOBILE-SATELLITE (R) (Earth-to-Space) 3685/352 3688/352D 3691/352G ~~3694/352J~~

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ADD 3684A The bands 1535-1550 MHz and 1625-1645 MHz may also be authorized for use by the mobile-satellite service. The use and development of this service shall be subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

Reason: A new footnote ADD 3684A has been proposed to provide for an increased operational flexibility in the use of maritime mobile-satellite systems taking into account that this increased flexibility is particularly desirable in the remote areas of the world where space techniques offer a viable solution to numerous social needs. The additional 5 MHz upband in both the mobile-satellite service and the maritime mobile-satellite service is to provide unidirectional data transfer.

ADD 3684B Satellite systems for search and rescue operations may utilize a band 1542.5-1543.5 MHz (in the space-to-earth direction) until January 1, 1990. Administrations are urged to take all practicable steps to ensure that no interference will be caused to such systems.

Reason: To allow for the establishment of the first generation Search and Rescue Satellite system.

MOD 3686/352A The bands ~~1558.5-1636.5 4200-4400 MHz,~~ 5000-5250 MHz and ~~15.4-15.7~~ 15.45-15.75 GHz are reserved on a world-wide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities.

Reason: The intent of No. 3686/352A insofar as the band 1558.5-1636.5 MHz is concerned is now reflected in the proposed amendment to the Table. Insofar as the band 4200-4400 MHz is concerned, this band is being proposed ~~for~~ exclusive use of airborne radio altimeters (see ADD 3743A).

MOD 3687/352B The bands ~~1558.5-1636.5~~ 1565-1624 MHz, 5000-5250 MHz and ~~15.4-15.7~~-15.45-15.75 GHz are also allocated to the aeronautical mobile (R) service for use and development of systems using space radiocommunication techniques. Such use and development is subject to agreement and coordination between the administrations concerned and thosehaving services, operating in accordance with the Table, which may be affected.

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MOD 3689 352E The use of the ~~band~~ bands 1535-~~1542.5~~ 1550 MHz and 1625-1645 MHz, is limited to ~~transmission from space to earth stations in~~ the maritime mobile satellite service for communications and/or radiodetermination purposes. ~~Transmissions from coast stations direction to ship stations, or between ship stations, are also authorized when such transmissions are used to extend or supplement the satellite to ship links.~~ Earth stations located on structures, other than ships, operating in the marine environment may also utilize these bands subject to agreement between Administrations concerned.

Reason: Direction of transmission incorporated in Table. Use of these bands in the Maritime Mobile Satellite service is primarily for connection between ships and satellites but, subject to agreement between Administrations concerned, may also be used by earth stations on structures, other than ships, in the maritime environment, as set forth in Article 7 of the Convention of the International Maritime Satellite Organization.

SUP 3690 352F

Reason: No longer a shared band. Text incorporated in MOD 3689/352E and MOD 3691/352G.

MOD 3691/352G The use of the band bands ~~1543.5-1558.5~~ 1550-1565 MHz and 1645-1660 MHz is limited to ~~transmission from space to earth stations in~~ the aeronautical mobile-satellite (R) service for communication and/or radiodetermination purposes. This includes transmissions between space stations and earth stations at fixed points when such transmissions are used to extend or supplement the links between aircraft and satellites. Transmissions ~~from~~ between terrestrial aeronautical stations ~~directly to~~ and aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the ~~satellite to aircraft~~ links between aircraft and satellites.

Reason: Modifications to footnote 352G are to remove possible constraints or the use of the aeronautical mobile satellite (R) bands for communication between earth stations used in that service. Direction of transmission is included in the Table

ADD 3691A The band 1624-1625 MHz is reserved solely for the use and development of distress and safety systems using space techniques.

Reason: To provide a satellite downlink for EPIRB systems.

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SUP 3692/352H

Reason: Direction of transmission incorporated in Table, text incorporated in MOD 3689/352E.

SUP 3693/352I

Reason: As for 3690/352F

SUP 3694/352J

Reason: Direction of transmission incorporated in Table, text incorporated in MOD 3691/352G.

MOD 3695/352K Radio astronomy observations on important spectral lines due to the hydroxyl ~~radicle~~ radical OH at frequencies 1612.231 MHz and 1720.530 MHz are carried out in a number of countries under national arrangements; the bands observed being ~~1611.5-1612.5~~ 1610.6-1613.8 MHz and 1720-1721 MHz respectively. Administrations ~~should bear in mind the needs of the radio astronomy service in their future planning of the bands 1558.5-1636.5 MHz and 1710-1770 MHz~~ are urged to give all practicable protection to the radio astronomy service in the bands 1610.6-1613.8 MHz and 1720-1721 MHz.

Reason: To provide additional protection for the Radio Astronomy service.

General Reasons for modifications to the 1535-1660 MHz bands

1) The allocations to the maritime mobile-satellite service have been expanded to take account of recent traffic projections. Provision has been made for operation of search and rescue satellite systems (e.g., SARSAT) through a new allocation at 1624-1625 MHz (see ADD 3691A). The above-noted changes have been accomplished through a reduction in the allocation to aeronautical radionavigation (originally 1558.5-1636.5 MHz) which, it is believed, will not be technically deleterious to known services operating, or planned to operate, within this band.

2) The requirements of Global Position System (GPS) Navstar have been recognized by the inclusion of radionavigation-satellite in the aeronautical radio navigation band.

MHz

Region 1	Region 2	Region 3
1660-~~1670~~ 1664.4 METEOROLOGICAL AIDS RADIO ASTRONOMY 3696/353A 3697/354 3698/354A 3699/354B		
1664.4-1668.4 ~~METEOROLOGICAL AIDS~~ RADIO ASTRONOMY 3696/353A 3697/354 3698/354A 3699/354B		
1668.4-1670 METEOROLOGICAL AIDS RADIO ASTRONOMY 3696/353A 3697/354 3698/354A 3699/354B		

MOD 3696/353A In view of the successfull detection by astronomers of two hydroxyl spectral lines in the regions of 1665 MHz and 1667 MHz, administrations are urged to give all practicable protection in the band 1660-1670 MHz for ~~future~~ research in radio astronomy ~~particularly by eliminating air-to-ground transmissions in the meteorological aids service in the band 1664.4-1668.4 MHz as soon as practicable.~~

Reason: To continue the process begun at the 1971 WARC of eliminating airborne transmitters of the Meteorological Aids service from this band which is important to the Radio Astronomy service.

MHz

Region 1	Region 2	Region 3
1670-1690		
	METEOROLOGICAL AIDS	
	FIXED	
	METEOROLOGICAL-SATELLITE (Space-to-Earth) ~~3629/324A~~ 3701A	
	MOBILE except aeronautical mobile	
	3697/354	

SUP 3629/324A

ADD 3701A It is intended that meteorological-satellite space stations operating in the band 1670-1690 MHz shall transmit to selected earth stations. The location of such earth stations is subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

Reason: In order to locate the footnote more sequentially, 3629/324A has been renumbered 3701A. The wording of the footnote remains unchanged.

MHz

Region 1	Region 2	Region 3
1710-1770	1710-1770	
FIXED	FIXED	
Mobile	MOBILE	
3695/352K 3702/356	3695/352K 3703/356A	

Reason: For MOD 3695/352K refer to the band 1590-1624 MHz.

MHz

Region 1	Region 2	Region 3
2300-~~2450~~ 2350 FIXED Amateur 3644/320A Mobile Radiolocation MARITIME RADIO-NAVIGATION 3711A ~~3709/357~~ 3710/358 3711/359	2300-~~2450~~ 2350 RADIOLOCATION Amateur 3644/320A Fixed Mobile MARITIME RADIONAVIGATION 3711A ~~3709/357~~ 3712/360	
2350-2450 FIXED Amateur Mobile Radiolocation 3709/357 3710/358 3711/359	2350-2450 RADIOLOCATION Amateur Fixed Mobile 3709/357 3712/360	

ADD 3711A In the band 2300-2350 MHz the Maritime Radionavigation service is limited to shore-based radars.

Reason: To provide an allocation for use by shore-based radars in geographical areas where heavy rainfall precludes the use of higher bands.

Footnote 3644/320A would allow the amateur-satellite operations in the bands 2300-2310 MHz. (Refer to the band 435-438 MHz.)

MHz

Region 1	Region 2	Region 3
2500-~~2550~~ 2535 FIXED 3721/364C MOBILE except aeronautical mobile BROADCASTING-SATELLITE 3715/361B AUXILIARY-SATELLITE (Space-to-Earth) 3714/361A 3716/362 3724/364F	2500-2535 FIXED 3721/364C FIXED-SATELLITE (Space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 3715/361B AUXILIARY-SATELLITE (Space-to-Earth) 3714/361A 3715/361B 3723/364E 3724/364F	
2535-2550	FIXED 3721/364C MOBILE except aeronautical mobile BROADCASTING-SATELLITE 3715/361B FIXED-SATELLITE (Space-to-Earth) 3714/361A 3716/362 3723/364E 3724/364F	
2550-2655	FIXED 3721/364C MOBILE except aeronautical mobile BROADCASTING-SATELLITE 3715/361B FIXED-SATELLITE (Space-to-Earth) 3716/362 3717/363 3718/364 3723/364E 3724/364F	

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2655-2690 FIXED 3721/364C 3722/364D MOBILE except aeronautical mobile AUXILIARY-SATELLITE (Earth-to Space) BROADCASTING-SATELLITE 3715/361B ~~3726/364H~~ Earth Exploration (Passive Sensor) Earth Exploration-Satellite (Passive (Sensor) 3717/363 3718/364 3724/364F ~~3725/364G~~	2655-2690 FIXED 3721/364C 3722/364D FIXED-SATELLITE ~~(Earth-to-Space)~~ (Space-to-Earth) MOBILE except aeronautical mobile AUXILIARY-SATELLITE (Earth-to-Space) BROADCASTING-SATELLITE 3715/361B ~~3726/364H~~ Earth Exploration (Passive Sensor) Earth Exploration-Satellite (Passive Sensor) 3723/364E 3724/364F ~~3725/364G~~

Reasons for changes to the Table

1) The Auxiliary-Satellite Service allocations are proposed on a world-wide basis to provide an allocation for that newly-defined service. (see ADD 3102A Article N1/1 in these proposals)

2) The Earth-exploration and Earth-exploration-satellite allocations are proposed on a secondary basis to provide a necessary wider bandwidth for these services.

3) The fixed-satellite Space-to-Earth allocations are broadened to include the entire 2500-2690 MHz bands to correspond to that of the broadcasting-satellite allocation so that new services such as tele-education and tele-health can be provided in this band by satellite whether they fall under the fixed-satellite service or the broadcasting-satellite service.

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MOD 3723/364E The use of the ~~bands 2500-2535 MHz and 2655-2690 MHz~~ band 2500-2690 MHz by the fixed-satellite service is limited to domestic and regional systems and such use is subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Articles N11 and N13/9A). ~~In the direction space-to-Earth, the~~ The power flux density at the Earth's surface shall not exceed the values given in No. 6055/470NE.

Reason: In accordance with associated changes in the Table.

SUP 3725/364G

SUP 3726/364H

Reason: The suppression of 3725/364G and 3726/364H is consequential to the proposed deletion of Radio Astronomy in the band 2690-2700 MHz.

MHz

Region 1	Region 2	Region 3
2690-2700		
	~~RADIO-ASTRONOMY~~	
	EARTH EXPLORATION-SATELLITE (Passive Sensor)	
	EARTH EXPLORATION (Passive Sensor)	
	~~3531/233B~~ 3717/363 3719/364A 3720/364B 3815/412J	

Reasons: This proposal is one of several in the frequency range extending up to approximately 40 GHz, designed to specify, along with existing allocations and other proposals, a suitably distributed series of allocations to the Earth Exploration Services for the passive remote sensing of earth surface and atmospheric constituents and parameters. In combination, these bands provide the spread of frequencies for the operation of multifrequency radiometers in the measurement of water salinity, sea ice, snow-and ice morphology, soil moisture, cloud, rain, and water vapour. The multitude of bands is needed to estimate the separate radiant sources where the individual spectra are broad and overlapping.

The reason for deleting Radio Astronomy in the above bands is that the band is too narrow and an alternative band 3325-3360 MHz is proposed.

MHz

Region 1	Region 2	Region 3
2700-2900		
	AERONAUTICAL RADIONAVIGATION 3676/346	
	Radiolocation	
	3727/366 3727A	

ADD 3727A In the band 2850-2900 MHz shore-based radars used for maritime radionavigation purposes are authorized to operate on a permitted basis.

Reason: The addition of 3727A would provide for shore-based radars for maritime radionavigation operations.

MHz

Region 1	Region 2	Region 3
3100-3300 RADIONAVIGATION RADIOLOCATION 3675A 3697/354 ~~3731/368~~ ~~3732/369~~ 3733A		
3300-~~3400~~ 3325 RADIOLOCATION 3733/370 3734/371	3300-~~3400~~ 3325 RADIOLOCATION Amateur 3739/376	
3325-3360 RADIOLOCATION RADIO ASTRONOMY 3733/370 3733A 3734/371	3325-3360 RADIOLOCATION RADIO ASTRONOMY Amateur 3733A 3739/376	
3360-3400 RADIOLOCATION 3733/370 3734/371	3360-3400 RADIOLOCATION Amateur 3644/320A 3739/376	

SUP 3731/368

SUP 3732/369

ADD 3733A Radio astronomy observations on the important spectral lines due to the CH radical at frequencies of 3263.788 MHz, 3335.475 MHz and 3349.185 MHz are being carried out in a number of countries. Administrations are urged to give all practicable protection to the radio astronomy service for spectral line and continuum observations in the band 3325-3360 MHz and for spectral line observations in the band 3261.8-3265.8 MHz.

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Reasons

1) The allocation proposed for the Radionavigation service in the 3100-3300 MHz band is to provide for additional requirements needed for this service in this part of the spectrum.

2) The addition of footnote 3675A in the band 3100-3300 MHz would allow for radar operations in the Earth Exploration (Active Sensor) and the Earth Exploration-Satellite (Active Sensor) services under certain conditions. (Refer to the band 1215-1300 MHz)

3) Footnote 3732/369 has been deleted as a consequence of the proposal for the band 3100-3300 MHz.

4) Protection is needed for radio astronomy observations of the three important spectral lines of the CH radical. In addition, the existing allocation at 2690-2700 MHz is too narrow and can be released in favour of a wider allocation which also provides protection for two of the three CH spectral lines.

5) The suppression of footnote 3731/368 in the band 3100-3300 MHz is consequential to the addition of the Radionavigation service in this band.

6) The addition of footnote 3644/320A in the band 3360-3400 MHz would provide for Amateur-Satellite operations between 3390-3400 MHz. (Refer to the band 435-438 MHz)

MHz

Region 1	Region 2	Region 3
3400- ~~3600~~ 3500 FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE Radiolocation 3735/372 3736/373 3737/374 3738/375	3400-3500 FIXED-SATELLITE (Space-to-Earth) RADIOLOCATION Amateur 3739/376	
3500-3600 FIXED ~~FIXED-SATELLITE (Space-to-Earth)~~ MOBILE Radiolocation AUXILIARY-SATELLITE (Space-to-Earth) 3735/372 3736/373 3737/374	3500- ~~3700~~ 3600 FIXED ~~FIXED-SATELLITE (Space-to-Earth)~~ MOBILE ~~RADIOLOCATION~~ AUXILIARY-SATELLITE (Space-to-Earth) Radiolocation	3500-~~3700~~ 3600 ~~FIXED-SATELLITE (Space-to-Earth)~~ ~~RADIOLOCATION~~ Fixed Mobile AUXILIARY-SATELLITE (Space-to-Earth) Radiolocation 3740/377
3600-~~4200~~ 3700 FIXED FIXED-SATELLITE (Space-to-Earth) 3741A Mobile AUXILIARY-SATELLITE (Space-to-Earth) 3737/374	3600-3700 FIXED FIXED-SATELLITE (Space-to-Earth) 3741A MOBILE AUXILIARY-SATELLITE (Space-to-Earth) ~~RADIOLOCATION~~ Radiolocation	3600-3700 FIXED-SATELLITE (Space-to-Earth) 3741A ~~RADIOLOCATION~~ AUXILIARY-SATELLITE (Space-to-Earth) Fixed Mobile Radiolocation 3740/377 3741/378

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3700-4200 FIXED FIXED-SATELLITE (Space-to-Earth) Mobile 3737/374	3700-4200 FIXED FIXED-SATELLITE (Space-to-Earth) Mobile 3742/379	

ADD 3741A In the bands 3600-3700 MHz and 6425-6525 MHz the fixed-satellite service is restricted to single-channel-per-carrier or other frequency-division multiple-access systems.

Reason:

1) The Auxiliary-Satellite Service is added on a primary basis in the 3500-3700 MHz band to provide space-to-earth feeder links between mobile satellites of various types and their earth stations at specified fixed locations.

2) The Fixed-Satellite Service in the band 3600-3700 MHz is restricted to thin route applications (eg. SCPC or FDMA systems), to facilitate frequency and orbit sharing with the basically narrow band Auxiliary-Satellite Service.

3) In order to facilitate the development of space services in the band 3500-3700 MHz, the primary category allocation to the radiolocation service has been reduced to secondary. Secondary category to radiolocation is deemed adequate to meet the future developments of this service.

MHz

Region 1	Region 2	Region 3
4200-4400		
	AERONAUTICAL RADIONAVIGATION	
	~~3686/352A~~ 3743/379A 3743A 3744/381 3745/382 ~~3748/383~~	

ADD 3743A The use of the band 4200-4400 MHz by the aeronautical radionavigation service is reserved exclusively for airborne radio altimeters.

Reason: The addition of footnote 3743A and the deletion of the provisions of 3686/352A as they apply to the above band, is consequential to the specific requirements of the Aeronautical Radionavigation service.

MHz

Region 1	Region 2	Region 3
4400-4700	FIXED 3721/364C FIXED-SATELLITE (Earth-to-Space, Space-to-Earth) 3745A	

MOD 3721/364C When planning new tropospheric scatter radio-relay links in the bands 2500-2690 MHz and 4400-4700 MHz, all possible measures shall be taken to avoid directing the antennae of those links towards the geostationary satellite orbit.

Reason: To allow effective sharing of the band 4400-4700 MHz by the different services allocated to that band on a primary basis.

ADD 3745A In Region 2 the fixed-satellite service in the band 4400-4700 MHz is limited to international systems in the space-to-Earth direction and to domestic systems in the Earth-to-space direction.

Reason: To provide a frequency allocation for fixed-satellite systems in the space-to-Earth direction in response to an international requirement and also an Earth-to-space Fixed-Satellite Service allocation for domestic systems. In Region 2 this can be accommodated by using different orbital positions for the different services.

MHz

Region 1	Region 2	Region 3
4700-~~4990~~ 4810 FIXED MOBILE FIXED-SATELLITE (Space-to-Earth) ~~3531/233B~~ 3697/354		
4810-4850 FIXED MOBILE ~~3531/233B~~ ~~3697/354~~ 3746/382A		
4850-4900 FIXED MOBILE FIXED-SATELLITE (Space-to-Earth) ~~3531/233B~~ ~~3697/354~~		
4900-4950 FIXED MOBILE ~~3531/233B~~ ~~3697/354~~		
4950-4990 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 3531/233B ~~3697/354~~ ~~3746/382A~~ ~~3747/382B~~		

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MHz		
4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 3531/233B	4990-5000 RADIO ASTRONOMY FIXED MOBILE except aeronautical mobile 3531/233B ~~3749/383A~~	4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 3531/233B

MOD 3746/382A Radio astronomy observations on the formaldehyde line (rest frequency 4829.649 MHz) are being carried out in a number of countries under national arrangements. Administrations ~~should bear in mind the needs of the radio astronomy service in their future planning of the band 4825-4835 MHz.~~ are urged to give all practicable protection to the radio astronomy service in the band 4826.6-4832.6 MHz.

SUP 3747/382B

SUP 3749/383A

Reasons:

1) To provide spectrum at 4700-4810 MHz and at 4850-4900 MHz for the expansion of the Fixed-Satellite service.

2) The importance of the spectral line of formaldehyde to radio astronomy is emphasized by strengthening footnote 3746/382A.

3) The proposed additional spectrum 4950-4990 MHz to Radio Astronomy and MOD 3531/233B (see the band 37.5-38.25 MHz) reflect the requirements for this service.

4) MOD 3746/382A, SUP 3749/383A, SUP 3747/382B are consequential to the proposed changes in the Table between 4950 and 5000 MHz.

5) Footnote 3697/354 does not apply above 4810 MHz.

6) In the bands 4950-5000 MHz, the mobile service is proposed for use only by transmitters on the earth's surface because of the difficulty of sharing air to ground frequencies with the radio astronomy service.

MHz

Region 1	Region 2	Region 3
5000-5250		
AERONAUTICAL RADIONAVIGATION		
3686/352A 3687/352B 3750/383B		

MOD 3750/383B The bands 5000-5250 MHz ~~is~~ and 15.45-15.75 GHz are also allocated to the ~~fixed-satellite-service~~ auxiliary-satellite service for connection between one or more earth stations at ~~specified~~ fixed points on the Earth and satellites used by the aeronautical mobile (R) service and/or the radiodetermination service. Such use and development shall be subject to agreement and coordination between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

Reason:

1) To make provision for the use of wideband signal format on aeronautical satellites operating in the 5 and 15 GHz range.

2) For MOD 3686/352A and 3687/352B, refer to the proposals for the bands 1535-1660 MHz.

MHz

Region 1	Region 2	Region 3
5650-5670		
	RADIOLOCATION	
	Amateur 3644/320A	
	3756/388 3757/389	

Reason: MOD 3644/320A will provide for operation for the Amateur-Satellite Service throughout this band. (Refer to the band 435-438 MHz.)

MHz

Region 1	Region 2	Region 3
5725-5850 FIXED-SATELLITE (Earth-to-Space) RADIOLOCATION Amateur 3697/354 3756/388 3759/390 3760/391 3761/391A	5725-~~5850~~ 5825 RADIOLOCATION Amateur 3757/389 3760/391 3761/391A	
	5825-5850 RADIOLOCATION FIXED-SATELLITE (Earth-to-Space) Amateur 3757/389 3760/391 ~~3761/391A~~	
5850-5925 FIXED FIXED-SATELLITE (Earth-to-Space) MOBILE 3760/391	5850-5925 RADIOLOCATION FIXED-SATELLITE (Earth-to-Space) Amateur 3760/391	5850-5925 FIXED FIXED-SATELLITE (Earth-to-Space) MOBILE Radiolocation 3760/391
5925-6425 FIXED FIXED-SATELLITE (Earth-to-Space) MOBILE		
6425-~~7250~~ 6525 FIXED-SATELLITE (Earth-to-Space) 3741A AUXILIARY-SATELLITE (Earth-to-Space) FIXED MOBILE 3743/379A ~~3762/392AA~~ 3767/393		
6525-6625 AUXILIARY-SATELLITE (Earth-to-Space) FIXED MOBILE 3767/393		

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MHz

6625-7125	FIXED MOBILE FIXED-SATELLITE (Earth-to-Space) ~~3762/392AA~~ 3767A
7125-7250	FIXED MOBILE ~~3762/392AA~~ 3763/392B 3767A

SUP 3762/392AA

ADD 3767A The band 6625-7250 MHz may be used for operations in the Earth Exploration-Satellite (Passive Sensors) and the Earth Exploration (Passive Sensors) Services. Administrations should bear in mind the needs of these passive operations in their future planning of this band.

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Reasons:

1) In conjunction with proposals for fixed satellite allocation between 3600 and 4700 MHz, to provide for the expansion of the fixed satellite services in the 5825-6525 MHz bands.

2) In conjunction with the proposal in the 3500 to 3700 MHz band, to provide an up band for the Auxiliary-Satellite Service at 6425-6625 MHz.

3) The proposed allocation to the Fixed-Satellite Service at 6625-7125 MHz is to provide for the expansion of international fixed-satellite services.

4) Re ADD 3741A, refer to the band 3600-3700 MHz.

5) Re SUP 3762/392AA, the need for this footnote appears no longer required particularly in view of the proposed above amendments to the Table.

6) Re ADD 3767A, these passive operations would be carried out to study both land and ocean features.

MHz

Region 1	Region 2	Region 3
7250-7300		
	FIXED-SATELITE (Space-to-Earth)	
	MOBILE-SATELLITE (Space-to-Earth)	
	~~3764/392D~~ 3765/392G	
7300-7450		
	FIXED	
	FIXED-SATELLITE (Space-to-Earth)	
	MOBILE	
	~~3764/392D~~	
7450-7550		
	FIXED	
	FIXED-SATELLITE (Space-to-Earth)	
	METEOROLOGICAL-SATELLITE (Space-to-Earth)	
	MOBILE	
	~~3764/392D~~	
7550-7750		
	FIXED	
	FIXED-SATELLITE (Space-to-Earth)	
	MOBILE	
	~~3764/392D~~	
7975-8025		
	FIXED-SATELLITE (Earth-to-Space)	
	MOBILE-SATELLITE (Earth-to-Space)	
	3766/392H	

SUP 3764/392D

Reasons:

1) There is a requirement to operate mobile earth stations in conjunction with fixed earth stations operating in the bands 7250-7300 MHz and 7975/8025 MHz.

2) It is proposed to suppress 3764/392D since the use of passive satellites appears to have outlived their usefulness.

MHz

Region 1	Region 2	Region 3
8500-8750	RADIOLOCATION 3675A 3697/354 3772/395	
8750-8850	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 3773/396 3774/397	
8850-9000	MARITIME RADIONAVIGATION 3774/397 3774A RADIOLOCATION 3775/398	
9000-9200	AERONAUTICAL RADIONAVIGATION 3676/346 Radiolocation 3774/397	
9200-9300	MARITIME RADIONAVIGATION 3774/397 3774A RADIOLOCATION 3775/398	
9500-9800	RADIONAVIGATION RADIOLOCATION ~~3775/398~~	

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MOD 3774/397 In Belgium, France, the Netherlands and the F.R. of Germany, the bands 8825-~~9225~~ 8850 MHz and 9000-9200 MHz ~~is~~ are also allocated to the maritime radionavigation service noting that in these countries all the bands from 8825 MHz to 9225 MHz are for use by shore-based radars.

ADD 3774A In the bands 8850-9000 MHz and 9200-9300 MHz the Maritime Radionavigation Service is limited to shore-based radars.

MOD 3775/398 In Albania, Austria, Bulgaria, Hungary, Poland, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the bands 8850-9000 MHz, and 9200-9300 MHz ~~and 9500-9800 MHz~~ are also allocated to the radionavigation service.

Reasons:

1) The amendments to the bands 8850-9000 MHz, 9200-9300 MHz and 9500-9800 MHz are to provide for the increasing requirements of each of the Maritime Radionavigation and the Radionavigation Services in this area of the spectrum. The amendment to footnote 3774/397 and the suppression of the band 9500-9800 MHz in footnote 3775/398 are consequential to the above proposals.

2) ADD 3774A is to provide for shore-based radars for Maritime Radionavigation purposes in geographical areas where the adjacent band 9300-9500 MHz is congested by mobile stations in the primary service.

3) ADD 3675A refer to the band 1215-1300 MHz.

MHz

Region 1	Region 2	Region 3
10000-10500		
	RADIOLOCATION	
	Amateur 3644/320A	
	3779/401A 3780/402 3781/403	

Reason: MOD 3644/320A would provide for the operation of amateur-satellites in the 10475-10500 MHz. (Refer to the band 435-438 MHz)

GHz

Region 1	Region 2	Region 3
10.6-10.68		
	FIXED	
	MOBILE except aeronautical mobile	
	RADIO ASTRONOMY	
	EARTH EXPLORATION (Passive Sensors)	
	EARTH EXPLORATION-SATELLITE (Passive Sensors)	
	Radiolocation	
	3783/404A	
10.68-10.7		
	RADIO ASTRONOMY	
	EARTH EXPLORATION (Passive Sensors)	
	EARTH EXPLORATION-SATELLITE (Passive Sensors)	
	3784/405B 3815/412J	

Reasons

1) To provide for additional spectrum for passive sensor operations.

2) For MOD 3815/412J refer to the band 1400-1427 MHz.

3) Insofar as the band 10.6-10.68 GHz is concerned, frequency sharing between aeronautical mobile service (air-ground) and the radio astronomy service need to be avoided.

GHz

Region 1	Region 2	Region 3
10.7-10.95		
	FIXED	
	MOBILE	
	FIXED-SATELLITE (Space-to-Earth) 3783A	
11.2-11.45		
	FIXED	
	MOBILE	
	FIXED-SATELLITE (Space-to-Earth)	

ADD 3783A Administrations are urged, in their planning of the band 10.7-10.95 GHz for the Fixed-Satellite service, to give all practicable protection to the passive operations in the adjacent bands 10.6-10.68 and 10.68-10.7 GHz.

Reasons:

1) The addition of Fixed-Satellite Services in the bands 10.7-10.95 and 11.2-11.45 GHz is to provide overall 1,000 MHz wide fixed-satellite downlink between 10.7 and 11.7 GHz to meet the requirements of this service.

2) ADD 3783A is to provide protection for passive sensor operations.

GHz

Region 1	Region 2	Region 3
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	11.7-12.2 ~~FIXED~~ FIXED-SATELLITE (Space-to-Earth) ~~MOBILE except aeronautical mobile~~ BROADCASTING-SATELLITE ~~BROADCASTING~~ ~~3786/405BB~~ 3787/405BC	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 3785/405BA
3785/405BA	12.2-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 3787A 3789A	12.2-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING

SUP 3786/405BB

ADD 3787A The use of the band 12.2-12.5 GHz in Region 2 by the Broadcasting-Satellite service is limited to domestic systems and is subject to previous agreements between the administrations concerned and those having services operating in accordance with the Table, which may be affected (see Articles N11 and N13/9A and Resolution No. Spa 2-3).

ADD 3789A New satellite and terrestrial radiocommunication systems in the band 12.2-12.5 GHz in Region 2 shall not be introduced until after the 1983 Regional Administrative Radio Conference on Broadcasting Satellites.

Reasons:

1) The suppression of 3786/405BB is consequential to the proposed deletion of all terrestrial services in the 11.7-12.2 GHz band.

2) The changes to the allocations in the Table between 11.7 and 12.5 GHz and the associated ADD 3787A and ADD 3789A are to provide the flexibility for the 1983 RARC to fixed satellites and broadcasting satellites in planning for the space service and to provide for the requirements of the Broadcasting-Satellite Service.

GHz

Region 1	Region 2	Region 3
12.75-13.25 FIXED MOBILE FIXED-SATELLITE (Earth-to-Space)		

Reason: To provide more bandwidth for fixed-satellite earth-to-space transmission as a complement to the proposed expansion of the Fixed-Satellite and Broadcasting-Satellite Services (space-to-earth) in the bands 10.7-12.5 GHz.

GHz

Region 1	Region 2	Region 3
13.4-14.0 RADIOLOCATION 3675A 3792/407 3793/407A 3794/408 3798/409		

Reason: See under the band 1215-1300 MHz for ADD 3675A re radar operation in the Earth Exploration (Active Sensor) and the Earth Exploration-Satellite (Active Sensor) Services.

GHz

Region 1	Region 2	Region 3
14-14.3	FIXED-SATELLITE (Earth-to-space) 3789AB RADIONAVIGATION 3795/408A 3792/407 3793/407A	
14.3-14.4	FIXED-SATELLITE (Earth-to-space) 3789AB RADIONAVIGATION-SATELLITE 3795/408A	
14.4-14.5	FIXED FIXED-SATELLITE (Earth-to-space) 3789AB MOBILE 3796/408B 3797/408C	
14.5-15.35	FIXED MOBILE 3796/408B 3797/408C	
15.35-15.4	RADIO ASTRONOMY EARTH EXPLORATION (Passive Sensor) EARTH EXPLORATION-SATELLITE (Passive Sensor) 3799/409C 3815/412J	

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15.4-~~15.7~~ 15.45 RADIO ASTRONOMY EARTH EXPLORATION (Passive Sensor) EARTH EXPLORATION-SATELLITE (Passive Sensor) ~~AERONAUTICAL-RADIONAVIGATION~~ ~~3686/352A 3687/352B~~ 3792/407 3815/412J
15.45-15.7 AERONAUTICAL RADIONAVIGATION 3686/352A 3687/352B 3750/383B 3792/407 3797A
15.7-~~17.7~~ 15.75 ~~RADIOLOCATION~~ AERONAUTICAL RADIONAVIGATION 3686/352A 3687/352B 3750/383B 3792/407 3794/408 3797A
15.75-17.2 RADIOLOCATION 3792/407 3794/408 3799A
17.2-17.7 ~~RADIOLOCATION~~ FIXED-SATELLITE (Earth-to-space) 3789AB 3789AC Radiolocation 3792/407 3794/408

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ADD 3789AB Fixed-satellite earth-to-space allocations in the 14.0-14.5 GHz and the 17.2-17.5 GHz bands shall be used to connect to broadcasting satellites operating in the 11.7 to 12.5 GHz band located in those portions of the geostationary satellite orbit which are specified for primary use by broadcasting satellites in Article 12 of the Final Acts of the 1977 WARC-BS, or which may be so specified by the Region 2 RARC of 1983. Earth-to-space connections in the 14.0-14.5 GHz and 17.2-17.5 GHz bands to any other satellite located in the above-mentioned portions of the geostationary orbit, shall, with respect to earth-to-space connections to the above broadcasting satellites, operate in accordance with No. 3430 of the Radio Regulations.

ADD 3789AC Fixed-satellite earth-to-space allocations in the 17.2-17.5 GHz band shall be used as earth-to-space connections to broadcasting-satellites operating in the 12.2-12.5 GHz band located in those portions of the geostationary orbit between 75°W and 170°W not referred to in footnote 3789AB. Earth-to-space connections in the 17.2-17.5 GHz band to any other satellite located in the above-mentioned portions of the geostationary orbit shall, with respect to earth-to-space connections to the above broadcasting satellites, operate in accordance with No. 3430 of the Radio Regulations.

MOD 3797/408C Radio astronomy observations on the formaldehyde line (rest frequency ~~14.489~~ 14.488 GHz) are being carried out in a number of countries under national arrangements. In making assignments to ~~stations in the fixed and mobile~~ other services, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference, particularly from airborne or spaceborne transmitters, in the band ~~14.485-14.515~~ 14.473-14.503 GHz.

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ADD 3797A In the future planning of the bands 15.45 to 15.75 GHz, administrations are urged to give all practicable protection to radio astronomy from out of band transmissions by assigning frequencies for earth-based transmitters in the lower portion of the band and frequencies for airborne transmitters in the upper portion of the band.

ADD 3799A Frequencies between 15.75 to 16.20 GHz may also be used for Airport Surface Detection Equipment (ASDE).

Reasons:

1) For MOD 3686/352A and MOD 3687/352B, refer to the bands 1535-1660 MHz in these proposals.

2) For MOD 3750/383B, refer to the bands 5000-5350 MHz in these proposals.

3) ADD 3789AB and ADD 3789AC - to assure the availability of Earth-to-space links for the broadcasting satellites which will operate in the 11.7-12.5 GHz band, and which will be planned at the 1983 Region 2 RARC. The findings of the SPM of the CCIR indicate that no less than a one to one uplink-to-downlink allocation of frequencies would be feasible. The Canadian proposal is that the following frequency bands be used for broadcasting satellites and their uplink Fixed-Satellite feeder systems:

Orbital Arc	Downlink Frequencies	Uplink Frequencies
$75^{o}W$-$95^{o}W$ (or $75^{o}W$-$100^{o}W$	11.7-12.5 GHz	14.0-14.5 GHz and 17.2-17.5 GHz
$95^{o}W$-$140^{o}W$ (or $100^{o}W$-$140^{o}W$)	12.2-12.5 GHz	17.2-17.5 GHz
$140^{o}W$-$170^{o}W$	11.7-12.5 GHz	14.0-14.5 GHz and 17.2-17.5 GHz

Further, it is the Canadian proposal that these uplink frequency bands, in the specified portions of the orbital arc, not be used by other satellite networks.

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4) MOD 3797/408C is to emphasize the radio astronomy need for protection from transmitters operating from aircraft and spacecraft and to centre the protected band on the line frequency.

5) The existing allocation at 15.35-15.4 GHz for radio astronomy is too narrow and thus the proposed addition of 15.4-15.45 GHz. Also, a more efficient use of the radio spectrum is achieved if airborne transmissions do not occur in bands immediately adjacent to those allocated to radio astronomy (refer ADD 3797A). There is also a need to provide spectrum for passive sensors compatible with radio astronomy spectrum usage between 15.35 and 15.45 GHz.

6) To provide additional spectrum at 17.2-17.7 GHz for Fixed-Satellite earth-to-space transmission as a complement to the fixed-satellite and broadcasting satellite space-to-earth bands in the 10.7-12.5 GHz range.

7) The proposed allocation to Aeronautical Radionavigation in the 15.7-15.75 GHz band is to offset the loss of spectrum to this service in the band 15.4-15.45 GHz.

8) ADD 3799A reflects the requirements for ASDE in the range 15.75 to 16.20 GHz.

9) Re MOD 3815/412J, refer to the band 1400-1427 MHz in these proposals.

GHz

Region 1	Region 2	Region 3
17.7-~~19.7~~ 17.9 FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE except aeronautical mobile Earth Exploration-Satellite (Passive Sensor) Earth Exploration (Passive Sensor)		
17.9-19.7 FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE		
19.7-~~21.2~~ 19.9 FIXED-SATELLITE (Space-to-Earth) Earth Exploration-Satellite (Passive Sensor) Earth Exploration (Passive Sensor) 3800/409E		
19.9-21.2 FIXED-SATELLITE (Space-to-Earth) 3800/409E		
22.0-~~22.5~~ 22.21 FIXED MOBILE ~~3801/410A~~		
22.21-22.5 FIXED MOBILE except aeronautical mobile EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3801/410A		

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GHz

Region 1	Region 2	Region 3
22.5 -~~23~~ 22.55	FIXED MOBILE	22.5 -~~23~~ 22.55 FIXED MOBILE BROADCASTING-SATELLITE 3802/410B
22.55-23	FIXED MOBILE INTER-SATELLITE	22.55-23 FIXED MOBILE BROADCASTING-SATELLITE 3802/410B INTER-SATELLITE
23- ~~23.6~~ 23.55	FIXED MOBILE INTER-SATELLITE	
23.55-23.6	FIXED MOBILE	
23.6-24.0	RADIO ASTRONOMY EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3792/407 3815/412J	
24.25-25.25	RADIONAVIGATION ~~3804/411~~ 3805/412	
31-31.3	FIXED MOBILE Space Research 3813/412H 3814/412I	

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<table>
<tr><td>31.3-31.5</td><td colspan="3">RADIO ASTRONOMY
EARTH EXPLORATION-SATELLITE (Passive Sensor)
EARTH EXPLORATION (Passive Sensor)
3806/412A 3815/412J</td></tr>
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SPACE RESEARCH (Passive)
EARTH EXPLORATION-SATELLITE (Passive Sensor)
EARTH EXPLORATION (Passive Sensor)
RADIO ASTRONOMY
Fixed
Mobile</td><td>31.5-31.8
SPACE RESEARCH (Passive)
EARTH EXPLORATION-SATELLITE (Passive Sensor)
EARTH EXPLORATION (Passive Sensor)
RADIO ASTRONOMY
3815/412J 3790/405C</td><td>31.5-31.8
SPACE RESEARCH (Passive)
EARTH EXPLORATION-SATELLITE (Passive Sensor)
EARTH EXPLORATION (Passive Sensor)
Fixed
Mobile
RADIO ASTRONOMY</td></tr>
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INTER-SATELLITE
Space Research
3807/412B 3807A</td></tr>
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INTER-SATELLITE
3807A</td></tr>
<tr><td>32.8-33</td><td colspan="3">RADIONAVIGATION</td></tr>
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Space Research
EARTH EXPLORATION-SATELLITE (Active Sensor)
EARTH EXPLORATION (Active Sensor)
3792/407 3794/408 3805/412 3808/412C ~~3809/412D~~</td></tr>
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SUP 3804/411

ADD 3807A In the planning of systems for the inter-satellite and radionavigation services in the band 31.8 to 32.8 GHz administrations shall take all measures to prevent harmful interference between these two services, which would otherwise result in restricting the operation of the radionavigation service.

SUP 3809/412D

Reasons:

1) 17.7-17.9 GHz, 19.7-19.9 GHz, 22.21-22.5 GHz, 23.6-24 GHz, 31.5-31.8 GHz.

These several proposals are designed to specify, along with existing allocations and other proposals, a suitably distributed series of allocations to the Earth Exploration Services for the passive remote sensing of earth surface and atmospheric constituents and parameters. In combination, these bands provide the spread of frequencies for the operation of Multifrequency Radiometers in the measurement of water salinity, sea ice, snow and ice morphology, soil moisture, cloud, rain, and water vapour. The multitude of bands is needed to estimate the separate radiant sources where the individual spectra are broad and overlapping. The band 31.5-31.8 GHz has also been proposed to meet the requirements of Radio Astronomy.

2) 22.21-22.5 GHz

The difficulty involved in sharing with radio astronomy as provided for under footnote 3801/410A makes it necessary to limit the mobile service to transmitters on the earth's surface in the band 22.21-22.5 GHz. These changes in band limits are consequential to this proposal.

3) 22.55-23.55 GHz, 31.8-32.8 GHz

In these bands where the Inter-satellite service has been proposed, this allocation would provide a 1 GHz wide go and return band for radiocommunication between geostationary satellites. The band edges of the 22.55-23.55 GHz allocation were chosen to minimize interference to the radio astronomy service.

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Reasons cont'd:

4) 34.2-35.2 GHz
This band, and lower frequency bands, will be used to measure meteorological properties of rain clouds. Cloud height, temperature profile and water content are determined by multifrequency radars.

5) FN 3804/411 has been suppressed because this footnote could result in excessive restrictions on radionavigation operations in the 24.25-25.25 GHz band and, in particular, on the operation of Airport Surface Detection Equipment (ASDE).

6) FN 3807A has been added to take into account the safety-of-life nature of the Radionavigation service in considering the sharing of the 31.8-32.8 GHz band by the two primary services allocated to the band.

7) The suppression of footnote 3809/412D is consequential to the proposal to provide for the Earth Exploration Satellite service (active sensor) in the band 34.2-35.2 GHz.

8) For MOD 3815/412J, refer to the band 1400-1427 MHz in these proposals.

GHz

Region 1	Region 2	Region 3
36-40 38.5 FIXED MOBILE 3761/391A 3810/412E		
38.5-40 FIXED MOBILE FIXED-SATELLITE (Space-to-Earth)		
40-41 FIXED-SATELLITE (Space-to-Earth) FIXED MOBILE		

Reason: These bands are required to provide for future terrestrial and space systems noting that the overall band 38.5-41 GHz available to the Fixed-Satellite Service might be used in association with the proposed Fixed-Satellite allocation at 47.5-50 GHz.

GHz

Region 1	Region 2	Region 3
41-43 BROADCASTING-SATELLITE 3817		

ADD 3817 Among more than 500 molecular lines which have been observed in interstellar space, radio astronomers have identified a few as having major importance. Those not specifically covered elsewhere in the Allocation Table are SiO at 42.82 and 43.12 GHz, CS at 48.99, 97.98 and 146.97 GHz, H_2CO at 140.84 GHz and CO at 219.56 and 220.40 GHz. Observations of these spectral lines are being carried out in a number of countries under national arrangements. Administrations are urged to give all practicable protection to radio astronomy observations in the bands 42.78-42.86 GHz, 43.08-43.16 GHz, 48.94-49.04 GHz, 97.88-98.08 GHz, 140.70-140.98 GHz, 146.82-147.11 GHz, 219.34-219.78 GHz and 220.18-220.62 GHz.

Reason: To provide protection to the Radio Astronomy Service to the extent practicable.

GHz

Region 1	Region 2	Region 3
43-~~48~~ 47.5	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE AERONAUTICAL MOBILE MARITIME MOBILE AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION 3817	
47.5-48	~~AERONAUTICAL MOBILE-SATELLITE~~ ~~MARITIME MOBILE-SATELLITE~~ ~~AERONAUTICAL RADIONAVIGATION-SATELLITE~~ ~~MARITIME RADIONAVIGATION-SATELLITE~~ FIXED-SATELLITE (Earth-to-Space) FIXED MOBILE	
48-50	~~(Not Allocated)~~ FIXED-SATELLITE (Earth-to-Space) FIXED MOBILE Amateur	

Reasons:

1) To provide additional spectrum for the Maritime and Aeronautical Mobile and the Radionavigation Services in the band 43-47.5 GHz. The bands 47.5 to 50 GHz are required to provide additional spectrum for the long-term for the Amateur, Fixed Satellite, the Fixed and Mobile Services noting that the Fixed Satellite allocation proposed above might be used in association with the 38.5-41 GHz band.

2) Re ADD 3817 refer to the band 41-43 GHz in these proposals.

GHz

Region 1	Region 2	Region 3
50-51	~~FIXED-SATELLITE-(Earth-to-Space)~~ EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3815/412J	
51-52	EARTH EXPLORATION-SATELLITE (Passive Sensor) SPACE RESEARCH (Passive) EARTH EXPLORATION (Passive Sensor) 3815/412J	
52-54.25	SPACE RESEARCH (Passive) EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3815/412J	
54.25-58.2	INTER-SATELLITE EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3815/412J	
58.2-59	SPACE RESEARCH (Passive) EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3815/412J	

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Reason: There are some 14 spectral regions distributed more or less uniformly over the band 50-59 GHz which are uniquely associated with molecular resonances of Oxygen. A majority and perhaps all of these areas are being and will be exploited for the measurement of temperature profile of the earth's atmosphere. These profiles are a critical operational input into weather prediction models. There is now no way to predict which subset of these regions will be sufficient to meet minimum objectives. For the next 25 years this entire band, with a minor exception, should be protected from radio frequency emissions to permit unhampered development and operational use of these passive sounding systems.

For MOD 3815/412J, refer to the band 1400-1427 MHz.

GHz

Region 1	Region 2	Region 3
59-64 INTER-SATELLITE FIXED		

Reason: Terrestrial very short haul systems radiating at a very low elevation angle can be accommodated without adverse effects on the Inter-Satellite Service due to the absorption characteristics in this area of the spectrum.

GHz

Region 1	Region 2	Region 3
71-~~84~~ 73 ~~(Not Allocated)~~ EARTH EXPLORATION (Active Sensor) EARTH EXPLORATION-SATELLITE (Active Sensor)		

Reason: To provide spectrum for active sensors.

GHz

Region 1	Region 2	Region 3
73-74	~~(Not Allocated)~~ AMATEUR-SATELLITE AMATEUR	
74-84	~~(Not Allocated)~~ FIXED-SATELLITE FIXED MOBILE Amateur	

Reason: The allocations proposed above are required to provide for future systems in the services indicated.

GHz

Region 1	Region 2	Region 3
92-95	FIXED-SATELLITE ~~(Earth-to-Space)~~ FIXED MOBILE	
95-~~101~~ 100	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE AERONAUTICAL MOBILE MARITIME MOBILE AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION 3817	
100-101	~~AERONAUTICAL MOBILE-SATELLITE~~ ~~MARITIME MOBILE-SATELLITE~~ ~~AERONAUTICAL RADIONAVIGATION-SATELLITE~~ ~~MARITIME RADIONAVIGATION-SATELLITE~~ EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3815/412J	
101-102	SPACE RESEARCH (Passive) EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3815/412J	

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102-105	FIXED-SATELLITE ~~(Space-to-Earth)~~ FIXED MOBILE
105-~~130~~ 105.5	~~INTER-SATELLITE~~ FIXED-SATELLITE FIXED MOBILE

Reasons:

1) Bands 92-95 GHz, 102-105 GHz and 105-105.5 GHz

The above proposed allocationsare required for future systems in the services indicated above. The deletion of the sense of transmission for the Fixed-Satellite service would provide for flexibility of system design.

2) Band 95-100 GHz

To accommodate the future requirements of various maritime and aeronautical services.

3) Bands 100-101 GHz and 101-102 GHz

The proposed amendments to the Table will allow the Earth Exploration Services to provide for the passive remote sensing of trace atmospheric gases through the measurement of their line spectra. Ozone and Nitrous Oxide have prominent lines in the 100-101 GHz band. Extending the use of the 101-102 GHz band to the Earth Exploration Services will provide a clear band to be used with the other two.

4) For ADD 3817, refer to the band 41-43 GHz.

5) For MOD 3815/412J, refer to the band 1400-1427 MHz in these proposals.

GHz

Region 1	Region 2	Region 3
105.5-~~130~~ 116	~~INTER-SATELLITE~~ RADIO ASTRONOMY ~~3816/412K~~	
116-130	INTER-SATELLITE FIXED	
130-139	~~RADIO-ASTRONOMY~~ ~~SPACE-RESEARCH-(Passive)~~ FIXED-SATELLITE FIXED MOBILE ~~3815/412J~~	
139-140	~~RADIO-ASTRONOMY~~ SPACE RESEARCH (Passive) 3815/412J	

SUP 3816/412K

Reason: The reallocation of the Radio Astronomy Service from the band 130-139 GHz to the band 105.5-116 GHz is necessary in order to provide protection for observations of a large number of spectral lines in the latter band thus allowing the former band to be used by the Fixed and Fixed-Satellite Services. The addition of the Fixed Service in the 116-130 GHz band will provide for very short haul terrestrial services. The suppression of 3816/412K is consequential to this proposal.

GHz

Region 1	Region 2	Region 3
140-142	FIXED-SATELLITE ~~(Earth-to-Space)~~ FIXED MOBILE 3817	
142-150	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE AERONAUTICAL MOBILE MARITIME MOBILE AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION 3817	
150-152	FIXED-SATELLITE ~~(Space-to-Earth)~~ FIXED MOBILE	
152- ~~170~~ 162	~~(Not Allocated)~~ FIXED-SATELLITE FIXED MOBILE	
162-165	~~(Not Allocated)~~ AMATEUR-SATELLITE AMATEUR	

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165-170	~~(Not Allocated)~~ FIXED-SATELLITE FIXED MOBILE
170-182	INTER-SATELLITE FIXED

Reasons:

1) 142-150 GHz

To provide bands in this area of the spectrum for Maritime Mobile, Aeronautical Mobile and the Aeronautical and Maritime Radionavigation Services.

2) 140-142 GHz and 150-182 GHz

To provide wide-band allocation for the services indicated. No direction of transmission has been indicated for the proposed fixed-satellite bands in order to allow system design flexibility for long range planning.

3) For ADD 3817, see the band 41-43 GHz.

GHz

Region 1	Region 2	Region 3
182-185	SPACE RESEARCH (Passive) EARTH EXPLORATION-SATELLITE (Passive Sensor) EARTH EXPLORATION (Passive Sensor) 3818/412J	

Reason: These proposed changes in allocation to Earth Exploration Services are to provide for the passive remote sensing of trace atmospheric gases through the measurement of their line spectra. Ozone and Water Vapour have prominent lines in the 182-185 GHz band.

GHz

Region 1	Region 2	Region 3
185-190	INTER-SATELLITE FIXED	
190-200	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE AERONAUTICAL MOBILE MARITIME MOBILE AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION	
200-220	~~(Not Allocated)~~ FIXED-SATELLITE FIXED MOBILE 3817	
220-230	FIXED-SATELLITE FIXED MOBILE 3817	
230-240	RADIO ASTRONOMY SPACE RESEARCH (Passive) 3815/412J	
240-250	~~(Not Allocated)~~ FIXED-SATELLITE FIXED MOBILE Amateur 3644/320A	

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250-265	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE AERONAUTICAL MOBILE MARITIME MOBILE AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION
265-275	FIXED-SATELLITE FIXED MOBILE

Reasons:

1) To provide wideband allocations in this area of the spectrum for the services indicated in the bands from 185 to 275 GHz. The direction of transmission for the Fixed-Satellite Service was deliberately ommitted in order to provide system flexibility for long range planning.

2) Footnote 3644/320A would allow amateur satellite operations in the band 240-250 GHz (refer to the band 435-438 MHz).

3) Footnote MOD 3815/412J, refer to 1400-1427 MHz band.

4) For ADD 3817, refer to the band 41-43 GHz.

ARTICLE N8/6

Special Rules for the Assignment and Use of Frequencies

ADD 3926 On the condition that harmful interference is not caused to stations of the fixed service, the frequency bands allocated exclusively for use by the fixed service between 1605 and 28000 kHz may also be used by stations of the land mobile service communicating only within the boundary of the country in which they are located.

Reason: To accommodate special requirements for land mobile service in the HF band.

ADD 3927 Members of the Union recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; they are urged therefore to take this factor into account in the assignment and use of frequencies.

Reason: To highlight the necessity to take into account safety aspects in the assignment of frequencies.

ARTICLE N9/8

General Provisions

NOC 3952/472 § 2. The functions of the Board shall include:

MOD 3953/473 a) the processing of frequency assignment notices received from administrations for recording in the Master International Frequency Register with a view to ensuring, as appropriate, formal international recognition thereof and in the same conditions and for the same purpose the orderly recording of orbital positions assigned by countries to geostationary satellites;

Reason: To reflect the provisions of Article 10, paras 65 a) and 66 b) of ITU Convention, Malaga-Torremolinos, 1973.

ARTICLE N11

Coordination of Frequency Assignments[1] to Stations in a Space Radiocommunication Service except Stations in the Broadcasting Satellite Service and to Appropriate Terrestrial Stations

Section I. Procedures for the Advance Publication of Information on Planned Satellite Systems

MOD 4100/639AA §1. (1) An administration (or one acting on behalf of a group of named administrations) which intends to establish a satellite system shall, prior to the coordination procedure in accordance with No. 4114/639AJ where applicable, send to the International Frequency Registration Board no earlier than five years nor later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix 1B.

Reasons:

1) To ensure that Advance Information is published at an early date to enable Administrations planning space systems to be aware of problems and to be able to reach compromise solutions before large financial commitments are made.

2) To ensure that sufficient time is available to complete coordination and notification procedures prior to the projected date of putting into use the proposed system.

MOD 4106/639AE (5) An administration receiving comments sent in accordance with 4104/639AD shall, where practicable, provide additional information which is available in an endeavour to resolve any difficulties that may arise. For this purpose, the administration responsible for the planned system may, as appropriate, send to the requesting administration the information listed in Appendix 1A.

Reason: To coincide with proposed changes to 4112/639AH.

MOD 4110/639AI (8) An administration on behalf of which details of planned satellite networks in its system have been published in accordance with the provisions of Nos. 4100/639AA to 4102/639AC ~~shall periodically inform the Board whether or not comments have been received and of the progress made with other Administrations in resolving any difficulties~~ shall at the end of the ninety day period mentioned in No. 4104/639AD, as appropriate, periodically inform the Board of the progress made with other administrations in resolving any difficulties. The Board shall publish this information in a special section of its weekly circular and shall also, when the weekly circular contains such information, so inform all administrations by circular telegram.

Reason: To ensure that the Board is aware of negotiations taking place between administrations in resolving conflicts between proposed and existing space systems.

MOD 4112 639AH (9) In complying with the provisions of 4106/639AE to 4108/639AG, an administration responsible for a planned satellite system may ~~shall, if necessary~~ as applicable, commence the frequency assignment coordination procedure in accordance with Nos. 4117/639AJ and 4138/639AN or, the sending of its notices to the Board pursuant to No. 4580/639BF for those frequency assignments that do not require coordination under the application of Nos. 4115/639AK or 4139/639AR. ~~defer its commencement of the coordination procedure, or where this is not applicable, the sending of its notices to the Board, until one hundred and fifty days after the date of the weekly circular containing the information listed in Appendix 1B on the relevant satellite network. However, in respect of those administrations with whom difficulties have been resolved or who have responded favourably, the coordination procedure, where applicable, may be commenced prior to the expiry of the one hundred and fifty days mentioned above.~~

Reason: To facilitate the expeditious completion of the frequency assignment coordination procedure.

Section II. Coordination of Frequency Assignments to a Space Station on a Geostationary Satellite or an Earth Station Communicating with such a Space Station in Relation to Stations of Other Geostationary Satellite Networks

MOD 4114/639AJ §2. (1) Before an administration notifies to the Board or brings into use any frequency assignment to a space station on a geostationary satellite or to an earth station that is to communicate with a space station on a geostationary satellite, it shall effect coordination of the assignment with any other administration whose assignment in the same band for a space station on a geostationary satellite or for an earth station that communicates with a space station on a geostationary satellite is recorded in the Master Register, or has been coordinated or is being coordinated under the provisions of this paragraph or where a notice containing all the basic characteristics specified in Appendix 1A for which coordination of the assignment was, in fact, not required under No. 4115/639AK is in the process of being examined by the Board under Nos. 4583/639BI to 4592/639BR.

Reason: To ensure that coordination takes place between an administration proposing a new planned space system and an administration which has notified proposed frequency assignments to the Board when the coordination of such assignments with other administrations was not required because of the provisions of 4115/639AK.

MOD 4115/639AK (2) No coordination under No. 4114/639AJ is required:

a) when the use of a new frequency assignment will cause, to any service of another administration, an increase in the noise temperature of any space station receiver or earth station receiver, or an increase in the equivalent satellite link noise temperature, as appropriate, not exceeding the predetermined increase of noise temperature calculated in accordance with the method given in Appendix 29; or

b) when an administration proposes to change the characteristics of an existing assignment in such a way as will, in respect to any service of another administration, meet the requirements of subparagraph a) above, or, where this assignment has previously been coordinated, will cause an increase in noise temperature not exceeding the value agreed during coordination, or, for an existing assignment which did not previously require coordination and which will not produce any additional increase in noise temperature.

Reason: To provide a procedure in cases where the characteristics of an existing assignment which did not require to be coordinated are being changed.

MOD 4118/639AL (3) An Administration initiating the coordination procedure referred to in No. 4114/639AJ shall at the same time send to the Board a copy of the request for coordination, with the information listed in Appendix 1A ~~and~~ including the name(s) of the administration(s) with which coordination is sought. The Board shall examine such information and, when appropriate, despatch a telegram to the Administration seeking to effect coordination identifying other Administration(s) with which coordination should also be effected. The Board shall publish this information in a special section of its weekly circular, together with a reference to the weekly circular in which details of the satellite system were published in accordance with Section I of this Article. When the weekly circular contains such information, the Board shall so inform all Administrations by circular telegram making particular reference to the Administration(s) it considers should be brought into the coordination procedure.

Reason: As the Board has the most up-to-date frequency coordination and registration information it is in a good position to advise Administrations seeking to effect coordination under 4114/639AJ of cases where they have failed to bring an Administration(s) into the coordination procedure. This type of action by the Board should tend to avoid possible delays which might otherwise be encountered when frequency assignment notification action is taking place.

MOD 4120/639AM (5) An administration believing that it should have been included in the coordination procedure under No. 4114/639AJ shall have the right to request that it be brought into the coordination procedure and shall so inform the administration initiating the coordination procedure and the Board. If no such request(s) is received by the administration seeking to effect coordination within thirty days after the date of the weekly circular publishing the information under No. 4118/639AL, it will be assumed that no other administration(s) have any objections to the use of the frequency assignments as published.

Reason: To complete the provisions of No. 4120/639AM and to specify a period of time during which administrations may request to be brought into the coordination procedure.

Section III. Coordination of Frequency Assignments to an Earth Station in Relation to Terrestrial Stations

MOD 4139/639AR (2) No coordination under 4138/639AN is required when an administration proposes:

a) to bring into use an earth station, the coordination area of which does not include any of the territory of any other country;

b) to change the characteristics of an existing assignment in such a way as not to increase the level of interference to or from the terrestrial radiocommunication stations of other administrations;

c) to operate a transportable earth station or a mobile earth station. However, if the coordination area associated with the operation of such a transportable earth station or mobile earth station, in a frequency band referred to in No. 4138/639AN, includes any of the territory of another country, it shall be subject to prior agreement between the administrations concerned in order to avoid harmful interference to existing terrestrial radiocommunication stations of that country. This agreement shall apply to the characteristics of the transportable earth station(s) or mobile earth station(s), or to the characteristics of a typical transportable or mobile earth station, and shall apply to a specified service area; unless otherwise stipulated in the agreement, it shall apply to any transportable or mobile earth station in the specified service area provided that the probability of harmful interference caused by them shall not be greater than that caused by the typical earth station for which the technical characteristics appear in the notice and have or are being submitted in accordance with No. 4578/639BD.

Reason: To give recognition to the unique nature of transportable earth station operation vis-a-vis coordination and notification procedures.

Additional Proposals for Article N11

Consequential to Canada's proposals in Article N1/1 ADD 3141D "Permissible Interference" and MOD 3142/93 "Harmful Interference" the following additional modifications are proposed.

MOD 4104/639AD change to read in 2nd line --- is of the opinion that interference in excess of what would be permissible, may be caused to its ---

MOD 4134/4156/639AX a) change to read in 1st line --- in respect of any interference in excess of what would be permissible which may be caused ---

b) change to read in 2nd line --- stations will not cause interference in excess of what would be permissible to the use ---

MOD 4139/639AR c) change to read in 5th and 10th line --- probability of interference in excess of what would be permissible cause them shall not be greater ---

NOC 4161/492C

NOC 4165/492B

NOC 4167/492B

NOC 4168/492E

NOC 4170/492D

NOC 4175/492G

NOC 4176/492E

MOD 4177/492FC change to read in 5th and 6th line --- respect of interference in excess of what would be permissible which may be caused ---

ARTICLE N12/9

Notification and Recording in the[1] Master International Frequency Register of Frequency Assignments[2] to Terrestrial Radiocommunication Stations

Section I. Notification of Frequency Assignments

ADD 4280A (1A) Frequency assignments referred to in No. 4280/486 shall be notified by the Administration of the country on whose territory the station is located unless the countries concerned have concluded a special arrangement in accordance with Article 31 of the Convention and advised the Union accordingly.

Reason: Consequential to the proposed suppression of Resolution No. 5.

MOD 4282/488 (3) Specific frequencies prescribed by these Regulations for common use by stations of a given service ~~(for example, international distress frequencies 500 kc/s and 2182 kc/s, frequencies of ship radiotelegraph stations operating in their exclusive high frequency bands, etc.)~~, as listed in Table 9 of the Preface to the International Frequency List, shall not be notified to the Board.

Reason: Table 9 of the Preface to the International Frequency List contains a list of frequencies prescribed by the Radio Regulations for common use by stations of a given service which could be used as a ready reference by administrations to determine those frequencies that do not require notification to the IFRB.

Section III. Recording of Dates and Findings in the Master Register

MOD 4421/589 §41. (1) Frequency bands allocated exclusively to the Aeronautical Mobile (R) Service between 2850 and ~~17970~~ 22000 kHz.

Reason: To reflect the Canadian Proposals for Article N7/5.

Additional Proposals for Article N12/9

Consequential to Canada's proposals in Article N1/1 ADD 3141D "Permissible Interference" and MOD 3142/93 "Harmful Interference", the following additional modifications are proposed.

MOD 4280/486 (1) a) change to read --- is capable of causing harmful interference or interference in excess of what is permissible to any service of ---

It is proposed that the term "harmful interference" be retained wherever it appears in Sub-Section IIA, IIB, IIC, and IID as sharing between terrestrial and earth stations is not involved.

MOD 4370/570AB a) change to read in last line --- probability of interference in excess of what would be permissible);

MOD 4372/570AD change to read in 1st line --- the probability of interference in excess of what would be permissible to the service ---

change in 6th line --- has not, in fact, caused interference in excess of what would be permissible to any frequency assignment ---

MOD 4377/570AGB change to read in 7th and 9th line --- complaint of interference, in excess of what would be permissible, having been received.

MOD 4395/570AX change to read in 2nd, 7th, 9th and 10th line -- probability of interference in excess of what would be permissible --

MOD 4398/570BB change to read in 4th and 5th line --- does not increase the possibility of interference to a level in excess of what would be permissible to assignments already recorded. ---

MOD 4403/570BG change to read in 7th and last line --- absence of complaint of interference in excess of what would be permissible.

NOC 4443/611

NOC 4444/611A

MOD 4445/612 change to read in 4th line --- on the grounds of actual interference in excess of what would be permissible,

MOD 4447/614 change to read in 3rd line --- in cases where interference, in excess of what would be permissible, has been experienced, ---

MOD 4450/617 change to read in first line --- regard to the probability of interference in access of what would be permissible remains unfavourable, ---

MOD 4451/618 change to read in 4th line --- the administrations concerned, that interference is excess of what would be permissible has not, in fact, occured, ---

NOC 4459/626

MOD 4460/627 change to read in 2nd line --- these regulations, or of interference in access of what would be permissible.

NOC 4464/631

ARTICLE N13/9A

Notification and Recording in the Master International Frequency Register of Frequency Assignments[1] to Radio Astronomy and Space Radiocommunication Stations except Stations in the Broadcasting-Satellite Service

Section I. Notification of Frequency Assignments

ADD 4575A (1A) Frequency assignments referred to in No. 4575/639BA shall be notified by the Administration of the country on whose territory the earth station is located or by the Administration (or one acting on behalf of a group of named Administrations) for which the space station is to be brought into use, unless the countries concerned have concluded a special arrangement in accordance with Article 31 of the Convention and advised the Union accordingly.

Reason: Consequential to the proposed suppression of Resolution No. 5.

MOD 4578/639BD (4) A notice submitted in accordance with Nos. 4575/639BA or 4576/639BB and relating to a frequency assignment to transportable earth stations or mobile earth stations in a satellite system shall include the technical characteristics either of each transportable earth station or mobile earth station, or of a typical transportable or mobile earth station, and an indication of the service area within which these stations are to be operated.

Reason: To be consistent with the modification to No. 4139/639AR and to provide a means by which transportable earth stations may be notified.

ADD 4578A Individual frequency assignment notices are not required under 4575/639BA or 4576/639BB for a replacement space station located at the same nominal position as an operational satellite on the geostationary satellite orbit when the frequencies, antennae, power outputs, antennae pointing and other technical characteristics of the spare space station are identical to those of the operational space station or are such that the permissible level of interference agreed to during the coordination procedures of the operational space station would not be exceeded and the position of the replacement space station is maintained within the station keeping limits of the operational satellite. The Board shall be informed that a replacement space station having characteristics identical to the operational space station and meeting the station keeping requirements of this regulation has been placed in geostationary orbit. The Board shall publish this information in a special section of its weekly circular.

Reason: There does not appear to be a need to notify replacement space stations of the type described above.

MOD 4579/639BE §2. (1) Except as provided in (2), for any notification under No. 4575/639BA, 4576/639BB, 4577/639BC, or 4578/639BD, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix 1A, the various Sections of which specify the basic characteristics to be furnished according to the case. It is recommended that the notifying administration should also supply the additional data called for in Section A of that Appendix, together with such further data as it may consider appropriate.

(2) In cases where a number of frequency assignments have identical characteristics, a collective notice may be drawn up as prescribed in Appendix 1A and (1) above to include all such similar assignments on the same notice.

Reason: To reduce repetition of similar frequency assignment notices.

Note: The Frequency Assignment Notice form will need modifiying slightly if this proposal is adopted.

Section II. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

MOD 4583/639BI §5. Upon receipt of a complete notice, the Board shall include all of the particulars thereof, with the date of receipt, in the weekly circular referred to in No. 4292/497, which shall contain the particulars of all such notices received since the publication of the previous circular.

Reason: To ensure that diagrams forwarded to the Board as part of a complete notice are included in the weekly circular referred to in No. 4292/497.

MOD 4618/639CR (2) A notice relating to a radio astronomy station shall not be examined by the Board with respect to Nos. 4588/639BN, 4589/639BO, 4590/639BP, 4591/639BQ and 4592/ 639BR. ~~Whatever the finding, the assignment shall be recorded in the Master Register with a date in Column 2e.~~ The assignment shall be recorded in the Master Register with a date in Column 2c if it is in accordance with 4587/639BM. The date of receipt by the Board of the notice shall be recorded in the Remarks Column.

Reason: To indicate that notices relating to radio astronomy stations should be examined by the Board with respect to their conformity to the provisions of No. 4587/639BM of the Radio Regulations.

MOD 4625/639CY (3) If, within thirty days after the projected date of bringing into use, the Board receives confirmation from the notifying administration of the date of putting into use, the special symbol shall be deleted from the Remarks Column. In the case where the Board, in the light of a request from the notifying administration received before the end of the thirty-day period, finds that exceptional circumstances warrant an extension of this period, the extension shall in no case exceed one ~~hundred and fifty days~~ year.

Reason: Because of the limited number of agencies with launching capabilities, unforeseen circumstances such as launch windows, weather conditions, etc. may result in delays of many months before an actual launch can take place.

Section VI. Modification, Cancellation and Review of Entries in the Master Registry

MOD 4642/639DP §27. If, in connection with an inquiry by the Board under No. 4641/639DO, the notifying administration has failed to supply the Board within ~~forty-five~~ ninety days from the date of the inquiry with the necessary or pertinent information, the Board shall make suitable entries in the Remarks Column of the Master Register to indicate the situation.

Reason: In practice it has been established that forty-five days is insufficient time to obtain the necessary information from the operating agency and subsequent forwarding to the Board.

Section VII. Studies and Recommendations

MOD 4644/639DR (2) The Board shall thereupon prepare and forward to the administration concerned a report containing its findings and recommendations for the solution of the problem and such findings and recommendations shall be forwarded to other administrations concerned.

Reason: The proposed wording indicates in a more positive sense the action to be taken by the Board in such cases.

MOD 4645/639DS §29. In a case where, as a result of a study, the Board ~~submits~~ has submitted to one or more administrations suggestions or recommendations for the solution of a problem, ~~and where no answer has been received from one or more of these administrations within a period of ninety days, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer,~~ these administrations shall within ninety days from the date of the Board's submission, send their comments to the Board. In cases when the Board's suggestions or recommendations have been unacceptable to the administrations concerned, further efforts should be made by the Board to find an acceptable solution to the problem. If ~~it was~~ the requesting administration ~~which failed~~ fails to answer within this period, the Board shall close the study.

Reason: The proposed wording indicates in a more positive sense the action to be taken by the Board in such cases.

Additional Proposals for Article N13/9A

Consequential to Canada's proposals in Article N1/1 ADD 3141D "Permissible Interference" and MOD 3142/93 "Harmful Interference" the following additional modifications are proposed.

MOD 4575/639BA §1 (1) a) change to read in 1st and 2nd line --- is capable of causing interference in excess of what would be permissible to any service ---

MOD 4587/639BM a) change to read in last line --- and the probability of interference in excess of what would be permissible.);

MOD 4590/639BP d) change to read in 1st line --- the probability of interference in excess of what would be permissible to the service ---

change to read in 5th line --- in fact caused interference in excess of what would be permissible to any frequency assignment ---

MOD 4591/639BQ e) change to read in 1st line --- the probability of interference in excess of what would be permissible to the service rendered ---

change to read in 5th line --- in fact, caused interference in excess of what would be permissible to any frequency assignment ---

MOD 4592/639BR f) change to read in 1st line --- the probability of interference, in excess of what would be permissible, caused to the receiving earth station ---

MOD 4593/639BS change to read in 2nd line --- upon the probability on interference in excess of what would be permissible to a recorded assignment ---

MOD 4599/639BY change to read in 9th line --- any complaint of intereference in excess of what would be permissible having been received.

change to read in 11th line --- of the advice that no complaint of inteference in excess of what would be permissible has been received ---

MOD 4612/639CL change to read in 6th line --- assessing the probability of interference in excess of what would be permissible (extreme propagation conditions, ---

MOD 4616/639CP change to read in 2nd line --- the probability of interference in excess of what would be permissible, but not sufficiently to permit ---

change to read in 7th line --- without any complaint of interference in excess of what would be permissible having been received.

change to read in 3rd line up --- that no complaint of interference in excess of what would be permissible has been received ---

MOD 4621/639CU change to read in 4th line --- the probability of interference in excess of what would be permissible to assignments already recorded, ---

MOD 4630/639DD change to read in 1st line and 7th line (2) If interference in excess of what would be permissible is actually caused to ---

MOD 4631/639DE change to read in 1st line (3) Interference in excess of what would be permissible to the reception of any station ---

MOD 4632/639DF change to read in 2nd inset ---, but only on the grounds of actual interference in excess of what would be permissible;

MOD 4636/639DJ change to read in 1st line --- with regard to the probability of interference in excess of what would be permissible remains unfavourable, ---

ARTICLE N16

Interference

Section II. Industrial Interference

MOD 5002/698 §7. Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, including power networks, Industrial, Scientific and Medical Operations (ISM), and cable distribution systems, do not cause harmful interference to a radio service operating in accordance with the provisions of these regulations.

Reason: To reflect reference to other sources of interference from systems other than radio communications systems and also to include the ISM newly defined in ADD 3023B.

Section III. Special Cases of Interference

MOD 5003/699 §8. Administrations authorizing the use of frequencies below 10 kHz ~~for special national purposes~~ shall ensure that no harmful intereference is caused thereby to the services to which the bands above 10 kHz are allocated.

Reason: To generalize the applicability of the above paragraph, considering possible allocations below 10 kHz.

ARTICLE N17

Tests

ADD 5030A (2A) It is recognized that in some cases, in the aeronautical safety service, it is undesirable to transmit identification while making emissions for tests, adjustments or experiments. However, these transmissions should be kept to a minimum.

Reason: In the Aeronautical Service, test emissions carry no identification, per ICAO recommendations. The absence of identification is recognized as a test signal by pilots, etc.

ARTICLE N19/16

Reports of Infringements

MOD 5100/721 If an administration has information of an infringement of the Convention or Radio Regulations, committed by a station over which it ~~has authorized~~ may exercise authority, it shall ascertain the facts, fix the responsibility, and take the necessary action.

Reason: To clarify the authority of administrations over stations committing infringements.

ARTICLE N20*/15*

Procedure in a Case of Harmful Interference

MOD 5132/710 7. Having determined the source and characteristics of the interference, the administration having jurisdiction over the transmitting station interfered with shall inform the administration having jurisdiction over the interfering station, giving all useful information in order that this administration may take such steps as may be necessary to eliminate the interference. The latter administration shall acknowledge receipt of the interference complaint immediately by telegram.

Reason: In order that the administration originating the complaint be assured that it has been received by the administration having jurisdiction over the interfering station.

ARTICLE N22/18

Licences

MOD 5227/731 (2) For land mobile stations, including stations comprised of equipment capable of reception only, a clause shall be included in the licence, specifically or by reference, under which the operation of these stations shall be forbidden in countries other than the country which has issued the licence, except as may be provided by special agreement between the governments of the countries concerned.

Reason: To recognize licensed radio stations capable of reception only.

ARTICLE N23

Identification of Stations

Section II. Allocation of International Series and Assignment of Call Signs

MOD 5340/743 §8. (1) All stations open to the international public correspondence service, all amateur stations, and other stations which are capable of causing harmful interference beyond the boundaries of the country ~~to~~ in which they are located or belong, shall have call signs from the internationalseries located to ~~each~~ the country which is operating the station as given in the Table of allocation of Call Sign Series in Appendix C.

Reason: For clarification purposes.

ADD 5340A Administrations authorizing the operation of a station from another country within its national boundaries may specify the use of supplementary identification.

Reason: For identification of area of operation.

ARTICLE N24/20

Service Documents

SUP 5520/802

MOD 5521/803 ~~a)~~ List III ~~A.~~ List of Broadcasting Stations Operating in Bands below 5950 kHz.

This list shall contain those broadcasting stations the frequency assignments of which are shown in List I.

SUP 5522/804

Reason: Only List III as noted above is now published.

Secretary General Circular letter no. 214 dated February 2 refers.

MOD 5541/822 §5. (1) The List of Broadcasting Stations Operating in Bands below 5950 kHz (List III A) shall be republished at intervals to be determined by the Secretary-General. Recapitulative supplements shall be published every six months.

SUP 5542/823

Reason: Consequential to MOD 5520/802 and 5522/804

ARTICLE N25

Terrestrial Radiocommunication Services sharing Frequency Bands with Space Radiocommunication Services above 1 GHz

Section II. Power Limits

ADD 6006A (2A) Where new radio-relay systems are built on existing routes[1], the maximum values of equivalent isotropically radiated power shall not, as far as possible, exceed for each transmitter[2]:

+47 dBW for any antenna beam directed within 0.5^{o} of any location in the geostationary satellite orbit which has been notified to the International Frequency Registration Board, or, if practicable, for any antenna beam directed towards the geostationary satellite orbit;

+47 to +55 dBW, on a linear decibel scale ($_{o}$8dB per angular degree) for any antenna beam directed between 0.5^{o} and 1.5^{o} of any location in the geostationary satellite orbit which has been notified to the International Frequency Registration Board, or, if practicable, all locations on the geostationary satellite orbit.

ADD 6006A.1 [1] An existing route is regarded as one already planned before 1 July 1966, and brought into service before 1 January 1973. With respect to those frequency bands shared between a space radiocommunication service and the fixed and mobile services, as a result of the WARC 1979, an existing route is defined as one which was brought into service prior to the date given in Resolution B covering the implementation schedule for newly-shared frequency bands.

ADD 6006A.2 [2] The operation of a radio relay station established on an existing route and exceeding the limits given in 6006A may, in view of the characteristics of the terrestrial and space systems involved, result in objectionable levels of interference to a space station on a geostationary satellite whose position has been notified after the radio-relay station has been brought into service. In such a case, the action to be taken with regard to both systems to reduce interference to a level which can be agreed by the Administrations concerned shall be determined by consultation between those Administrations.

Reason: To promote the intent of the existing CCIR Recommendation 406-3 which protects the geostationary satellite orbit without imposing undue hardship on line-of-sight radio relay systems which share the same frequency band.

MOD 6009 470D (5)The limits given in Nos. 6002/470AA, 6005/470B, 6006/470BA and 6007/470C apply in the following frequency bands allocated to the fixed-satellite service, the auxiliary-satellite service and the meteorological-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

2655 - 2690 MHz ~~(for Regions 2 and 3)~~

4400 - 4700 MHz

5800 - 5850 MHz (for the countries mentioned in No. 3759/390)

5825 - 5850 MHz (for the countries mentioned in No. 3757/389)

5850 - 5925 MHz (for Region 1 and 3)

5925 - 6425 MHz

6425 - 6525 MHz

6525 - 6625 MHz

6625 - 7125 MHz

7900 - 7975 MHz

7975 - 8025 MHz (for the countries mentioned in No. 3766/392H)

8025 - 8400 MHz

MOD 6010 470DA (6) The limits given in Nos. 6003/470AB, 6005/470B and 6008/470CA apply in the following frequency bands allocated to the fixed-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

10.95 - 11.20 GHz (for Region 1)

12.50 - 12.75 GHz (for Regions 1 and 2)

12.75 - 13.25 GHz

14.175 - 14.300 GHz (for the countries mentioned in No. 3792/407)

14.4 - 14.5 GHz

MOD 6011 470DB (7) The limits given in Nos. 6005/470B and 6008/470CA apply in the following frequency bands allocated to the fixed-satellite service and the auxiliary-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

17.0 - 17.5 GHz (for the countries mentioned in No. 3792/407 and 3794/408)

27.5 - 29.5 GHz

29.5 - 31.0 GHz (for the country mentioned in No. 3800/409E)

Reason: MOD 6009/470D, MOD 6010/470DA, MOD 6011/470DB
To bring the Auxiliary-Satellite Service within the same provisions as those applicable to the Fixed-Satellite Service.

ARTICLE N26

Space Radiocommunication Services sharing Frequency Bands with Terrestrial Radiocommunication Services above 1 GHz

Section II. Power Limits

MOD 6045 470J (8) The limits given in No. 6039/470G apply in the following frequency bands allocated to transmission by earth stations in the fixed-satellite service, the auxiliary-satellite service, the mobile-satellite service, and earth exploration-satellite service, ~~and in particular the meteorological satellite service~~ where these bands are shared with equal rights with the fixed or mobile service:

2655 - 2690 MHz ~~(Regions 2 and 3)~~

4400 - 4700 MHz

5800 - 5850 MHz (for the countries mentioned in No. 3759/390)

5825 - 5850 MHz (for the countries mentioned in No. 3757/389)

5850 - 5925 MHz (Region 1 and 3)

5925 - 6425 MHz

6425 - 6525 MHz

6525 - 6625 MHz

6625 - 7125 MHz

7900 - 7975 MHz

7975 - 8025 MHz (for the countries mentioned in No. 3766/392H)

8025 - 8400 MHz

10.95 - 11.20 GHz (Region 1)

12.50 - 12.75 GHz (Regions 2 and 3 and for the countries mentioned in No. 3788/405BD)

12.75 - 13.25 GHz

14.175 - 14.300 GHz (for the countries mention in No. 3792/407)

14.4 - 14.5 GHz

MOD 6046 470JA (9) The limits given in No. 6040/470GA apply in the following frequency bands allocated to transmission by earth stations in the fixed-satellite service, where ~~this is~~ these are shared with equal rights with the fixed or mobile service:

17.0 - 17.5 GHz (for the countries mentioned in No. 3792/407 and 3794/408)

27.5 - 29.5 GHz

Reason: Modifications are consequential to the Article N7/5 changes.

Section IV. Limits of Power Flux Density from Space Stations

MOD 6056 470NF b) The limits given in No. 6055/470NE apply in the frequency bands listed in No. 6057/470NG which are allocated to transmission by space stations in the following space radiocommunication services:

-- Earth exploration-satellite service and in particular meteorological-satellite service (space-to-Earth)

-- space research service (space-to-Earth)

-- fixed-satellite service (space-to-Earth)

-- auxiliary-satellite service (space-to-Earth)

where these bands are shared with equal rights with the fixed or mobile service:

MOD 6065 470NN b) The limits given in No. 6064/470NM apply in the frequency bands listed in No. 6066/470NO which are allocated to transmission by space stations in the following space radiocommunication services:

-- fixed-satellite service (space-to-Earth)

-- auxiliary-satellite service (space-to-Earth)

-- meteorological-satellite service (space-to-Earth)

-- mobile-satellite service (space-to-Earth)

where these bands are shared with equal rights with the fixed or mobile service:

MOD 6066 470NO

3400 - 3500 MHz (for Region 1 and the countries mentioned in 3739/376)

3500 - 4200 MHz

4400 - 4700 MHz

7250 - 7300 MHz (for the countries mentioned in No. 3765/392G)

7300 - 7750 MHz

MOD 6070 470NS

8025 - 8400 MHz

8400 - 8500 MHz

10.7 - 10.95 GHz

10.95 - 11.20 GHz

11.20 - 11.45 GHz

11.45 - 11.70 GHz

Reason: Consequential to modifications of Article N7/5.

Note: In addition to the above proposals, the reference to passive satellite in 6051/470NA, 6055/470NE, 6064/470NM, 6066/470NO, 6072/470NV and 6076/470NY should be suppressed.

MOD 6057 470NG

1670 - 1690 MHz

1690 - 1700 MHz (for the countries mentioned in No. 3698/354A)

1700 - 1710 MHz

1770 - 1790 MHz (for the countries mentioned in No. 3704/356AA)

2200 - 2290 MHz

2290 - 2300 MHz

2500 - ~~2535 MHz~~ 2690 MHz

Reason: Consequential to modifications of Article N7/5.

ARTICLE N27

Special Rules Relating to Space Radiocommunication Services

MOD Section II. Control of Interference ~~between~~ into Geostationary-Satellite ~~and non-synchronous inclined Orbit Satellite~~ Systems

MOD 6106 470VA §2. Non-geostationary space stations and space stations normally geostationary but in transit to their notified positions, ~~in the fixed satellite service~~ shall cease or reduce to a negligible level radio emissions[1], and their associated earth stations shall ~~not transmit to them~~ cease transmission whenever there is insufficient angular separation between ~~the non-geostationary~~ these satellites and geostationary satellites ~~and unacceptable~~ resulting in interference greater than permissible interference[1] to geostationary satellite space systems operating in accordance with these Regulations.

SUP 6106.1 470VA.1

ADD 6106.2 [1]The use of frequencies for telemetering, tracking, and telecommand functions by these satellite shall be agreed among the administrations concerned.

Reasons:

1. To protect geostationary satellites against interference from another geostationary satellite in a transfer orbit to its notified position. This provision would therefore apply equally to a satellite initially placed in orbit, as well as to one in transit from one nominal geostationary position to another. The modification to the title of this section is consequential. The new footnote recognizes the special problems of spacecraft telemetering, tracking, and telecommand during transfer orbit.

2. The deletion of the limitation to the fixed-satellite service generalizes the provision to include all non-geostationary space stations and all space stations in transit, no mater which service they operate within.

3. The substitution of the term "permissible interference" for "unacceptable interference" is consistent with the CCIR and the new definition 3141D. This modification permits the suppression of existing 6106.1 since by definition permissible interference is agreed between Administrations.

Section III. Station Keeping of Space Stations[2]

MOD 6108 470VC - shall have the capability of maintaining their position within ± ~~1~~ 0.1 degree of the longitude of their nominal positions, ~~but efforts should be made to achieve a capability of maintaining their positions at least within ± 0.5 degree of the longitude of their nominal positions;~~

MOD 6109 470VD - shall maintain their positions within ± ~~1~~ 0.1 degree of longitude of their nominal positions irrespective of the cause of variation; but

MOD 6110 470VE - need not comply with No. 6109/470VD as long as the satellite network to which the space station belongs does not produce ~~an unacceptable level of~~ interference greater than permissible interference[±] into any other satellite network whose space station complies with the limits given in No. 6109/470VD.

SUP 6110.1 470VE.1

Reasons: To promote more efficient orbit-spectrum utilization, it is necessary to maintain a closer satellite station-keeping tolerance of ± 0.1 degree in longitude. The benefits of tighter station-keeping have been shown in the CCIR and the station-keeping performance attained by several operational satellites has shown the practicality of achieving these new limits. The possible need for less stringent station-keeping tolerance in the case of experimental or other short-life satellites will be satisfied by the provisions of MOD 6110/470VE.

Precedent for tighter station-keeping has been set at the WARC/BS (77) where a tighter tolerance of ±0.1 degree was found necessary. In addition the SPM concluded, after careful consideration, that a tolerance of ± 0.1 degree in longitude was appropriate for any service likely to have a large number of satellites in the future, regardless of orbital position.

The substitution of the term "permissible interference" for "unacceptable interference" is consistent with the CCIR and the new definition 3141D. This modification permits the suppression of existing 6106.1/470VA.1 since by definition permissible interference is agreed between Administrations.

Section IV. Pointing Accuracy of Antennae on Geostationary Satellites

MOD 6111 470VF §4. The pointing direction of maximum radiation of any earth-ward beam of antennae on geostationary satellites, relative to the nominal pointing direction, shall be capable of being maintained within:

0.5 degree	for	$\theta_o > 5$ degrees,
(1/10) θ_o degree	for	1 degree $< \theta_o < 5$ degrees,
0.1 degree	for	$\theta_o < 1$ degree,

where θ_o is the half power beamwidth.

~~10% of the half-power beamwidth relative to the nominal pointing direction, or~~

~~0.5 degree relative to the nominal pointing direction whichever is the greater.~~ This provision applies only when such a beam is intended for less than global coverage.

In the event that the beam is not rotationally symmetrical about the axis of maximum radiation, the tolerance in any plane containing this axis shall be related to the half power beamwidth in that plane.

This accuracy shall be maintained only if it is required to avoid ~~harmful~~ interference greater than permissible interference to other systems.

SUP 6111.1/470VF.1

Reasons:

1. This sliding-scale criterion for pointing accuracy permits a tolerance varying from 0.5 degree to 0.1 degree. The 0.1 degree limit is consistent with that specified by the 77 WARC-BS and is based on latest CCIR documentation, which shows tolerances readily achievable using existing technology. It should be noted that the Final Acts of the 77 WARC-BS (Annex 8, para 3.14) have stipulated a more stringent pointing angle criterion for the Broadcasting-Satellite Service near 12 GHz, namely 0.1 degree irrespective of the beamwidth involved.

2. The 0.5 degree upper limit is proposed to permit the increased orbital efficiency, recognized by the CCIR. The present 10% rule would permit variations up to 1.7 degree, which are an unnecessary waste of the orbit/spectrum resources considering present and future spacecraft technology.
3. The modification of the last paragraph and the suppression of footnote 6111.1/470VF.1 are consequential to ADD 3141D.

ADD Section VI. The use of Passive Satellites

ADD 6113 The transmission of radiocommunication signals by reflection from a space station other than for radiodetermination purposes shall be permitted only for experimental or

scientific purposes and subject to agreement between the administrations concerned. These transmissions shall be such as not to produce interference greater than permissible to services operating in accordance with the Radio Regulations.

Reason: Consequential to SUP 3127/84BAD and SUP 3764/392D.

ARTICLE N28

Broadcasting Service and
Broadcasting-Satellite Service

Section I. Broadcasting Service

ADD 6215A Broadcasting stations in Band 7 shall not use a transmitter power in excess of+54 dBW for A3 or an equivalent power for other modes of emission.

ADD 6215B In Band 7, no administration shall employ more than one frequency per frequency band to provide simultaneously the same program intended for reception within a specific geographical area.

ADD 6215C In Band 7, broadcasting stations shall convert to the single sideband mode of emission as soon as possible.

Reason: In order to bring about more reasonable sharing of the broadcasting assignments in Band 7, it is necessary to limit transmitter power and repetitive programming on a number of assignments simultaneously. Also, as has been done by almost all other services in Band 7, the broadcasting service should begin using the single sideband mode of emission in order to make more efficient use of the radio spectrum.

MOD 6218 425 (2) The use by the broadcasting service of the bands listed below is restricted to the Tropical Zone:

2300-2498 kHz (Region 1)
2300-2495 kHz (Region 2 and 3)
3200-3400 kHz (All Regions)
4750-4995 kHz (All Regions)
~~5005-5060 kHz (All Regions)~~

Reason: Consequential to the proposed removal of Footnote 3496/202 in Article N7/5.

ARTICLE N29

MOD

Fixed Service
and
Land Mobile Service

Section I. General

MOD 6323 465 §1. (1) ~~Administrations are urged to discontinue, in the fixed service, the use of double sideband radiotelephone transmissions in the bands below 30 MHz, if possible as from 1 January 1970.~~ The use of double sideband radio transmissions in the bands below 30 MHz by the fixed and land mobile services shall be terminated by 1 January 1983.

Reason: In the fixed and land mobile services, the use of SSB below 30 MHz is practical and desirable from a spectrum efficiency viewpoint.

ARTICLE N33

Radiodetermination Service and Radiodetermination-Satellite Service

Section IV. Radiobeacon Stations

6475 B. Aeronautical Radiobeacons

MOD 6476 433 §15. (1) The assignment of frequencies to aeronautical radiobeacons operating in the bands between 160 and ~~415~~ ~~535~~ kHz shall be based on a protection ratio against interference of at least ~~10~~ 15 dB for each beacon throughout its service area.

Reason: A co-channel protection ratio of 10 dB is no longer technically acceptable since it can give rise to serious bearing errors.

Additional Proposals for Articles N5/3, N7/5, N8/6, N16, N17, N20/15, N30/41, N32/42

Consequential to Canada's proposals in Article N1/1 ADD 3141D "Permissible Interference" and MOD 3142/93 "Harmful Interference" the following additional editorial modifications are proposed:

ARTICLE N5/3 RR 3277/113, 3278/114, 3279/115, 3280/116 3282/117 - "harmful interference or interference in excess of the permissible, whichever is the case" ---

ARTICLE N7/5 RR 3430/139 a)b)c) and 3442/148 - same as Article N5/3

ARTICLE N8/6 RR 3918/414, 3922/418, 3925/421 - no change

ARTICLE N16 4996/676 --- elimination of harmful interference or interference in excess of the permissible, whichever is the case, employing --- etc.
5001/697 --- causes harmful interference or interference in excess of the permissible, whichever is the case, through its spurious emissions --- etc.
5002/698, same MOD as in 5001/697
5003/699 - No change

ARTICLE N17 5029/700, similar MOD as in 5001/697

ARTICLE N20/15 Title needs change, i.e. Procedure in a Case of Harmful Interference or Interference in excess of the Permissible
RR 5126/704, 5135/711B --- change wording in accordance with new title.
RR 5142/718 --- according to Nos 4280/486 or 4281/487 and 4575/639BA or 4576/639BB of these Regulations; or between --- etc.

ARTICLE N30/41 RR 6362/1567A --- in the event that harmful interference or interference in excess of the permissible is reported --- etc.

ARTICLE N32/42 RR 6427/1575 --- similar to 6362/1567A.

Appendix 1
Notices relating to Terrestrial Stations
(see ARTICLE N12/9)

II. Notes Concerning Information to be Entered in the Notice Pertaining to Specific Columns of the Master Register

MOD Column 1 Assigned Frequency

1. Indicate the assigned frequency[1,2,3] as defined in Article N1/1* in kHz up to ~~30000~~ 28000 kHz inclusive, and in MHz above ~~30000~~ 28000 kHz

2. This information is a basic characteristic.

MOD * 1 For television broadcasting stations in Region 1, the frequencies to be notified are those of the sound and vision carriers.

ADD 2 For the radiotelephone maritime mobile service see RR 8045/445A.

ADD 3 For the Aeronautical Mobile (R) service see Appendix 27 revised paragraph 27/7.

Reason: To correspond to the actual breakdown of the International Frequency List as currently published, and to reflect the special conditions relating to the radiotelephone maritime mobile service and the aeronautical mobile (R) service.

MOD Columns 9b and 9c ~~If the radiation characteristics of the antenna concerned differ from those recommended by the CCIR.~~ In cases where an antenna with directional radiation characteristics is used the following information should be notified in Column 9b and 9c;

Reason: The proposed change corresponds to the current practice.

APPENDIX 1A

Notices relating to Space Radiocommunications
and Radio Astronomy Stations

(See Articles N11, N13/9A)

Section B. Basic Characteristics to be furnished in Notices relating to Frequencies used by Earth Stations for Transmitting

MOD Item 8 Power characteristics of the transmission

a) [1]Indicate for each carrier, the peak power supplied to the input of the antenna.

b) Indicate the total peak power and the maximum power density per Hz[2] supplied to the input of the antenna averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

NOC [1]This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

ADD [2]The most recent version of CCIR Report should be used as a guide in calculating the maximum power density per Hz.

Reason: To standardize on a method for calculating this required parameter. This report results from a request to the CCIR to develop the appropriate formula.

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Section D. Basic Characteristics to be furnished in Notices relating to Frequencies used by Space Stations for Transmitting

MOD Item 9 Power characteristics of the transmission

a) [1]Indicate for each carrier the peak power supplied to the input of the antenna.

b) Indicate the total peak power and the maximum power density per Hz[2] at the input of the antenna averaged over the worst 4 kHz band for carriers below 15 GHz or averaged over the worst 1 MHz band for carriers above 15 GHz.

NOC [1]This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

ADD [2]The most recent version of CCIR Report should be used as a guide in calculating the maximum power density per Hz.

Reason: To standardize on a method for calculating this required parameter. This report results from a request to the CCIR to develop the appropriate formula.

APPENDIX 1B

Advance Publication Information to be furnished
for a Satellite Network
(See Article N11/9A)

Section C. Characteristics of the Satellite Network in the Earth-to-Space Direction

MOD Item 4 Power characteristics of the transmitted wave

a) For each Earth-to-Space service area indicate the maximum spectral power density (W/Hz)[1] to be delivered to the antenna of the transmitting earth station (the bandwidth over which this is averaged depends on the nature of the service concerned); and, if available, the total peak power and the necessary bandwidth of this emission.

b) If available, indicate, for each Earth-to-space service area, the actual radiation pattern (relative to isotropic) of the transmitting earth station antenna having the highest off beam equivalent isotropically radiated spectral power density.

ADD [1]The most recent version of CCIR Report should be used as a guide in calculating the maximum spectral power density.

Reasons: The new footnote will assist in standardizing the methods of calculating the spectral power density.

The addition of the total peak power and the bandwidth of the emission associated with the maximum spectral power density will assist in calculation of interference potential.

Note: The use of the term "total peak power" may need to be revised throughout Appendix 1A and 1B to reduce the confusion caused by trying to use one term for all methods of modulation.

NOC Section D. Characteristics of the Satellite Network in the Space-to-Earth Direction

MOD Item 4 Power characteristics of the transmission

For each space-to-Earth service area, indicate the maximum spectral power density (W/Hz)[1] to be delivered to the transmitting antenna of the space station the bandwidth over which this is averaged

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depends on the nature of the service concerned)~~.~~ and, if available, the total peak power and the necessary bandwidth of this emission.

ADD [1]The most recent version of CCIR Report should be used as a guide in calculating the maximum spectral power density.

Reasons: Identical to those given for MOD Item 4 of Section C.

APPENDIX 3

Table of Frequency Tolerances*

(See Article N4/12)

The Table below outlines the frequency tolerances applicable to various type of services, frequency bands and associated radiated powers which Canada proposes would remain in effect as shown.

MOD 1. Frequency tolerance is defined in Article N1/1 expressed in parts in 10^6 or, in some cases, (hertz) Hz.

NOC 2. The power shown for the various categories of stations is the mean power as defined in Article N1/1.

MOD

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983 ~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~
Band: 10 to 535 kHz	
1. Fixed Stations:	
- 10 to 50 kHz	1 000
- 10 to 535 kHz	200
2. Land Stations:	
a) Coast Stations:	
- power 200 W or less	500 1)
- power above 200 W	200 1)

*Certain services may need tighter tolerances for technical and operational reasons.

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983 ~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~
b) Aeronautical Stations:	~~200*~~ 100
3. Mobile Stations	
a) Ship Stations	1 000 k)
b) Ship's Emergency Transmitters	5 000
c) Survival Craft Stations	5 000
d) Aircraft Stations	500
4. Radiodetermination Stations	~~200*~~ 100
5. Broadcasting Stations	~~20~~ 10 Hz
Band: 535 to 1 605 kHz Broadcasting Stations	~~20~~ 10 Hz
Band: 1 605 to 4 000 kHz	
1. Fixed Stations:	
- power 200 W or less	100
- power above 200 W	50

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983
	~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~
2. Land Stations	
- power 200 W or less	100 h)1)
- power above 200 W	50 h)1)
3. Mobile Stations	
a) Ship Stations	200 i)k)
b) Survival Craft Stations	300
b A) Emergency Position Indicating Radiobeacons	300
c) Aircraft Stations	~~200*~~ 100
d) Land Mobile Stations	200
4. Radiodetermination Stations:	
- power 200 W or less	100
- power above 200 W	50
5. Broadcasting Stations	~~50~~ 20
Band: 4 to 29.7 MHz	

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983
	~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~
1. Fixed Stations:	
- power 500 W or less	~~100~~ 50
- power above 500 W	~~30~~ 15
2. Land Stations:	
a) Coast Stations:	
- power 500 W or less	50 h)1)
- power above 500 W and less than or equal to 5 kW	~~50*~~ 30 h)1)
- power above 5 kW	~~50~~ 15 h)1)
b) Aeronautical Stations:	
- power 500 W or less	100
- power above 500 W	50
c) Base Stations:	
- power 500 W or less	100
- power above 500 W	50
3. Mobile Stations	
a) Ship Stations	
1) Class ~~A1~~ A1A Emissions	~~200~~ 50 p)q)

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983	
	~~*1st January 1970 in the case of all tolerances marked with an asterisk.~~	
2) Emissions other than ~~A1~~ A1A	50 i)k)	
- ~~power 50 W or less~~	~~50 e)~~	
- ~~power above 50 W~~	~~50~~	
b) Survival Craft Stations	200	
c) Aircraft Stations	~~200*~~	100
d) Land Mobile Stations	200	
4. Broadcasting Stations	~~30~~	15
Band: 29.7 to 100 MHz		
1. Fixed Stations:		
- power 200 W or less	~~200*~~	50
- power above 200 W	~~200~~	30
2. Land Stations:		
- power 15 W or less	~~200~~	50
- power above 15 W	~~200~~	20
3. Mobile Stations:		
- power 5 W or less	~~200~~	100
- power above 5W	~~200~~	50

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983 ~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~
4. Radiodetermination Stations	200
5. Broadcasting Stations (other than television)	
- power 50 W or less	50
- power above 50 W	~~30~~ 20
6. Broadcasting Stations (television sound and vision):	
- power 50 W or less	100
- power above 50 W	~~30~~ 1 000 Hz
Band: 100 to 470 MHz	
1. Fixed Stations:	
- power 50 W or less	~~100*~~ 50
- power above 50 W	~~100*~~ 20
2. Land Stations:	
a) Coast Stations	~~100~~ 20 n)
b) Aeronautical Stations	~~100~~ 50
c) Base Stations:	

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983	
	~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~	
- power 5 W or less	~~100~~	50
- power above 5 W	~~100~~	20
3. Mobile Stations:		
a) Ship Stations and Survival Craft Stations:		
- in the band 156-174 MHz	~~100~~	20 n)
- outside the band 156-174 MHz	~~100~~	50 d)o)
b) Aircraft Stations	~~100~~	50
c) Land Mobile Stations:		
- power 5W or less	~~100~~	50
- power above 5 W	~~100~~	20
4. Radiodetermination Stations	~~200*~~	50 d)e)
5. Broadcasting Stations (other than television)	~~30~~	20
6. Broadcasting Stations (television sound and vision):		
- power 100 W or less	100	

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983	
	~~*1st January, 1970 in the case of all tolerances marked with an asterisk~~	
- power above 100 W	~~30~~	1 000 Hz
Band: 470 to 2450 MHz		
1. Fixed Stations:		
- power 100 W or less	~~7-500~~	300 f)
- power above 100 W	~~7-500~~	100 g)
2. Land Stations	~~7-500~~	300
3. Mobile Stations	~~7-500~~	300
4. Radiodetermination Stations	~~7-500~~	500 e)
5. Broadcasting Stations (other than television)	~~7-500~~	100
6. Broadcasting Stations (television sound and vision) in the band 470-960 MHz		
- power 100 W or less	~~7-500~~	100
- power above 100 W	~~7-500~~	1 000 Hz

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1st January ~~1966*~~ 1987 to transmitters in use and to those to be installed before 1st January, ~~1964~~ 1983	
	~~*1st January, 1970 in the case of all tolerances marked with an asterisk.~~	
Band: 2 450 to 10 500 MHz		
1. Fixed Stations:		
- power 100 W or less	~~7-500~~	300 f)
- power above 100 W	~~7-500~~	100 g)
2. Land Stations	~~7-500~~	300
3. Mobile Stations	~~7-500~~	300
4. Radiodetermination Stations	~~7-500~~	2 000 e)
Band: 10.5 to 40 GHz		
1. Fixed Stations		500
2. Radiodetermination Stations		7 500 e)

Notes Referring to Table of Frequency Tolerances

NOC a) SUP

NOC c) SUP

NOC d) This tolerance is not applicable to survival craft stations operating on the frequency 243 MHz.

NOC e) Where specific frequencies are not assigned to radar stations, the bandwidth occupied by the emissions of such stations shall be maintained wholly within the band allocated to the service and the indicated tolerance does not apply.

NOC f) For transmitters using time division multiplex the tolerance of 300 may be increased to 500.

NOC g) This tolerance applies only to such emissions for which the necessary bandwidth does not exceed 3 000 kHz; for larger bandwidth emissions a tolerance of 300 applies.

NOC h) For coast station single sideband radiotelephone transmitters the tolerance is 20 Hz.

MOD i) For ship station single sideband radiotelephone transmitters the tolerance is:

1) in the band 1605-4000 kHz
100 Hz for transmitters in use or to be installed before 1 January 1982;
50 Hz for transmitters installed after 1 January 1982;

2) in the band 4000-23000 kHz
100 Hz for transmitters ~~in use or to be~~ installed before 1 January 1978;
50 Hz for transmitters installed after 1 January, 1978.

(See also Appendix 17A)

NOC j) SUP

NOC k) For ship station transmitters used for direct printing telegraphy or for data transmissions the tolerance is 40 Hz. This tolerance is applicable to equipment installed after 1 January, 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 100 Hz (with a maximum deviation of 40 Hz for short periods of the order of 15 minutes).

NOC 1) For coast station transmitters used for direct printing telegraphy and for data transmission the tolerance is 15 Hz. This tolerance is applicable to equipment installed after 1 January, 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 40 Hz.

NOC m) SUP

NOC n) For coast and ship station transmitters in the band 156-174 MHz put into service after 1 January 1973 a tolerance of 10 parts in 10^6 shall apply. This tolerance is applicable to all transmitters, including survival craft stations, after 1 January 1983.

NOC o) For transmitters used by on-board communication stations a tolerance of 5 parts in 10^6 shall apply.

MOD p) ~~Applicable from 1 June 1977. However, in the A1~~ For A1A Morse telegraphy operating on frequencies in Appendix 15D working frequency bands a frequency tolerance of 200 parts in 10^6 may be applicable to existing transmitters after 1 June 1977, provided that the emissions are contained within the band in question.

MOD q) In the ~~A1~~ A1A Morse calling frequency bands (Appendix 15C) frequency tolerances of 40 parts in 10^6 in the band between 4 and 23 MHz and of 30 parts in 10^6 in the 25 MHz bands are recommended as far as possible.

ADD r) For R3E, J3H, H3E, J8B emissions, where applicable, the tolerance is 40 Hz.

Results of the SPM (Appendix 3)

Canada generally agrees with the findings of the SPM (Chapter 8, Table 8.1). This Table of Frequency Tolerances would be applicable to new transmitters installed after 1 January, 1983 and to all transmitters after 1 January 1987.

It should be noted that Canada's proposals differs from the SPM in two cases only:

i) band 100-470 MHz re Base Station 160 MHz 15 12)
ii) band 100-470 MHz re Land Mobile 160 MHz 15 12) 13)

CCIR STUDY GROUPS
Special Preparatory Meeting (WARC-79)
Geneva 1978

Doc. P/1022-E
13 November 1978

Ref. : Com D; Docs. P/514(Rev.1), P/483(Rev.1)

DRAFT SPM REPORT

CHAPTER 8

(§ 8.1)

8.1 Frequency tolerances*

In proposing frequency tolerance values for transmitters, the SPM has taken account of :

(1) the need for efficient frequency spectrum utilization,

(2) the operational requirements of the various communication systems,

(3) the technical feasibility of achieving the standards laid down against a background of environmental and economic constraints,

(4) the basic differences between fixed and mobile stations, and especially hand-held equipment, necessitating in some cases a relaxed value of tolerance for the mobile stations,

(5) the accumulation of frequency errors of individual frequency sources in the case of some multi-hop radio relay systems necessitating some relaxation in the overall tolerance limits.

Due consideration has been given also to existing CCIR texts, where appropriate.

The conclusions are contained in Table 8.1, which the WARC-79 might consider in revising Appendix 3 to the Radio Regulations. It is emphasized that these conclusions reflect the future needs and therefore do not always correspond to present equipment specifications. Particular attention is drawn to the fact that in a few cases the suggested values of tolerances are such that the actual frequency instability would far exceed the necessary bandwidth. This could lead to inefficient use of the radio frequency spectrum.

Table 8.1 follows the general format of the existing Appendix 3 to the Radio Regulations. Frequency sub-divisions have been introduced where necessary for some services to clarify the presentation.

No attempt has been made to attach dates of implementation. This is not a matter for the SPM.

The tolerance value quoted for a particular category is normally for the most significant service in that category. Other significant types of usage in the same category requiring different tolerances are contained in explanatory footnotes.

For broadcasting stations (other than television) in the band 470 to 2 450 MHz the existing frequency tolerance value has been quoted in the absence of any further information.

No tolerance values have been established for meteorological aids nor for the amateur services. This matter can best be handled by national regulations.

Recognizing the continuing development of equipment and systems, no frequency tolerances have been established for services operating above 40 GHz. /The SPM notes, however, that there is an urgent need for the CCIR to study this matter./

In order to distinguish clearly between existing footnotes in the Appendix 3 Table and the new ones, the latter have been given numerical designations.

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* SPM Contributions

8.1	P/3, P/194	SG 1, 10
	P/253, P/285	SG 1, 9
	P/48, P/75(Rev.1), P/165 P/285, P/305, P/330, P/374	SG 1

TABLE 8.1

Table of frequency tolerances

1. Unless otherwise indicated, frequency tolerance is expressed in parts in 10^6.

2. The power shown for the various categories of stations is the mean power.

3. Frequency tolerances for aircraft and space stations do not include frequency shifts due to Doppler effects.

4. Certain services may need more stringent tolerances for technical and operational reasons.

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable to new transmitters installed after 1st January ~~1964~~ 1983 and to all transmitters after 1st January ~~1966~~* 1987
Band: 10 to 535 kHz	
1. *Fixed Stations*:	
— 10 to 50 kHz	100
— 50 to 535 kHz	50
2. *Land Stations*:	
a) Coast Stations:	100 one)
b) Aeronautical Stations	100
3. *Mobile Stations*:	
a) Ship Stations	200 k)
b) Ship's Emergency Transmitters	500 one)
c) Survival Craft Stations	500
d) Aircraft Stations	100
4. *Radiodetermination Stations*	100
5. *Broadcasting Stations*	10 Hz
Band: 535 to 1 605 kHz *Broadcasting Stations*	10 Hz *b)*

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable to new transmitters installed after 1st January ~~1964~~ 1983 and to all transmitters after 1st January ~~1966*~~ 1987
Band: **1605 to 4000 kHz**	
1. *Fixed Stations :*	
— power 200 W or less	100 2) 3)
— power above 200 W	50 2) 3)
2. *Land Stations*	
— power 200 W or less	100 2) 1) r)
— power above 200 W	50 2) 1) r)
3. *Mobile Stations*	
a) Ship Stations	40 Hz 4)
b) Survival Craft Stations	100
b A) Emergency Position-Indicating Radiobeacons	100
c) Aircraft Stations	100 r)
d) Land Mobile Stations	50 5)
4. *Radiodetermination Stations :*	
—power 200 W or less	20 6)
—power above 200 W	10 6)
5. *Broadcasting Stations*	10 Hz 17)
Band: **4 to 29·7 MHz**	
1. *Fixed Stations :*	
a) single sideband and independent sideband emissions	20 Hz
b) Class F1 emissions	10 Hz
c) Other classes of emissions	
- power 500 watts or less	20
- power above 500 watts	10

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable to new transmitters installed after 1st January ~~1964~~ 1983 and to all transmitters after 1st January ~~1966~~* 1987
2. Land stations	
a) Coast stations	20 Hz 1) 20)
b) Aeronautical Stations:	
—power 500 W or less	100 r)
—power above 500 W	50 r)
c) Base Stations:	20 2)
3. *Mobile Stations:*	
a) Ship Stations:	
1) Class A1 emissions	10
2) Emissions other than Class A1	50 Hz k) 7)
b) Survival Craft Stations	50
c) Aircraft Stations	100 r)
d) Land Mobile Stations	40 8)
4. *Broadcasting Stations*	10 Hz 15) 17)
5. Space stations	20
6. Earth stations	20
***Band*: 29.7 to 100 MHz**	
1. *Fixed Stations:*	
—power 50 W or less	30
—power above 50W	20
2. *Land Stations:*	20
3. *Mobile Stations:*	20 9)
4. *Radiodetermination Stations*	50
5. *Broadcasting Stations (other than television)*	2 000 Hz 18)
6. *Broadcasting Stations (television sound and vision)*	500 Hz 16) 19)
7. Space stations	20
8. Earth stations	20

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable to new transmitters installed after 1st January ~~1964~~ 1983 and to all transmitters after 1st January ~~1966~~* 1987
***Band*: 100 to 470 MHz**	
1. *Fixed Stations:*	
—power 50 W or less	20 10)
—power above 50 W	10
2. *Land Stations:*	
a) Coast Stations	10
b) Aeronautical Stations	20 11)
c) Base Stations :	
- 160 MHz band	15* 12)
- 300 MHz band	7 12)
- 450 MHz band	5 12)
3. *Mobile Stations:*	
a) Ship Stations and Survival Craft Stations:	
— in the band 156-174 MHz	10
— outside the band 156-174 MHz	50 o)
b) Aircraft Stations	30 11)
c) Land Mobile Stations:	
- 160 MHz band	15* 12) 13)
- 300 MHz band	7 12) 13)
- 450 MHz band	5 12) 13)
4. Radiodetermination stations	50 e)
5. Broadcasting stations (other than television)	2 000 Hz 18)
6. Broadcasting stations (television, sound and vision) :	500 Hz 16) 19)
7. Space stations	20
8. Earth stations	20

*changes proposed by Canada: SPM suggested 10 rather than 15

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable to new transmitters installed after 1st January ~~1964~~ 1983 and to all transmitters after 1st January ~~1966*~~ 1987	
Band: 470 to 2 450 MHz		
1. Fixed Stations: -power 100 W or less -power above 100 W	100 50	
2. Land Stations	20	14)
3. Mobile Stations	20	14)
4. Radiodetermination Stations	500	e)
5. Broadcasting Stations (other than television)	100	
6. Broadcasting Stations (television, sound and vision) in the band 470-960 MHz:	500 Hz	16)19)
7. Space Stations	20	
8. Earth Stations	20	
Band: 2 450 to 10 500 MHz		
1. Fixed Stations: -power 100 W or less -power above 100 W	200 50	
2. Land Stations	100	
3. Mobile Stations	100	
4. Radiodetermination Stations	1250	e)
5. Space Stations	50	
6. Earth Stations	50	

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable to new transmitters installed after 1st January ~~1964~~ 1983 and to all transmitters after 1st January ~~1966*~~ 1987
Band: 10.5 to 40 GHz	
1. Fixed Stations	300
2. Radiodetermination Stations	5000 e)
3. Broadcasting Stations	100
4. Space Stations	100
5. Earth Stations	100

Notes referring to Table of Frequency Tolerances

(b) In the area covered by the North American Regional Broadcasting Agreement (NARBA) the tolerance of 20 Hz may continue to be applied.

(e) Where specific frequencies are not assigned to radar stations, the bandwidth occupied by the emissions of such stations shall be maintained wholly within the band allocated to the service and the indicated tolerance does not apply.

(k) For ship station transmitters used for direct-printing telegraphy or for data transmission the tolerance is 40 Hz.

(l) For coast station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 15 Hz.

(o) For transmitters used by on-board communication stations a tolerance of 5 ppm shall apply.

(r) For single-sideband transmitters operating in the frequency bands 1 605-4 000 kHz and 4-29.7 MHz which are allocated exclusively to the Aeronautical Mobile (R) Service, the tolerance on the carrier (reference) frequency is :

- for all aeronautical stations 10 Hz
- for all aircraft stations operating on international services 20 Hz
- for aircraft stations operating exclusively on national services 50 Hz

Note : In order to achieve maximum intelligibility it is suggested that Administrations encourage the reduction of this last tolerance to 20 Hz.

(one) If the emergency transmitter is used as the reserve transmitter for the main transmitter, the tolerance for ship station transmitters applies.

(2) For single sideband radiotelephone transmitters the tolerance is 20 Hz.

(3) For radiotelegraphy transmitters with frequency shift keying the tolerance is 10 Hz.

(4) For A1 emissions the tolerance is 50 ppm.

(5) For transmitters used for single-sideband radiotelephony or for frequency-shift keying radiotelegraphy the tolerance is 40 Hz.

(6) For radiobeacon transmitters in the band 1 605 to 1 800 kHz the tolerance is 50 ppm.

(7) For ship station transmitters in the band around 27 120 kHz, on board small craft, with an output power not exceeding 5 watts operating in near coastal waters and utilizing A3 or F3 emissions the frequency tolerance is 40 ppm.

(8) The tolerance is 50 Hz for single sideband radiotelephone transmitters, except for those transmitters operating in the band around 27 120 kHz, and not exceeding a peak envelope power of 15 watts, for which the basic tolerance of 40 ppm applies.

(9) For non-vehicular mounted portable equipment with a mean transmitter power not exceeding 5 watts the tolerance is 40 ppm.

(10) For multi-hop radio-relay systems employing direct frequency conversion the tolerance is 30 ppm.

(11) For a channel spacing of 50 kHz the tolerance is 50 ppm.

(12) These tolerances apply to channel spacings $\geq$ 20 kHz.

(13) These tolerances may not be achieved for non-vehicular mounted portable equipment with a mean transmitter power not exceeding 5 watts.

(14) Further study within the CCIR is required on the applicability of these tolerances.

(15) It is suggested that Administrations avoid carrier frequency differences of a few Hertz, which cause degradations similar to periodic fading. This can be avoided if the frequency tolerance were 0.1 Hz, a tolerance which would also be suitable for single sideband emissions.

(16) In the case of television stations of :

- 50 watts or less in the band 29.7 to 100 MHz
- 100 watts or less in the band 100 to 960 MHz

and which receive their input from other television stations or which serve small isolated communities, it may not, for operational reasons, be possible to maintain this tolerance. For such stations the tolerance is 2 000 Hz.

For stations of 1 watt or less this tolerance may be relaxed further to :

- 5 kHz in the band 100 to 470 MHz
- 10 kHz in the band 470 to 960 MHz.

(17) For transmitters with an output power of 10 kW or less the tolerance is 20 ppm and 15 ppm in the band 1 605 to 4 000 kHz and 4 to 29.7 MHz respectively.

(18) For transmitters of 50 watts or less operating at fequencies less than 108 MHz a tolerance of 3 000 Hz applies.

(19) For transmitters for system M(NTSC) the tolerance is 1 000 Hz. However, for low power transmitters using this system note (16) applies.

(20) For A1 emissions the tolerance is 10 ppm.

APPENDIX 4

Table of Tolerances for the Levels of Spurious Emissions

Canada generally agrees with the results of the SPM on the matter of spurious emissions.

APPENDIX 4

Table of Tolerances for the Levels of Spurious Emissions

Canada generally agrees with the results of the SPM on spurious emissions as given in Annex 8.2.2 attached. Consequently, it is not deemed necessary to formulate detailed proposals for the ITU on the subject. It is however the view of the Department that more stringent rules on spurious emission levels should apply in the future particularly in the VHF/UHF bands and Canada will foster this approach at the 79 WARC.

CCIR STUDY GROUPS
Special Preparatory Meeting (WARC-79)
Geneva 1978

Doc. P/1080-E
16 November 1978

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COMMITTEE H

DRAFT SPM REPORT

CHAPTER 8

(§ 8.2)

8.2 Spurious emissions*

8.2.1 General

(a) Recommendation 329-3 [1/1050] provides limits for spurious emissions for certain services in the frequency range 10 kHz to 960 MHz.

No limits are specified for transmitters operating on fundamental frequencies above 960 MHz. Until agreed limits can be specified for these transmitters their levels of spurious emission shall be as low as practicable.

(b) Recommendation 328-4 [1/1046] distinguishes between out-of-band emissions and spurious emissions, and specifies limits for out-of-band emissions. This section of the Report specifies limits for spurious emissions as defined in § 2.2.3.

(c) In the Radio Regulations the limits of spurious emission are specified in terms of "the mean power". Consideration has shown that it may be desirable to specify the limits for certain emissions in terms of "the peak envelope power" instead of "the mean power", subject to further study.

(d) For the time being, limits for spurious emission shall continue to be expressed in terms of the mean power supplied by the transmitter to the antenna feeder at the frequencies of the spurious emission considered. Furthermore, spurious radiation from any part of the installation other than the antenna system, i.e., the antenna and its tranmission line, shall not have an effect greater than would occur if this antenna system were supplied with the maximum power permissible at that spurious emission frequency. (RR App. 4, Note 2)

8.2.2 Permissible levels of spurious emissions (Annex 8.2.2)

(a) The Table in the Annex 8.2.2 specifies the maximum permissible spurious levels without indicating any spectral distribution. The SPM recognizes the desirability of specifying the levels in the Table in terms of spectral density as power content in a convenient bandwidth such as 4 kHz, and suggests further studies in this regard.

(b) The bandwidth of the measuring equipment shall be sufficiently wide to accept all significant components of the spurious emission concerned.

(c) Attention is drawn to Note 1 of Annex 8.2.2 which indicates that specific services may need lower levels. In particular, Recommendation 478-2 / 8/1008 / describes the limits of spurious emissions of land mobile transmitters, and Report 713 / 4/1053 / describes spurious emissions from Earth stations and space stations of the Fixed-Satellite Service. This latter Report has very tentative conclusions and notes need for further studies.

8.2.3 Conclusions

The conclusions of the SPM are contained in the Table in the Annex 8.2.2. The Table follows the general format of the existing Table in Appendix 4 to the Radio Regulations.

It was decided that the implementation dates were not relevant to technical consideration and these were not discussed at the SPM.

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Chapter of SPM Report	SPM Contributions	Study Group concerned
8.2.2	P/47 P/76 P/132 P/167 P/252 P/265 P/270 P/375	SG 1 SG 2 SG 8 SG 9 SG 10 SG 11

Annex : 1

Annex 8.2.2

Table of maximum permissible levels of spurious emissions

Fundamental frequency band	The mean power of any spurious emission shall not exceed the values specified as minimum levels in Columns A and B below (Notes 1, 10, 11)	
	A Limits applicable to transmitters now in use and to those installed before	B Limits applicable to new transmitters installed after ....., and to all transmitters after .....
Below 30 MHz	40 decibels below the mean power of the fundamental emission without exceeding the power of 50 milliwatts (Notes 3, 4, 5)	40 decibels below the mean power of the fundamental emission without exceeding the power of 50 milliwatts (Notes 2, 3, 4, 5, 8)
30 MHz to 235 MHz for transmitters having mean power: - greater than 25 watts - 25 watts or less	60 decibels below the mean power of the fundamental emission without exceeding 1 milliwat 40 decibels below the mean power of the fundamental emission without exceeding 25 microwatts and without the necessity for reducing this value below 10 microwatts	60 decibels below the mean power of the fundamental emission without exceeding 1 milliwatt (Notes 2, 6, 8) 40 decibels below the mean power of the fundamental emission without exceeding 25 microwatts (Note 2)
235 MHz to 960 MHz for transmitters having mean power: - greater than 25 watts - 25 watts or less		60 decibels below the mean power of the fundamental emission without exceeding 20 milliwatt (Notes 2, 7, 8, 9) 40 decibels below the mean power of the fundamental emission without exceeding 25 microwatts
Above 960 MHz		Due to the diverse nature of technologies employed by services operating above 960 MHz, further study by the CCIR is required prior to specification of levels. The values to be observed shall be those shown in appropriate CCIR Recommendations. Until suitable Recommendations have been adopted, the lowest possible values achievable shall be employed.

Notes :

1. It is recognized that specific services may need lower levels for technical and operational reasons. The values applied to these services shall be those agreed upon by the appropriate service conference. Lower levels also can be fixed by specific agreement between the Administrations concerned.

2. These limits are not appropriate to life-boats, EPIRB's, survival craft and maritime transmitters used in emergency situations.

3. For transmitters having an output power greater than 50 kW which can operate on two or more frequencies, covering a frequency range approaching an octave or more, it may not always be practicable to achieve a suppression greater than 60 dB.

4. For some hand-portable equipment of power less than 5 W, it may not be practicable to achieve a suppression of 40 dB, in which case a suppression of 30 dB should apply.

5. A limit of 50 mW may not be practicable for mobile transmitters, in which case the spurious emission should be at least 40 dB below the fundamental emission, without exceeding the value of 200 mW.

6. In some areas, where the interference problem is not serious, a limit of 10 mW may be sufficient.

7. Where several transmitters feed a common antenna or closely spaced antennae on adjacent frequencies, it may not always be possible to achieve this degree of attenuation for spurious emission, the frequencies of which are close to the occupied band.

8. For radiodetermination stations, until acceptable methods of measurement exist, the lowest practicable level of spurious emission should be achieved.

9. Since the limits mentioned above may not provide adequate protection for receiving stations in the Radioastronomy and Space Services, lower limits might be considered in each individual case in the light of the geographical position of the stations concerned.

10. In the case of suppressed or reduced carrier emissions, the power of the fundamental emission shall be expressed in terms of peak envelope power.

11. When checking compliance with the provisions of the Table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

Appendix 5

Examples of Necessary Bandwidths and Designation of Emissions
(see Article N3/2, Section II)

Chapter 8, Annex 8.3.1 of the SPM Report reflects Canada's proposals for the calculation of the necessary bandwidth.

CCIR STUDY GROUPS
Special Preparatory Meeting (WARC-79)
Geneva 1978

Doc. P/1040-E
15 November 1978

Ref. : Com D; Doc. P/579

COMMITTEE H

DRAFT SPM REPORT CHAPTER 8

(§ 8.3)

8.3 Necessary bandwidth

8.3.1 Introduction

It is necessary to point out at first that the SPM had insufficient information to develop a necessary bandwidth calculation for all the examples of emissions which have been identified in Recommendation 507, and which may be suitable for a complete consideration of the matter at WARC-79.

Appendix 5 to the Radio Regulations indicates three methods of determining necessary bandwidth, i.e.,

(a) use of the formulae included in its Table which also gives examples of necessary bandwidths and designation of corresponding emissions;

(b) computation in accordance with CCIR Recommendations;

(c) measurement, in cases not covered by (a) or (b) above.

/ It is further noted that only a CCIR Report (418-1) exists. The WARC-79 may wish to request the CCIR expedite its studies and formulate an appropriate Recommendation at an early date based on recent development of radioelectronic technology. The Recommendation could be supplemented from time to time as required to provide current examples of necessary bandwidth for use with Appendix 5 as stated in its present text. /

Several contributions to the SPM were considered, along with Report 418-1, and are believed appropriate for referral to the WARC-79. An examination of Appendix 5 to the Radio Regulations, Report 418-1 and these contributions, has resulted in a new proposal which is presented in the attached Annex 8.3.1, and which the WARC-79 may wish to examine when reviewing Appendix 5.

8.3.2 Definition of necessary bandwidth

In Chapter 2, it is concluded that consideration should be given to replacing the definition of necessary bandwidth in RR 3140/91 by that contained in Recommendation 328-4. As the previous reference to occupied bandwidth is omitted, the necessary bandwidth for each class of emission should be derived from one of the three methods described in Appendix 5. / 1/1046 /

8.3.3 Necessary bandwidth for various classes of emissions

8.3.3.1 Amplitude modulated emissions

The major suggestions made in § I of the Table (of Annex 8.3.1) are based on the following considerations :

(a) Facsimile, carrier modulated by tone and by keying

This type of emission has not been included as being wasteful of bandwidth and in conflict with Recommendations 343-1 and 344-2. It has been replaced by facsimile by sub-carrier frequency modulation of a single-sideband emission with reduced carrier.

The example has been brought in line with Recommendation 344-2 and the relevant Recommendations T1 and T15 of the CCITT by including one of the standard values of the index of cooperation, rather than mentioning the present (non-standardized) values of cylinder diameter and number of lines per millimetre.

The formula for the necessary bandwidth is based on that for frequency-shift telegraphy (F1) discussed in § 8.3.4.

(b) Television (vision and sound)

The terminology employed is that used by the CCIR Service Study Group concerned.

(c) Composite emissions

Two examples of composite emissions given in Report 418-1 have been included.

8.3.3.2 Frequency modulation emissions

The major suggestions in § II of the Table are based on the following considerations :

(a) Frequency-shift telegraphy

After reviewing the formulae for calculating the necessary bandwidth of the various classes of frequency modulation telegraphy emissions given in Appendix 5 and the contributions to the SPM relating to this subject, it is concluded that it would be desirable, and also possible, to use a single, basic expression for all frequency-shift emissions.

The formula developed is in very close agreement with results using the present two formulae of Appendix 5 and the more complex expression for F1 emissions given in Report 179-1. It also permits the necessary bandwidth to be calculated for modulation indices down to the value of about 0.4 used in modern systems.*

Finally, the example given in the third column of the Table has been brought in line with the provisions of Recommendation 246-3.

(b) Commercial telephony

The peak frequency deviation D used in this example is the value most commonly used for a channel spacing of 25 kHz.

(c) Facsimile

Because the formula and the example given in Appendix 5 no longer correspond to the class of emission F4, they could be replaced by the three formulae and the example given in Report 418-1. However, since there is a discontinuity in the three formulae covering modulation indices from 0.14 to 3.45, it is suggested that they be replaced by a single formula similar to that used for frequency-shift telegraphy emissions.*

The example given has been brought in line with the provisions of Recommendations 343-1 and 344-2. It is similar to that described in § 8.3.3, Item (a).

(d) Four frequency diplex telegraphy

It is felt that the formula given in Report 418-1 is more appropriate than that in Appendix 5. However, it is proposed that this formula is written in the basic form as for F1 and F4 emissions, because this has proved to be in better agreement with recent results of measurement.* The example has been brought in line with Recommendation 346-1.

(e) Composite emissions

The following examples have been included in the Table :

- Microwave radio-relay systems using FM/FDM

  These examples as well as § II.B of the Table of Annex 8.3.1 which has to be used for the calculation of the necessary bandwidth have been taken from Report 418-1.

- Stereophonic frequency modulation broadcasting

  The example has also been taken from Report 418-1.

8.3.3.3 Pulse modulated emissions

The deviations from Appendix 5 are based on the following considerations :

(a) Unmodulated pulse emission

The general formula given in Appendix 5 for an unmodulated pulse emission was retained, but the example in the third column has been replaced by the case of a series of triangular pulses produced by a radar station.*

One input document was concerned with the spectrum produced by a series of trapezoidal pulses. Although the significance of this contribution should be recognized, it seemed premature to include the formulae.*

(b) Modulated pulse emissions

Because a general method has not yet been established to determine the necessary bandwidth for modulated pulse emissions P2 and P3, formulae and examples have not been included in the Table.

(c) Composite pulse emission

The Table contains the example of the pulse position modulated radio-relay system given in Report 410-1.

8.3.3.4 Digital radiocommunication systems

A significant number of modulation techniques particular to digital radiocommunication systems is still in the early stage of development. After reviewing Report 378-3 and the input documents to the SPM pertinent to the subject, it was concluded that none of these should be proposed at this time, but that further study is particularly needed of digital systems using phase, frequency, or amplitude modulation. Design factor, F, and bit rate, R, need special attention along with the formulae for calculating necessary bandwidth.* /9/1053/

* List of SPM documents used in preparing the paragraphs of the Report marked by an asterisk.

Sections of the Report	Contributions to the SPM	Study Groups concerned
8.3.3.2	P/17	1, 3, 4, 8, 9
8.3.3.3	P/17 P/216	1, 3, 4, 8, 9 1, 8
8.3.3.4	P/17 P/193	1, 3, 4, 8, 9 1, 4, 9

Annex 8.3.1

Examples of Necessary Bandwidths and Designations of Emissions

The necessary bandwidth may be determined by one of the following methods:

a) use of the formulae included in the following Table which also gives examples of necessary bandwidths and designation of corresponding emissions;

b) computation in accordance with C.C.I.R. Recommendations;

c) measurement, in cases not covered by *a)* or *b)* above.

The value so determined should be used when the full designation of an emission is required.

However, the necessary bandwidth so determined is not the only characteristic of an emission to be considered in evaluating the interference that may be caused by that emission.

In the formulation of the Table, the following terms have been employed:

B_n = Necessary bandwidth in hertz.

B = Modulation rate in bauds.

N = Maximum possible number of black plus white elements to be transmitted per second, in facsimile.

M = Maximum modulation frequency in hertz.

C = Sub-carrier frequency in hertz.

D = Peak deviation, i.e., half the difference between the maximum and minimum values of the instantaneous frequency. The instantaneous frequency in hertz is the time rate of change of phase in radians divided by 2π.

t = Pulse duration in seconds at half-amplitude.

t_r = Pulse rise time in seconds between 10% and 90% amplitude.

K = An overall numerical factor which varies according to the emission and which depends upon the allowable signal distortion

N_c: number of baseband telephone channels in radio systems employing multichannel multiplex telephony;

f_p : continuity pilot subcarrier frequency (Hz) (continuous signal utilized to verify performance of frequency division multiplex systems).

Type of emission (1)	Necessary bandwidth		Designation of emission (1)	Rec. 507 designation
	Formula	Details		
I. AMPLITUDE MODULATION				
Continuous wave Telegraphy	$B_n = BK$ K = 5 for fading circuits K = 3 for non-fading circuits	Morse code at 25 words per minute, B = 20, K = 5, Bandwidth: 100 Hz.	0·1A1	100HA1AAN
Telegraphy by on-off keying of a tone modulated carrier	$B_n = BK + 2M$ K = 5 for fading circuits K = 3 for non-fading circuits	Morse code at 25 words per minute, B = 20, M = 1 000, K = 5; Bandwidth: 2 100 Hz.	2·1A2	2K10A2AAN
Commercial telephony	B_n = 2M for double sideband	Double sideband telephony, M = 3 000; Bandwidth: 6 000 Hz.	6A3	6K00A3EJN
	B_n = sum of M for each sideband for independent sideband	Telephony, two independent sidebands, M = 3 000; Bandwidth: 6 000 Hz	6A3B	6K00B8EJN
	B_n = M for single sideband reduced carrier	Single sideband telephony, reduced carrier, M = 3 000; Bandwidth: 3 000 Hz.	3A3A	3K00R3EJN
	B_n = M - lowest modulation frequency for single sideband suppressed carrier	Single sideband telephony suppressed carrier, M = 3 000 lowest modulation frequency = 300 Hz; Bandwidth: 2 700 Hz.	2.7A3J	2K70J3EJN
Sound Broadcasting	B_n = 2 M M may vary between 4 000 and 10 000 depending on the quality desired.	Speech and music, M = 4 000; Bandwidth: 8 000 Hz.	8A3	8K00A3EGN

(1) see Article N 3

Type of emission (1)	Necessary bandwidth: Formula	Necessary bandwidth: Details	Designation of emission (1)	Rec. 507 designation
Facsimile by sub-carrier frequency modulation of a SSB emission with reduced carrier	$B_n = C + \frac{N}{2} + DK$ K = 1.1 typically	N = 1100 (half-tone) corresponding to an index of cooperation of 352 and a cylinder rotation speed of 60 rpm. Index of cooperation is product of drum diameter and number of lines per unit length C = 1900 D = 400 Bandwidth = 2 890 Hz	2.89 A4A	2K89R3CMN
Television (vision and sound)	Refer to relevant C.C.I.R. documents for the bandwidths of the commonly used television systems.	Number of lines = 625; Nominal video bandwidth : 5 MHz Sound carrier relative to video carrier = 5.5 MHz Total vision bandwidth : 6.25 MHz FM sound bandwidth including guard bands : 0.75 MHz RF channel bandwidth : 7 MHz	6 250A5C 750F3	6M25C3F 750KF3EGN
Composite emission	$B_n = 2C + 2M + 2D$ (Double sideband)	Television relay, video limited to 5 MHz, audio on 6.5 MHz frequency modulated sub-carrier, sub-carrier deviation = 50 kHz C : 6.5 MHz D : 50 kHz M : 15 kHz Bandwidth : 13.13 x 10^6 Hz.	13130A9	13M1A8W
Composite emission	$B_n = 2\Delta f$ (double sidebund)	Radio-relay system providing 10 voice channels occupying base-band between 1 and 164 kHz; Δf = 164 000; Bandwidth: 328 000 Hz.	328A9	328KA8E
II-A FREQUENCY MODULATION				
Telegraphy by frequency shift keying	$B_n = 2M + 2DK$ M = B/2 K = 1.2 normally	Single channel B = 100 bauds D = 85 Hz (170 Hz shift) B_n = 304 Hz	0.30F1	304HF1B

(1) see Article N 3

Type of emission (1)	Necessary bandwidth		Designation of emission (1)	Rec. 507 designation
	Formula	Details		
Commercial Telephony	$B_n = 2M + 2DK$ K is normally 1 but under certain conditions a higher value may be necessary.	For an average case of commercial telephony, $D = 5\,000$ $M = 3\,000$; Bandwidth: 16 000 Hz.	16F3	16K0F3EJN
Sound Broadcasting	$B_n = 2M + 2DK$	Monaural $D = 75000$, $M = 15\,000$ and assuming $K = 1$; Bandwidth: 180 000 Hz.	180F3	180KF3EGN
Facsimile by direct frequency modulation of the carrier	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ $K = 1.1$	N = 1100 elements/sec (black and white) D = 400 Hz B_n = 1 980 Hz	1.98 F4	1K98F1C
Four-frequency Diplex telegraphy	$B_n = 2M + 2DK$ B = Modulation rate in bauds of the faster channel. If the channels are synchronized M = B/2 (otherwise M = 2B) K = 1.1	Spacing between adjacent frequencies = 400 Hz Synchronized channels. B = 100 bauds; M = 50 D = 600 B_n = 1 420 Hz	1.42 F6	1K42F7BDX
Composite transmission	$B_n = 2f_p + 2DK$ $K = 1$	Microwave radio relay system: FM/FDM 60 telephone channels occupying baseband between 60 and 300 kHz; rms per-channel deviation 200 kHz; continuity pilot at 331 kHz produces 100 kHz rms deviation of main carrier. Computation of B_n: See Table II-B below $D = 200 \times 10^3 \times 3.76 \times 2.02$ $= 1.52 \times 10^6$ Hz $f_p = 0.331 \times 10^6$ Hz; Bandwidth: 3.702×10^6 Hz.	3700F9	3M70F8EJF
Composite transmission	$B_n = 2M + 2DK$ $K = 1$	Microwave radio relay system: FM/FDM 960 telephone channels occupying baseband between 60 and 4028 kHz; rms per-channel deviation 200 kHz; continuity pilot at 4715 kHz produces 140 kHz rms deviation of main carrier. Computation of B_n: See Table II-B below $D = 200 \times 10^3 \times 3.76 \times 5.5$ $= 4.13 \times 10^6$ Hz; $M = 4.028 \times 10^6$ Hz; $f_p = 4.715 \times 10^6$ Hz; $(2M + 2DK) > 2f_p$ Bandwidth B_n 16.32×10^6 Hz.	16300F9	16M3F8EJF

(1) see Article N 3

Type of emission (1)	Necessary bandwidth		Designation of emission (1)	Rec. 507 designation
	Formula	Details		
Composite transmission	$B_n = 2f_p$	Microwave radio relay system: **FM/FDM** 600 telephone channels occupying baseband between 60 and 2540 kHz; rms per-channel deviation 200 kHz; continuity pilot at 8500 kHz produces 140 kHz rms deviation of main carrier. Computation of B_n: **See Table II-B below** $D = 200 \times 10^3 \times 3.76 \times 4.36 = 3.28 \times 10^6$ Hz. $M = 2.54 \times 10^6$ Hz; $K = 1$; $f_p = 8.5 \times 10^6$ Hz; $(2M + 2DK) < 2f_p$ Bandwidth B_n 17×10^6 Hz.	17000F9	17M0F8EJF
Composite transmission	$B_n = 2M + 2DK$ $K = 1$	Stereophonic frequency modulation broadcasting (pilot tone system) with multiplexed subsidiary telephony subcarrier; $M = 75\,000$ Hz; $D = 75\,000$ Hz; Bandwidth B_n 300 000 Hz.	300 F9	300KF8EHF

II.B MULTIPLYING FACTORS FOR USE IN COMPUTING D, PEAK FREQUENCY DEVIATION, IN FM FREQUENCY DIVISION MULTIPLEX (FM/FDM) MULTI-CHANNEL EMISSIONS

For FM/FDM systems the necessary bandwidth is :

$$B_n = 2M + 2DK.$$

The value of D or peak frequency deviation in this formula for B_n is calculated by multiplying the r.m.s. value of per-channel deviation by the appropriate "Multiplying factor" shown below.

In the case where a continuity pilot of frequency f_p exists above the maximum modulation frequency, M, the general formula becomes :

$$B_n = 2f_p + 2DK.$$

In the case where modulation index of the main carrier produced by the pilot is less than 0.25, and the r.m.s. frequency deviation of the main carrier by the pilot is less than or equal to 70 % of the r.m.s. value of per-channel deviation, the general formula becomes either

$$B_n = 2f_p \text{ or } B_n = 2M + 2DK$$

whichever is greater.

(1) see Article N 3

Number of telephone channels, N_c	Multiplying factor (1)
	(peak factor) + antilog $\left[\frac{\text{dB above modulation reference level}}{20}\right]$
$3 < N_c < 12$	(4·47) + antilog $\left[\frac{\text{a value in dB specified by the equipment manufacturer or station licensee, subject to administration approval.}}{20}\right]$
$12 \leqslant N_c < 60$	(3·76) + antilog $\left[\frac{(2{\cdot}6 + 2 \log N_c)}{20}\right]$
$60 \leqslant N_c < 240$	(3·76) + antilog $\left[\frac{(-1 + 4 \log N_c)}{20}\right]$
$N_c \geqslant 240$	(3·76) + antilog $\left[\frac{(-15 + 10 \log N_c)}{20}\right]$

(1) In the above chart, the multipliers 3·76 and 4·47 correspond to peak factors of 11·5 dB and 13·0 dB, respectively.

Type of emission (1)	Necessary bandwidth		Designation of emission (1)	Rec. 507 designation
	Formula	Details		
III. PULSE MODULATION				
Unmodulated pulse emission	$B_n = \frac{2K}{t}$ K depends upon the ratio of pulse duration to pulse rise time. Its value usually falls between 1 and 10 and in many cases it does not need to exceed 6.	Primary radar Range resolution 150 m. K = 1.5 (triangular pulse where $t \approx t_r$, only components down to -27 dB from the strongest are considered) Then $t = \frac{2 \text{ (range resolution)}}{\text{velocity of light}}$ $= \frac{2 \times 150}{3 \times 10^8}$ $= 1 \times 10^{-6}$ seconds $B_n = 3 \times 10^6$ Hz	3000 P0	3M00P0N AN
Composite emission	$B_n = \frac{2K}{t}$ $K = 1.6$	Radio-relay system, pulse-position modulated by 36-voice channel baseband; pulse width at half amplitude = 0·4 μs; Bandwidth: 8×10^6 Hz. (bandwidth independent of the number of voice channels)	8000 P9	8M00M7EJT

(1) see Article N 3

APPENDIX 9

Service Documents

(See Articles N9/8, N12/9, N13/9A, N15/10 and N24/20)

SUP List III B. List of Broadcasting Stations Operating in Bands between 5950 and 26100 kHz

Reason: Information for this list was obtained from annual High Frequency Broadcasting List which was discontinued in 1971. (List IIIB on hand is dated 1967).

APPENDIX 28

~~Spa2~~

Procedure for Determination of the Coordination Area around an Earth Station in Frequency Bands between 1 and 40 GHz shared between Space and Terrestrial Radiocommunication Services

MOD 1. Modify the entire text of this Appendix in accordance with CCIR Report 382-3 which has been adopted by the XIVth Plenary Assembly of the CCIR, 1978.

2. Retain the concept of frequency ranges used in the heading of Tables I and II as outlined in Report 382-3 instead of the more detailed frequency band headings used in Appendix 28 (Spa2).

3. Add the Auxiliary-Satellite Service to those columns of Table II below 20 GHz, which are pertinent to the Fixed-Satellite Service.

4. Incorporate the concept of using auxiliary contours within the coordination area of an earth station, as recognized in section 1 of Report 382-3, by retaining the detailed procedure as given in Annex B to Appendix 28 (Spa2).

Reasons:

1. Appendix 28 (Spa2) was largely based on the outcome of the CCIR Special Joint Meeting, 1971. Since that time, various Study Groups of the CCIR have devoted considerable effort to the task of improving the prediction techniques and the propagation data. Report 382-3, as approved by the CCIR XIVth Plenary Assembly, represents a considerable improvement over Appendix 28, both in terms of the propagation/interference mechanisms accounted for, and the ease-of-use of this relatively complex procedure. It is significant that both computerized techniques as well as the conventional graphical techniques can be employed.

2. The use of frequency ranges in Tables I and II will keep the latter to a manageable size. The increasing number of newly-shared bands, each of which may be either analogue or digital, is too great to accommodate easily in the Tables.

3. Canada notes with concern the questions raised by two Administrations at the SPM about the validity of certain parameters used in CCIR Report 382-3 for the determination of coordination area around an earth station. The use of Report 382-3 usually will result in larger coordination distances and it was the claim of these Administrations that operational experience to date using Appendix 28 (Spa2) did not in general

warrant the increase. However, other Administrations refuted this claim. The crux of the problem lay in the lack of available data necessary to evaluate any modification to the propagation parameters. It should be noted that the SPM was in full agreement that the procedures of CCIR Report 382-3 were generally acceptable as a replacement for Appendix 28 (Spa2). Thus, based on the present situation, Canada proposes:

i) that an appropriate working group of the Technical Committee be established at an early stage of the Conference to resolve this matter;

ii) that Administrations ensure that propagation and operational experts are available, with any available data, for these discussions; and,

iii) that, failing a resolution of this concern, the SPM conclusions be supported, and that any new data will be evaluated by the CCIR.

Discussion (Appendix 28)

The foregoing proposals were discussed in the Supplement to the Canadian Second Draft Proposals. Again, it should be noted that CCIR Report 382-3 (Kyoto 1978) has not been attached due to its size (43 pages) but is available on request.

Regarding the discussions at the SPM, Canada has expressed its concern over the hesitation to accept Report 382-3 as a basis for improving App 28 (Spa2). While it is important to have the best possible models and paramters based on both theory and measurement, the questions raised, without substantiation, may cast a shadow of doubt over the whole procedure. It is our intention to do everything possible to resolve this situation prior to, or very early during the WARC.

MOD APPENDIX 29

~~Spa2~~

Method of Calculation to evaluate the Degree of Interference between geostationary Satellite Networks Sharing the same Frequency Bands

Canada supports the conclusions of the SPM on revision of this Appendix as outlined below:

a) that the method given in Appendix 29 (Spa2) is still the most appropriate for determining whether two satellite networks need to be coordinated;

b) that an upward revision in the allowable value of increase in the equivalent satellite link noise temperature is justified, i.e. from 2 percent to 3 percent;

c) that some modifications to the procedure in Appendix 29 (Spa2) are desirable to reflect the most recent conclusions of CCIR Report 454-2; and,

d) that it is desirable to use topocentric angles in determining earth station antenna discrimination.

Reason: To reflect the result of recent studies of the CCIR and of the SPM.

Discussion (Appendix 29)

Canada continues to support the maintenance of the methodology of Appendix 29 (Spa2) as the general basis for determining whether two satellite networks need to be coordinated. The recent agreement that the maximym permissible single-entry, interference allowance would be increased from 40 pW0p to 600 pW0p, has led to the conclusion that the increase in the permissible equivalent satellite link noise temperature should be increased from 2% to 3%.

CCIR Report 454-2 contains new information which should be added to Appendix 29 (Spa2), specifically regarding approaches for handling the cases: 1) when only the up-path or down-path of the wanted satellite network shares a frequency band with the interfering satellite network; and 2) when signal-processing transponders are used. (See Attachment I for more details.)

The benefits of using topocentric angles instead of the present geocentric angles when determining earth station antenna discrimination has been recognized by the SPM. It seems worthwhile to use the actual angular geometry as seen by the earth station, i.e. topocentric angles.

ATTACHMENT I

Excerpt from the SPM Report Regarding App 29

This method is also described in CCIR Report 454-2, which contains the following technical information not currently reflected in Appendix 29 :

(a) If only the up-path or the down-path of the wanted satellite network shares a frequency band with the interfering satellite network, then the increase in equivalent noise temperature for the complete satellite link (ΔT) should be calculated with the increase in either the receiver noise temperature of the satellite (ΔTs) or the Earth station (ΔTe) having a zero value for the appropriate path. The SPM concluded that this information should be added to Appendix 29.

(b) Procedure for signal-processing transponders

In cases where a change in modulation, or re-generation of the signal, occurs in the satellite, computation of the effects of up-path interference on the total link performance will require special procedures which have not yet been developed by CCIR. In some cases, for example analogue signal processing transponders involving signal demodulation and re-modulation, it should be possible to compute an appropriate value for the transmission gain of the satellite link as defined in Appendix 29 (γ) which will take into account the signal processing and relate the up-path interference contribution to the down-path.

In other cases, it may not be possible to compute a γ which reasonably accounts for the signal processing in the satellite such as with digital regenerating transponders. In these cases, it would be necessary to treat the up-path and down-path separately, and separate up-path and down-path equivalent link noise temperatures for the up-path and down-path respectively, Tseq being the total up-path equivalent system temperature referred to the satellite receiver input, and Teeq the total down-path equivalent system temperature referred to the Earth station receiver input. Then $\Delta Ts/Tseq$ and $\Delta Te/Teeq$ would be computed and compared with a pre-determined value. The SPM concluded that further study of these particular cases is required.

ADD

RESOLUTION NO. A

Relating to Certain Entries in the
Master International Frequency Register
in the Bands below 27500 kHz

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that the Extraordinary Administrative Radio Conference, Geneva, 1951, adopted an International Frequency List which included entries not in conformity with the Table of Frequency Allocations, Atlantic City, 1947;

b) that the Administrative Radio Conference, Geneva, 1959, introduced the concept of primary and secondary services as defined in Article 5 of the Radio Regulations, Geneva, 1959 thus modifying the Table of Frequency Allocations, Atlantic City, 1947 resulting in the loss of priority for certain entries in the International Frequency List;

c) that the Administrative Radio Conference, Geneva, 1959, in the establishment of the Master International Frequency Register gave special consideration and treatment in the transfer of these entries from the Master Radio Frequency Record in accordance with the provisions of Resolution No. 4, Geneva, 1959;

further considering

d) that Administrations were urged to take the required action; and

e) that the next Administrative Radio Conference was invited to reconsider the situation;

resolves

1. that the Board commencing June 1, 1980 shall re-examine all entries in the Master International Frequency Register considered as a permitted service as a result of the applications of Resolution No. 4, Geneva, 1959 for their conformity with Article N7/5 of the Radio Regulations, 1976 Edition as modified by the 1979 World Administrative Radio Conference and make appropriate corrections as to priority dates and findings for all entries that are no longer in conformity with the Table of Frequency Allocations. The date of 1st January, 1982 would be entered into the Remarks Column;

2. that those entries for assignments which, in accordance with Article N7/5 of the Radio Regulations are considered to be a primary service, shall retain their original date(s);

3. that for those entries for assignments which, in accordance with Article N7/5 of the Radio Regulations, would then be considered to be a secondary service, the date in column 2a shall be transferred to column 2b, and in each case a special remark explaining the reason thereof will be entered in the Remarks Column of the Master Register.

Reason: Resolution No. A proposed in accordance with the decisions of the Administrative Radio Conference, Geneva, 1959, Resolution No. 4.

ADD

RESOLUTION NO. B

Relating to the Implementation of
1979 World Administrative Radio Conference
Article N7/5, Frequency Allocation Decisions.

The World Administrative Radio Conference, Geneva, 1979,
considering

a) that, as a result of changes to the Table of Frequency Allocations, certain existing entries for assignments in the Master International Frequency Register would no longer be in conformity with the provisions of Article N7/5 of the Radio Regulations;

b) that provisions have to be made to bring such operations into conformity with Article N7/5;

c) that the International Frequency Registration Board should carry out a study and make appropriate changes to entries in the Master International Frequency Register;

resolves

1. that these assignments should be brought into conformity with the provisions of the Radio Regulations, Geneva, 1979, as soon as possible, and in any event not later than 31st December, 1983, either by their transfer to appropriate bands or by discontinuance of the operations of the services concerned. Until the date this has been done or until 31st December 1983, whichever date is the earlier, the assignments concerned shall be considered as being for a permitted service as defined in Article N7/5 of the Radio Regulations, Geneva;

2. that the International Frequency Registration Board shall, commencing as of 1st June, 1980, examine entries in frequency bands which have been reallocated and in cases where entries are not in conformity with Article N7/5, shall on 1st January, 1981 transfer dates appearing in Column 2a of the Master International Frequency Register to Column 2b and enter in Column 13 a symbol to indicate non-conformity with the Table of Frequency Allocations, the International Frequency Registration Board shall draw the attention of the Administration concerned to these entries as soon as possible;

3. that, 30 days prior to 31st December, 1983, the International Frequency Registration Board shall send to Administrations extracts from the Master Register showing the relevant entries contained therein on their behalf, and shall remind them of the provisions of this Resolution. As of 31st December 1983, the International Frequency Registration Board shall cancel the entries concerned.

ADD Recommendation No. A

to the CCIR Relating to the Tolerances for the Levels of Spurious Emissions.

The World Administrative Radio Conference, Geneva, 1979, considering

a) that Appendix 4 to the Radio Regulations specifies tolerances which shall apply to the mean power of any spurious emission supplied by a transmitter to the antenna transmission line up to 960 MHz;

b) that there is a variety of emissions, according to service, ranging from modulated continuous waves to pulsed waves of high power, and leading to difficulties in the interpretation of the term "mean power" and its application;

c) that spurious emissions have high potential in causing interference to stations operating in other services, although this problem is mitigated by using highly directional antenna;

d) that in large metropolitan areas radio spectrum usage above 960 MHz is extensive and rapidly growing;

e) that much of this growth in urban areas is now taking place above 10 GHz.

invites the CCIR

1. to continue its study of spurious radiation above 960 MHz for the various radio services;

2. to categorize these tolerances according to classes of emission as appropriate whose magnitude are readily measured whether thy be peak or mean power levels.

Reason: To ask the CCIR to provide appropriate spurious emission tolerances above 960 MHz.

ADD Recommendation No. B

to the CCIR Relating to Examples of Necessary Bandwidth

The World Administrative Radio Conference, Geneva, 1979, considering

a) that Article N3/2 of the Radio Regulations requires that the necessary bandwidth be a part of the designation of an emission;

b) that Appendix 5 gives a partial list of examples of necessary bandwidths of some typical emissions;

c) that adding to this list may make Appendix 5 unduly cumbersome and bulky.

invites the CCIR

1. to develop a Table similar to Appendix 5 to which Administrations can make reference;

2. to progressively update and add to this Table to include all types of emissions

Reason: As explained in text.