THIRD VOLUME

of

PROPOSALS

for suitable methods of bringing the entire Atlantic City Frequency Allocation Table into operation

(Administrative Council Resolutions Nos. 199 and 200)

INTERNATIONAL TELECOMMUNICATION UNION

GENEVA, 1951

INDEX TO THE THIRD VOLUME OF PROPOSALS

INTRODUCTION

In Resolution No. 199, (Fifth Session, September 1950), concerning preparation for the Extraordinary Administrative Radio Conference to meet in Geneva on 16th August 1951, the Administrative Council requested:

" .....

"pending the meeting of the Conference and in order to facilitate and shorten its work;

" a) the active assistance of the I.F.R.B. (in accordance with paragraph c) of the Atlantic City Resolution relating to the participation in the P.F.B. of Members of the I.F.R.B.) and of all Members of the Union in studying and making proposals for suitable methods of bringing the entire Atlantic City Table of Frequency Allocations into operation as soon as possible;

" b) the I.F.R.B. to assemble and collate all ..... proposals and to circulate them to Members of the Union at least two months before the Conference."

In addition, the Administrative Council, in its Resolution 200, laid down the programme of preparation for the Extraordinary Administrative Radio Conference.

The present volume contains the proposal received by the I.F.R.B. since 15th May 1951. This proposal has already been forwarded, in English, at the request of the Administration concerned, to Members of the Union under cover of Circular-letter No. D 2090/R dated 3 July 1951. As time has not permitted the transmission of this volume to Members of the Union prior to the Extraordinary Administrative Radio Conference, it is submitted directly to the Conference itself.

Further proposals received prior to 16th August 1951 will also be presented directly to the Conference.

PAGE INTENTIONALLY LEFT BLANK

PAGE LAISSEE EN BLANC INTENTIONNELLEMENT

PROPOSAL No. 11

INDIA

(Letter IDWB-15/51 of 23rd June 1951)

I am directed to refer to Resolution 200 of the Administrative Council, Fifth Session, inviting countries to submit proposals relating to methods of implementing those parts of Atlantic City Allocation Tables for which the Extraordinary Radio Conference is not likely to establish a frequency list. It is regretted that it has not been possible to send a proposal up to now as the studies in that connection had not been completed.

2. I am now directed to enclose three copies of a paper outlining India's proposal for the implementation of the Atlantic City Allocation Tables for the consideration of the Extraordinary Administrative Radio Conference. As the time before the Conference is now limited, to avoid delay in circulating it to the various member-countries, this Administration has printed the proposal and has sent you by air freight 150 copies of the same. It is requested that these copies in English may be circulated immediately by air mail to the members for their consideration. Translations as necessary under I.T.U. regulations may be circulated in due course.

3. I am to add that this proposal would be open to modifications in the light of discussions at the Extraordinary Conference.

INDEX

EXTRAORDINARY ADMINISTRATIVE RADIO CONFERENCE AUGUST 1951

A PROPOSAL TO IMPLEMENT THE ATLANTIC CITY ALLOCATION TABLES BY INDIA

1. INTRODUCTION

1.1. In the preparation of this paper the following abbreviations have been used :

E.A.R.C.—Extraordinary Administrative Radio Conference—August 1951.

P.F.B.—Provisional Frequency Board.

I.F.R.B.—International Frequency Registration Board.

I.F.L.—The new International Frequency List contemplated by the Atlantic City Radio Conference.

Berne List—The list of frequency registrations published by the I.T.U. according to the Cairo Radio Regulations.

I.T.U.—International Telecommunication Union.

1.2. The following have been taken as the basis for the formulation of these proposals :—

1.2.1. The agenda for the E.A.R.C. as outlined in Resolution No. 199 by the Administrative Council and subsequently approved by the members,

1.2.2. The complete frequency assignments plans that have been prepared by the International Administrative Aeronautical Radio Conference, the Region 3 Administrative Radio Conference and the Maritime Mobile Group of the P.F.B.,

1.2.3. The work done by the P.F.B. with respect to the Fixed Service Bands between 3·9 and 27 5 Mc/s, and

1.2.4. The work done by the various High Frequency Broadcasting Conferences up to 1950.

1.3. It has been assumed that it would not be impracticable to have different dates of implementation for the different services, but Fixed Services have to be accommodated first for clearing the bands for the other Services.

1.4. It has also been assumed that there is general agreement on the need for implementing the A. C. Allocation Tables at as early a date as practicable. But judging from the experience gained in the P.F.B., it would appear to be improbable that the E.A.R.C. would attempt to prepare a detailed frequency assignment plan for the Fixed Service Bands dealt with by the P.F.B. It is, therefore, necessary to explore quicker and more acceptable methods keeping in view the basic implications behind the adoption of the new Allocation Tables at Atlantic City.

1.5. The fundamental problem is that of fitting all the Fixed Service operations, which have increased considerably since the Cairo Allocation Tables were adopted into a spectrum space which has been very much reduced from what it was for this

service in the Cairo Allocation Tables. In other words, it is one of clearing the existing fixed services from those portions of the spectrum which belonged to that service in the Cairo Allocation Tables, but have been since allocated to other services in the Atlantic City Tables. Consequently in the following paras the fixed service has been dealt with first and the other services subsequently.

1.6. The Land Mobile Service has not been dealt with separately in these proposals as its problem is more or less identical with that of the Fixed Service. It has, therefore, been assumed that any solution that is found for the problem of the Fixed Service would be applicable equally to the Land Mobile Service also.

2. FIXED SERVICE BANDS BETWEEN 3.9 AND 27.5 Mc/s.

2.1. *Background to the New Allocation Tables adopted at Atlantic City.*

2.1.1. It was recognised at Atlantic City that before the new allocation tables can be implemented a compilation of a new I.F.L. was pre-requisite. It was also recognised that until frequency assignments were made for all services it will not be certain that the most effective use has been made of the frequency spectrum or that the frequency requirements of any service can be satisfied (*vide* ' B ' of the preamble to the Resolution relating to the preparation of a new I.F.L.). Article 13 of the Resolution itself refers to the method by which priorities were to be accorded in the entries in the new I.F.L. In such a new list it was expected that some free space would be made available for countries to develop their future radio communications. In fact, Article 13 of the Resolution, referred to above, specifically enjoined on the P.F.B. to make adequate provision for the future development of radio services. The countries which were backward in the radio field and which did not have reasonably high priorities in the Berne List were, therefore, looking with hope to the preparation of a New I.F.L. which would give them an opportunity to find some space for developing at least their essential communications.

Thus, it was implicit throughout—

(*i*) that the existing Berne List does not reflect realistically the present conditions of radio usage, nor would it accommodate the reasonable needs of all countries within the reduced spectrum space allotted to the fixed service in Atlantic City allocations, and that the Berne List should, therefore, be replaced by a more equitable one in which all the essential requirements of countries would be accommodated on the basis of an equal priority, and

(*ii*) that the preparation of a satisfactory New I.F.L. is a pre-requisite condition for implementing the Atlantic City allocation tables.

2.1.2. *India, therefore, does not consider that a date for the implementation of the Atlantic City Tables can be agreed upon unless a solution is found to satisfy the essential requirements of under-developed countries on a reasonably comparable footing with others.*

2.1.3. It was further expected at Atlantic City and hoped at the beginning of the P.F.B. that it would be possible to prepare a satisfactory new frequency list by the application of engineering principles. But the work of the P.F.B. has shown that the application of mere engineering principles as developed by it led to an artificial congestion of the spectrum. It became impossible to accommodate all the stated essential requirements of the countries within the spectrum space available and the P.F.B. failed in its work mainly because it could not take into consideration the inci dence of traffic on the various circuits. As it had to assume that many of the circuits filed before it were more or less working throughout the 24 hours, many of the existing patterns of time sharing of frequencies were ignored and the requirements of spectrum space became enlarged to the extent of giving a very unrealistic picture.

2.2. *Essential task that should be done by the E.A.R.C.*

Proposals have now been made to implement the Atlantic City Allocation Tables and fix a date for the same. Various countries have suggested as to how the actual implementation should be done on this date. Although differing in details, the fundamental thought running through the majority of these proposals is to base the implementation purely on the Berne List of priorities. While it has to be recognised that many sharing patterns in Berne List have far greater realism in them than was thought of at Atlantic City, and it would certainly be desirable to preserve these patterns as far as possible in any new list, India considers that to carry into a new list all the Berne List priorities in toto would be entirely against the basic agreements on which the new allocation tables were framed, namely that equal priorities would be given to the essential requirements of all the countries. India, therefore, considers that the Atlantic City Allocation Tables cannot be implemented merely by agreeing on a date without fulfilling in substance at least the pre-requisite condition that a satisfactory New I.F.L. must be drawn up. While this necessity for a satisfactory list should be recognised, it is also to be appreciated that a detailed list of assignments to stations, etc., may not be practicable at the ensuing conference. It is, therefore, considered necessary that

(*a*) the E.A.R.C. should prepare at least a skeleton allotment plan showing the manner in which the total available spectrum quantity would be distributed among the various countries on some reasonable basis,

(*b*) the countries submit the details of their essential services up to this share, and

(*c*) then the I.F.R.B. be directed to write up the new detailed International Frequency List according to directions given to it by the E.A.R.C. and within the main structure of the skeleton allotment plan prepared by the conference.

2.3 As already stated, the P. F. B. could not take into full consideration the actual traffic incidence and time sharing pattern of the transmitters. It further did not evolve a general method of taking geographical sharing into account. It distributed only Kc/s to countries, testing each assignment individually for time and geographical sharing. To regard an assignment to a country merely in terms of Kc/s does not carry with it all the exclusive quantities associated with its usage. One such quantity specific to the assignment is the time during which interference-free use of the band-width is guaranteed internationally to that country. Thus, the quantity of " Kc. Hours " rather than " Kc/s " is better suited for distribution to the various countries. Going a step further, even the concept of " Kc. Hours " is not complete. The possibility of the usage of the same Kc. Hours during the same time by another transmitter exists and is determined by the powers and propagation conditions of the transmitters or the propagation coverage of the two tramsmitters concerned. Each transmitter carries with it as it were a coverage area up to a point where the signal strength is about 15 db below its service level. Such coverage is individual to itself. The coverage areas for the two transmitters should not overlap if they are to operate simultaneously on the same frequency irrespective of direction. An area corresponding to the above radius becomes exclusive to each assignment and is not in general available to another assignment. Therefore, the quantity suited for allotment to the countries is not " Kc. Hours " but " Kc/s hour coverage " *i.e.* band-width X hours for which that band-width is clear for the country X the area for which the use of that frequency during that time is in general to be kept clear of the field of the other transmitters on the same frequency. It is appreciated that this concept of Kc. hour coverage which determines the spacing of transmitters operating on the same frequency is susceptible of further refinements by a consideration of the direction of wanted transmission but such refinements could be and are proposed to be taken into account in the final stages of I.F.L. compilation by the I.F.R.B. when other adjustments are also contemplated and discussed later. A certain percentage of spectrum space is being reserved for such final adjustments and, therefore, their consideration can be deferred in the initial distribution of the total allottable spectrum quantity among the countries.

2.4. *The quantity to be distributed.*

2.4.1. The spectrum space, or " Ether Quantity " to be distributed among the countries should satisfy the following conditions :—

(*a*) The total quantity available for distribution should be capable of ready estimation at least roughly.

(*b*) When multiplied by a suitable factor it should determine the quantity which becomes available to each country.

(*c*) The share of the quantity which becomes available to a country must be capable of easy distribution among its own detailed requirements which differ in power, band-width and hours of usage.

(*d*) When the detailed requirements as submitted as in (*c*) above are put together and sufficient frequencies are allotted to enable their interference-free operation the total band-width so required at any particular part of the globe should not exceed at any particular hour the Atlantic City allocations by any appreciable amount.

Condition (*d*) makes it necessary that the ether quantity should be derived from the band-width in kilocycles allocated to fixed services in Atlantic City. Condition (*c*) makes it necessary that this quantity should be capable of being subdivided, in time and area so as to permit the sharing in time, and geographical distances as determined by the power of the transmitter and its propagation characteristics. As has already been shown time sharing can be taken into account by considering kilocycle hours and geographical sharing can in general be taken into account by associating each frequency usage with its propagation coverage. With this association it will be seen that when a number of transmitters on different powers are operating in any given area we can say that the chances of all these transmitters operating simulteneously without mutual interference ewist in general when the sum total of their individual propagation coverages is equal to the area in question. It is, therefore, considered that the ether quantity which will best satisfy all the above conditions of suitability for distribution is kilocycle-hour coverage.

2.4.2. If we derive this quantity, namely the " kilocycle-hour coverage ", for each megacycle band and distribute it to the various countries according to some accepted principles (which will be discussed later), then it would be possible to draw up a list showing the quantity that each country would get. It would then be open to the country itself to use its share of " kilocycle-hour coverage " to its best advantage by varying the type of emission which would affect the band-width, or the duration of the usage which would affect the hours or the power of the circuits concerned which would in turn affect the coverage, the only condition being that the total kilocycle hour coverage in that megacycle band for that country shall be the figure internationally accepted. This approach would further give the countries flexibility to accommodate their services as they desire, in the type of emission, hours of usage or power. A country can, if it so desires, keep the same sharing pattern that it now has in the Berne List. Such a list of requirements from each country keeping to its quota of kilocycle-hour coverage, when put together, is likely to add up to the total quantity available for the whole world without producing abnormal over or under loading. It is recognised, however, that in the first attempt there are bound to be areas where there is congestion. This is discussed later in this paper ; but by a second or third trial it is practicable to arrive at a list which would have comparatively greater chances of accommodating the essential requirements of the countries as declared by themselves, than by other methods tried so far.

2.4.3. *Total available Kilocycle Hour Coverage.*

The field created by all the transmitters in the world will cover not only the land areas but the areas over the oceans as well. Over the land in any particular area at any time the total number of kilocycles utilised for reception in the area and for transmissions to outside the area and for transmitting over the area add up to the total kilocycles allotted in that megacycle order. The utilisation of ether in that area in terms of Kilocycle Hour Coverage is equal to total kilocycle allotted for the service × 24 hours × area concerned × a factor of efficient usage of the spectrum. If the spectrum could be utilised to full efficiency all over the land and sea the total area covered will be the area of the globe. But the efficiency of utilising the spectrum will not be unity all over the globe. This figure over certain sea areas, like the Atlantic, may however, come up to the full value of unity. On the other hand, portions of the sea far removed from the coast will be subjected to less and less congestion from the transmissions of the stations situated on land. Further, the night part of the globe is likely to be more efficiently covered than the day part.

2.4.4. Annexure 1 gives the formula for calculating the total available Kc hour coverage for any megacycle. In the calculations given in Annexures 1 and 5 the factor of efficient usage has been assumed at a very conservative figure of 0.5. To simplify calculations the coverage area of a transmitter has not been calculated precisely as stated in para 2.3 but has been assumed to be the area corresponding to twice the service range of the transmitter. This provides a wider margin of safety. The band-width in kc/s allocated to the Fixed Service in each megacycle from 5 to 10 has been taken ; wherever the band is shared, the band-width so shared has been divided equally among the number of services sharing.

2.5. *The consideration that should govern the distribution to countries.*

The question then arises as to what shall be the principles according to which the kilocycle hour coverage of a particular megacycle shall be distributed among the countries. It is suggested that 75 percent of the total available quantity should be distributed between the countries so as to take into account equally the following three considerations of equity :—

(*i*) consideration to the countries which have developed radio communication earlier than others ;

(*ii*) consideration to the sovereign rights of a country to work within the limits of its own territory ; and

(*iii*) consideration to the reasonable needs of a country depending upon its trade and population.

This would leave 25 percent of the total unallotted ; it is suggested that this be reserved for clearing any glaring cases of inequity and to allow final adjustments for fitting the countries' requirements into the spectrum space, as discussed later. Under each consideration a factor will be derived for each country and added up to form a final factor so that when the spectrum quantity is multiplied by the final factor it will represent the kilocycle hour coverage allotted to that country.

2.6. *Derivation and Application of the factors.*

The following paragraphs describe how the factors mentioned are proposed to be derived and applied in practice.

2.6.1. *Priorities of Radio Development of Countries as reflected in the Berne List.*

Various countries have spent considerable time and money and developed large wireless networks much earlier than others and have established their stations over many years. It must be recognised that these countries must be given adequate consideration for their prior development. It is therefore proposed that 25 percent of the total allottable quantity be utilised for distribution purely according to considerations of existing priorities.

2.6.2. The question then arises as to how these priorities of a country are to be assessed in practice. Before 1939 the normal way in which a country has been notifying its radio development has been to register with the Berne Bureau ; and as the usage of Radio was much less than compared to the present day, every country notifying a frequency usually had the full use of that frequency for all the 24 hours of the day. But due to the great strides made in the science during the war years, Radio usage became far more wide spread resulting in a very large number of notifications after 1939 with progressive increase year by year. Consequently the possibility of a country using for all the 24 hours a frequency it notified after 1939 declined gradually year by year until it is very small today. Thus notifications up to 1939 may be roughly taken to have full value for use of a frequency or the operation of a station ; and the subsequent additions have gradually diminishing value to almost nil now. To make calculations easier in assessing quantitatively a factor to represent these priorities to a country, it is proposed that—

(*i*) the number of fixed stations that a country had registered in 1939 be taken in full ;

(*ii*) a percentage of the number of stations registered subsequent to 1939 and up to 1951, it is suggested that 10 percent, be taken ; and

(*iii*) add (i) and (ii), and the ratio of the number of stations so arrived at for the country to the total number of stations similarly calculated for all the countries be taken as the factor of priority for the country.

2.6.3. In the specimen calculations attached (Annexure 2), however, the number of fixed stations as published by the I.T.U. in its publication " List of Fixed Stations 1943 " has been taken in place of the 1939 figures and 1947 figures instead of 1951 as the latter were not available. As there were not many Registrations during the war years the general conclusions may not be materially affected by this.

2.6.4. *Sovereign Rights*

The sovereign rights of a country enable it to use the total kilocycles available for a certain service in any megacycle order for the full 24 hours over the entire area of its territory as long as its transmissions do not extend beyond its frontiers. The quantity representing the ether utilisation by the country under such circumstances may be stated as the total kilocycles $\times$ 24 hours $\times$ its own area. Whenever the transmissions from a country extend beyond its borders, it will be preventing a neighbouring country from using ether over its own territory and thereby restricting the exercise of sovereign rights by the neighbouring country. Compensation for this infringement is essential and the first country which causes interference beyond its frontiers has, therefore, to make a reduction either in the kilocycles or the hours of usage to the extent to which it overflows its own territorial limits. Such a reduction and compensation is automatically obtained if we consider that the total kilocycle-hours of use and propagation coverage from the transmitters of various powers of any country are always equal to the same quantity, namely kilocycles $\times$ 24 hours $\times$ its own area, in each megacycle order. It is realised that the distribution of the spectrum purely according to considerations of sovereign rights over the territory may not be wholly equitable. At the same time, it has to be admitted that the geographical area of a country

has a physical meaning in the extent of the use of its radio services and is a factor which cannot be ignored. It is, therefore, proposed that 25 percent of the total allottable quantity be utilised for distribution according to sovereign rights which correspond to their respective areas.

2.6.5. *Reasonable needs of a country*

Although a country may not have prior registrations in the Berne List and although it may not have yet developed many radio circuits, the needs of the country for radio circuits is something real and cannot be ignored. The reasonable needs of a country may perhaps be considered under two headings :

(*i*) the immediate established needs ; and

(*ii*) the long term needs.

The immediate established needs are necessarily a function of the activities of the country, which can be taken as represented by the imports and exports of the country. The ultimate or the long term needs of a country may be taken as represented by its population figures. It is obvious that the immediate needs of a country, that is for communications which it has now established, should be given greater consideration than its ultimate needs. The relative proportion in which consideration should be given to these two types of needs is a matter which can lend itself to protracted discussion. It is, therefore, proposed that each country name its own factor according to which these two types of needs should be taken into consideration. The two factors should add up to one. The average of these individual factors can be worked out for the conference and a factor called the " Conference Factor " worked out for each type of need ; next the average of the Conference Factor and the factor given by each country is worked out for the country. If these final factors do not add up to unity the total must be reduced to unity retaining the relative proportion to each country intact. Any undue weightage a country is disposed to give either to its population or trade would necessarily be evened out. In the sample figures worked out and attached to this proposal a figure of a quarter has been assumed for population and three quarters for the total of imports and exports.

2.6.6. It is proposed, as in the case of priorities and in the case of national sovereignty, 25% of the total allottable kilocycle-hour coverage be utilised for distribution according to this consideration of reasonable needs derived from population and trade.

2.6.7. It will thus be seen that 75% of the total allottable kilocycle-hour coverage is distributed for day and night to each country according to the formula given below :—

$$\tfrac{3}{4}\,Kc\times 24\times A\times E\ \left\{\left(\tfrac{1}{3}\,\frac{p}{\Sigma p}+\tfrac{1}{3}\,\frac{a}{\Sigma a}+\tfrac{1}{3}\left(\tfrac{1}{4}\cdot\frac{P}{\Sigma P}+\tfrac{3}{4}\,\frac{T}{\Sigma T}\right)\right)\right\}$$

Where

Kc is the band-width, allocated in A.C. tables for the megacycle order.

A is the total area of the globe

E is the factor of efficient usage of the spectrum

p is the priority figure for the country

a is the area of the country

P is the population of the country; and

T is the total of Imports and Exports of the country.

Note.—In applying the above formula for the figures in Annexure 5 it has been assumed that half the above quantity is utilized by the operation of day frequencies and the other half by operation of night frequencies. This has been explained in Annexure 1.

2.7. *Specimen Figures*

2.7.1. Annexure 3 gives the 1947 figures of area, population and the trade (export and import) for the 78 countries listed in Annexe. 1 to the Atlantic City Convention. The 1947 figures were adopted because they were readily available in the documents of the Mexico City Conference. The conference can decide on the figures of any other year it chooses. Annexure 4 gives the ratio to the total in each case for each country under the headings Priorities (paras 2.6.1. to 2.6.3.), Sovereign Rights (para 2.6.4.) and Reasonable Needs (paras 2.6.5. and 2.6.6.).

2.7.2. In order that members may have some concrete idea as to what would accrue to each country if the above proposals are applied, specimen figures have been worked out in Annexure 5, showing the number of kilocycle hours for each country for a one kilowatt station from 5 to 10 Mc/s. As the manner of distribution of the requirements of each country in the various power categories is not known, the calculations have been made for a one kilowatt usage. to enable a conerete conception, the results are given in kilocycle hours and not in kilocycle hour coverage. In para 2.6.5. it has been explained that a " Conference Factor " would be worked out, which in turn would be averaged with the co-efficients for population and trade given by the country itself, before these are applied. In the absence of the Conference Factor columns 4 and 5 in Annexure 4 have been worked out applying a co-efficient of 1/4 for population and 3/4 for trade. The figures shown in Annexure 5 are considered to be a very conservative estimate and are expected to show appreciable improvement if the formula is applied more precisely

2.8. *Comparisons*

2.8.1. It was considered that as a matter of interest a comparison can be instituted, in percentages for each country to the total for all countries in each case, between :—

(*i*) the position of each country according to the List of Fixed Stations 1943 and 1947, as explained in paras 2.6.1 to 2.6.3,

(*ii*) the position according to the number of circuits filed by each country at the Atlantic City Conference 1947, and

(*iii*) the position according to the proposed approach.

2.8.2. Annexure 6 gives the number of circuits filed by each country in 1947 at Atlantic City and its percentage to the total. It would be recalled that after the first blue books (2 volumes) giving the requirements of the countries in a consolidated form, no further lists of that nature were published by the P.F.B. Hence data ragarding the requirements of all the countries are not available for a date after 1947. But these 1947 figures do not contain the requirements of Brazil, Beilo Russia, Ukraine and the U.S.S.R. besides the requirements of a large number of countries are known to have undergone considerable modifications after they were filed at Atlantic City and when they were again revised in February 1948 for the P.F.B. The percentages with reference to the P.F.B. filings in Annexure 6 should, therefore, be interpreted with caution. They should be taken to indicate no more than the general tendency of all the countries to establish their claim to an increasing number of frequencies. The comparison of the position obtained according to the proposed approach with that obtained according to the number of fixed stations in Berne records as described in paras 2.6.1 to 2.6.3 has, however, a greater significance.

2.8.3. Annexure 7 gives the final comparison as explained in para 2.8.1 above.

2.9. *Adjustments*

As stated in para 2.5, it is proposed to distribute on the above lines only 75 percent of the overall allottable kilocycle hour coverage to the different countries. A balance of 25 percent has been left undistributed for the following reasons. It is recognised that when the spectrum is divided in the above manner, there may still be some cases of glaring inequity apparent to the whole conference. Provision has, therefore, to be made to meet this. Besides, some spectrum space would be needed for adjusting incompatible sharing patterns that may result from putting together the detailed list of essential operations submitted by the countries. It is proposed that the conference review the kilocycle hour coverage that each country gets according to priority, national sovereignty, and trade and population, and if the conference feels that it should remedy any glaring cases of inequity, 5% out of this 25% be utilised for such remedies and the balance of 20% be kept by the I.F.R.B. for meeting over-congestion when the detailed requirements submitted by countries are put together and all refinements are applied to evaluate the actual congestion. In the process of I.F.R.B-putting together the detailed list submitted by the countries, it will take into consideration the wanted direction of transmission as also fitting together the sharing patterns of the adjacent countries. The former will increase the sharing possibilities and lower the congestion, whereas the latter may show incompatible patterns and increase the congestion. On the whole it is expected that a reservation of 20% would be adequate to cover the possible difference between the first approximate methods and the final precise methods. It is recognised that this approach envisages the application of a uniform percentage to the various megacycles throughout the spectrum, whereas the distribution of requirements of the various countries may not be so uniform throughout the H.F. range. But such cases should be susceptible of negotiation and settlement in the conference or outside it between countries concerned.

2.10. *Merits of the proposed method*

The proposed approach has the following merits :—

(*i*) it recognises and affords protection to the countries who have prior registration in the existing Berne List ;

(*ii*) it gives due consideration to the sovereign rights of all the countries ;

(*iii*) it seeks to distribute the available spectrum space according to commonly recognised principles of equity while protecting the interests of countries who have already well developed radio systems ;

(*iv*) it offers the countries an opportunity to give proper weightage to their own assessments of their present and future requirements ;

(*v*) it gives flexibility to all the countries to utilise the total kilocycle hour coverage it gets in the manner it desires, so that it can cater to its essential communications in the manner it considers best ;

(*vi*) it assures some interference-free spectrum space to those countries who do not have high priorities in the Berne List now, and thereby gives them a chance to develop their communications; and

(*vii*) it avoids the E.A.R.C. preparing a detailed assignment plan and provides for the I.F.R.B. to write the same.

Thus it fulfils in substance all the implications that formed the background for the adoption of the new Allocation Tables at Atlantic City.

2·11. *India's Proposals*

India, therefore, proposes that the E. A. R. C. do the following so far as the preparation of a new I.F.L. for the Fixed Services in the bands 3·9 to 27·5 is concerned :—

(*a*) arrive at a percentage figure for each country, which will take into consideration the sovereign rights of a country, its existing priorities and its reasonable needs ;

(*b*) the total available spectrum quantity in every megacycle band (or 2 megacycle bands if it would be considered more practicable) should be distributed to countries in a skeleton list according to the above percentages ;

(c) give directions to the I.F.R.B. to draw up the detailed I.F.L.; and

(*d*) taking into consideration the various steps regarding implementation outlined below, fix a date for implementation of the Atlantic City tables.

2·12. *Implementation of the Proposal*

2·12·1. To implement the proposal to its final stages the following steps shall then be taken :—

(*a*) Each country shall submit to the I.F.R.B. its own list of individual requirements with power, location, hours of use, etc., keeping wherever it so desires its existing sharing patterns up to the maximum of the total kilocycle-hour coverage it has been allotted. This shall be done within three months from the date of the close of the conference. This list shall be arranged in the descending order of importance from the country's point of view, so that any adjustment in fitting these into the spectrum will be possible without further reference to the country by the I.F.R.B.; and

(*b*) these detailed lists submitted by the countries shall be put together by the I.F.R.B. to formulate the first draft of the new list.

2·12·2. It is conceivable that the mere putting together of all the lists submitted by the countries will not produce a list ; some over-loadings may occur in certain parts of the spectrum. In such cases, subject to the maximum kilocycle-hour coverage allotted to each country being maintained intact in their relative values, the I.F.R.B. shall suggest proportionate modifications to enable best utilization of the spectrum and shall in case of unavoidable overload place the circuits with the least priority in their lists on a notification basis. It is appreciated that more than one attempt may be necessary, as also negotiations between the countries for exchanges within the framework of their allotments, before the I.F.R.B. can produce a list which will generally conform to the lists submitted by the countries and the allotments of kilocycle-hour coverage approved by the conference. The work in these trials may be expedited considerably by mechanical processes. The Indian Administration has under consideration the development of a Radio Computor which could be used for this purpose. If the conference is interested, the details of this Computor would be placed before it.

2·12·3. It is anticipated that it will take roughly about six months for the I.F.R.B. to prepare the draft list and circulate it to the countries. The countries may be given three months from the date of circulation to study the list and make the necessary adjustments for changing over to the new frequencies as in the list. A date of implementation, say one year after the above period, may be fixed by the conference before it terminates, taking into consideration the various stages outlined above. The Conference should endeavour to fix as early a date as possible by which out-of-band operations should cease.

3. BROADCASTING SERVICE

3·1. A regional plan for Region 3 for frequencies below 3·9 Mc/s is available. The portion of this plan relating to medium wave broadcasting service, namely, the band 535 to 1605 Kc/s, is acceptable to India subject to certain minor modifications which have already been forwarded to the I.T.U.

3·2. The plans for Tropical Broadcasting prepared by the Region 3 Conference are fairly satisfactory so far as the number of channels allocated are concerned but are not acceptable from the point of view of co-channel and adjacent-channel protection ratios. It is felt, however, that the allocation under these bands would also be acceptable if certain modifications are carried out. India will submit the details of these modifications at the appropriate time.

3·3. So far as the High Frequency Broadcasting bands (6 to 21 Mc/s) are concerned, the existing Berne List does not reflect the true picture of the present day requirements of the broadcasting stations of the world. Any future list, based solely on the Berne List, cannot, therefore, reflect the desire of the countries to use the spectrum allocated to the broadcasting service in an orderly, efficient and equitable manner.

3·4. Detailed plans for High Frequency Broadcasting to cover one complete sun-spot cycle are not available yet. There is, however, a basic plan for the High Frequency Broadcasting bands which was prepared at Mexico City and which was acceptable to more than 50 members of the I.T.U. In the absence of detailed plans to cover the H.F. broadcasting bands through a complete sun-spot cycle, it is desirable to base the new I.F.L. for this service provisionally on the basic plan of the Mexico City Conference. Till final detailed plans can be worked out, such a procedure would remove the present unsatisfactory conditions of mutual interference and the resultant wasteful usage of spectrum space.

3·5. Bearing the above facts in mind, the following proposals are made for the implementation of the portions of the spectrum relating to the Broadcasting Service in the Atlantic City Allocation Tables :—

(*i*) The E.A.R.C. should agree upon the modifications to the Regional Plan for medium wave broadcasting (535 to 1605 Kc/s) and the plan for the tropical broadcasting (2·3 to 2·5 megacycles, 3·2 to 3·4 megacycles, 4·75 to 4·995 megacycles and 5·005 to 5·060 megacycles) and then E.A.R.C. approve the plans.

(*ii*) A draft plan for the band 3·9 to 4·0 megacycles should be prepared and approved by the Conference ;

(*iii*) The basic plan prepared by the Mexico City Conference should be taken as the basis for the preparation of preliminary frequency lists for the lists for the interim operation of broadcasting service in the H.F. broadcasting bands till final detailed plans are drawn up ;

(*iv*) A date for the implementation of the Atlantic City Allocation Table for the Broadcasting bands should be fixed by the E. A. R. C.; this date should be as early as possible and in any case not later than the date fixed for the cessation of the out-of-band operations.

(*v*) Based on the decisions as above a new International Frequency List should be prepared in which :—

(*a*) the lists mentioned under items (*i*) and (*ii*) above should be entered as on the final date of the Conference ;

(*b*) the list mentioned at item (*iii*) should be entered on a notification basis as of the final date of the Conference ;

(*c*) all other frequency requirements should be entered on a notification basis but with the condition that they will not be permitted to operate if they cause any harmful interference to the frequencies covered by items (*a*) and (*b*) above after the date of implementation ;

(*vi*) The Conference should decide the method and fix a date for the preparation of the final list for (*iii*) above.

4. AERONAUTICAL MOBILE SERVICE

The Frequency assignment plan for the aeromobile R and OR bands of the Atlantic City tables, as drawn up by the IAARC in 1949 and the ICAO SEA and MID Regional Frequency Assignment Planning meetings, 1950, can be accepted as being generally satisfactory although it is noted that some of the assignments are technically unsound and that no allotments have been made for Met broadcasts to aircraft in the Eastern Regions.

5. MARITIME MOBILE SERVICE

5·1. The Maritime Mobile plan both for telegraphs and telephones has taken into consideration all the requirements that were filed with the PFB before the dead line dated fixed by that Board. But according to Art. 16 of the Resolution relating to the preparation of the new draft I.F.L. countries were to notify to the P.F.B. and the I.T.U., their frequency assignments for operations, activated after the closing date of forms 1 & 2. It was expected at that time that the P.F.B., after preparing the draft list of the requirements before it on the closing date of the forms 1 & 2, would prepare a separate list regarding the requirements notified to it under Article 16, and submit the same to the Special Conference (which is now the E.A.R.C.) to recommend as to how these should be incorporated into the I.F.L. Article 13 of the same Resolution also stipulated that the priorities accorded to these requirements notified under Article 16 and subsequently entered into new I.F.L., would be the same, as for the requirements included by the P.F.B. in the main list. Thus in the final stage there would have been no distinction between the requirements that were before the Marine Mobile Group during the P.F.B. and the requirements notified subsequently under Article 16.

5·2. The requirements for the Maritime Mobile Service for India that were submitted to the P.F.B. before 25th February, 1948, have been duly considered in the draft plans. Although these plans do not give full satisfaction to India with reference to her requirements, it would be possible to accept these plans, with suitable modifications so far as these requirements are concerned.

5·3. But the majority of the essential requirements of India for the Maritime Mobile Service have been notified under Art. 16, after the closing date for the forms 1 and 2. This is essentially due to the fact that there were important political changes in the country. Thus her notifications under Article 16 are of vital importance to India.

5·4. As making suitable provision for the requirements under Article 16 was an integral part of the work of the Maritime Mobile Group before the final plans for this service are adopted by the E.A.R.C., it was hoped that all the essential requirements of India would be adequately provided for in the Final List. This unfortunately has not been realised as the plans have no provision for the accommodation of the requirements under Article 16.

5·5. Under these circumstances, India finds herself unable to accept the telegraph and telephone Martime Mobile Plan as they stand at present. It is, therefore, proposed that a special working group be constituted by the E.A.R.C. to take into consideration the Maritime Mobile requirements that have been filed under Article 16 and fit them into the plans before the E.A.R.C. adopts them.

6. REGION 3 PLAN

6·1. The Region 3 Plan consists of assignments to the Fixed, Maritime Mobile, Land Mobile, Aero-mobile and Broadcasting services.

6·2. So far as Fixed Services are concerned, India is proposing a new approach for the distribution of the spectrum space in the Fixed Service bands under the P.F.B. It would be logical, therefore, to continue the same principle below 3·9 Mc/s into the Regional Bands also for the Fixed Services so that all the Fixed Service bands are distributed according to one and the same principle, taking note, however, of the fact that where these bands are shared with Broadcasting, the latter has priority in the Tropical Zones. The necessity for this would be realised when it is seen that a number of assignments in the Regional Bands for the Fixed Service represents the night frequencies or the lowest frequencies of the complements that are necessary for working circuits, the day and transition frequencies of which are in the P.F.B. portions of the spectrum.

6·3. It will be recalled that a detailed frequency assignment plan is available for Region 3. When member-countries know the quota of kilocycle-hour coverage, they get in each megacycle order in the Regional Bands, it would be practicable to start with this existing frequency assignment plan as the basis and select their circuits which should occupy the quota available to each country on a registration basis. In other words, the frequency assignment plan that is now available will be split up by countries into two portions, namely :—

(*i*) those assignments which go into the new International Frequency List on a World Registration basis, up to the maximum quota allowed to the country, and

(*ii*) the balance that would be on a notification basis.

6·4. Regarding the other services, namely Maritime Mobile, Aeronautical Mobile and Broadcasting, the comments with reference to each of these services given separately in parts 3, 4 and 5 above would apply with equal validity to the portions of the spectrum relating to these services in the Regional bands.

6·5. To avoid confusion and to facilitate simultaneous preparation for the changeover to the new frequencies throughout the H.F. spectrum range, it is suggested that the date of implementation for the Regional bands should be the same as that for the P. F. B. portions.

ANNEXURE 1.

Total allottable Spectrum quantity in each megacycle.

(1) The total allottable Spectrum Quantity or band-width time coverage in each megacycle :

$B \times T \times A \times E$ Kc hour square miles

Where B is the band-width allocated in Atlantic City in that megacycle—wherever the fixed services share with other services, the share for the fixed services has been taken in proportion to the number of sharing services.

T is the total period of 24 hours in a day

A is the total area of the globe, *i.e.* 200×10^6 square miles.

E is the factor of efficient usage of the spectrum. This has been assumed to be 0·5 for day or night in the following calculations.

(2) The coverage of a transmitter according to definition in para. 2·3 is the area on the surface of the globe covered up to the point where the signal strength falls to 15 db below the standard required for good communication. In the following calculations, for the sake of simplicity, it has been assumed that

coverage $= \pi (2D)^2$ square miles

where D is the service range of the transmitter during the period under consideration.

Total allottable Kc hours for one Kw coverage in each megacycle from 5-10 Mc.

(3) From (1) and (2) above the total allottable kilocycle hours corresponding to the use of any one power for the complete day and night parts of the globe can be derived as follows :

$$\text{Total Kc Hours} = \frac{B \times 24 \times 200 \times 10^6 \times 0{\cdot}5}{\pi (2D)^2}$$

(4) Half the above quantity can be assumed to be available for night part and the other half for day part.

(5) Assuming the use of 1 Kw the total Kc Hours allottable to all the countries is given in the following table :

Mc/s	Band-width Kc/s	Day		Night	
		Service Range Miles	Allottable Kc Hours for 1 Kw coverage	Service Range	Allottable Kc hours for 1 Kw coverage
1	2	3	4	5	6
5 . .	544·5	670	117000	1950	13825
6 . .	235	880	29250	2100	5150
7 . .	895	980	89750	2500	13825
9 . .	680	1430	32000	2900	7800
Total . .	...	...	268000		406000

Grand Total (Day and Night) Kc Hours allottable. .. 3086000 ...

(6) The figures in the above table have been taken as the basis for calculations in Annexture 5.

(7) If different powers are used by any country, the Kc hours will vary inversely as the coverage area appropriate to the power.

ANNEXURE 2

Calculation of factor for priority for each country as reflected in the Berne List

(*vide* PARAS 2. 6.1 to 2. 6.3)

(Number of Fixed Stations taken from "List of Fixed Stations" published by I. T. U. 1943 & 1947 editions)

No.	Names of countries	No. of Stations in 1947	No. of Stations in 1943	1947 — 1943	1943+ 10% (47-43) priority figure	Ratio to total
1	2	3	4	5	6	7
1.	Afghanistan . . .	22	22	0	22	·0009
2.	Albania	4	5	...	...	·0002
3.	Arabia Saudi . . .	5	...	...	...	·0002
4.	Argentine . . .	652	451	201	471	·0195
5.	Australia . . .	457	220	237	244	·0102
6.	Austria	29	...	...	...	·0012
7.	Belgium . . .	39	19	20	21	·0009
8.	Bielorussia . . .	...	...	...	...	...
9.	Burma	27	23	4	23	·0009
10.	Bolivia	455	88	367	125	·0051
11.	Brazil	2,465	2,089	376	2,127	·0878
12.	Bulgaria . . .	5	5	0	5	·0002
13.	Canada	3,050	1,757	1,293	1,886	·0752
14.	Chile	332	...	...	...	·0136
15.	China	2,651	296	2,355	532	·0220
16.	Vatican City . . .	10	10	0	10	·0004
17.	Colombia . . .	144	306	...	144	·00595
18.	Portuguese Colonies . .	300	158	142	172	·0071
19.	U. K. Colonies . .	1,453	570	881	759	·03135
20.	French Colonies . .	858	662	205	672	·02775
21.	Congo-Belgian . .	200	3	197	23	·00095

Stations No.	Names of countries	No. of Stations in 1947	No. of Stations in 1943	1947—1943	1943+10% (47-43) priority figure	Ratio to total
1	2	3	4	5	6	7
22.	Costa Rica . . .	136	111	25	114	·00475
23.	Cuba	595	...	...	595	·02875
24.	Denmark (Greenland) .	109	102	.7	103	·00425
25.	Dominican Republic .	103	2	73	37	·00155
26.	Egypt	208	161	39	165	·00685
27.	El Salvador . . .	8	7	1	7	·0003
28.	Ecuador	30	30	0	30	·00125
29.	U. S. A.	4,823	2,863	1,960	3,059	·1265
30.	Ethiopia	48	...	...	48	·0020
31.	Finland	40	23	17	25	·0010
32.	France . . .	521	331	190	350	·0145
33.	Greece	21	35	...	21	·00088
34.	Guatemala . . .	161	147	14	148	·0061
35.	Haiti	25	14	11	15	·0006
36.	Honduras . . .	80	72	8	73	·0030
37.	Hungary . . .	21	22	...	21	·00088
38.	India	284	143	141	157	·0065
39.	Indonesia . . .	435	184	251	209	·00865
40.	Iran	41	7	34	10	·00041
41.	Iraq	34	39	...	34	·0014
42.	Ireland	14	11	3	11	·00045
43.	Iceland	83	42	41	46	·0019
44.	Itlay	391	395	...	391	·0162
45.	Lebanon. . . .	22	...	...	22	·0009
46.	Liberia	23	23	0	23	·00095
47.	Luxemburg	...	...	...	...	...

1	2	3	4	5	6	7
48.	Mexico	2,362	732	1,630	895	·0370
49.	Monaco	...	...	...	...	...
50.	Nicaragua	133	132	1	132	·00545
51.	Norway	142	123	19	125	·0052
52.	New Zealand	137	98	39	102	·0042
53.	Pakistan	...	...	...	...	...
54.	Panama	...	50	...	50	·0021
55.	Paraguay	34	27	7	28	·0012
56.	Netherlands Netherlands, West Indies	12	12	0	12	·0005
57.	Peru	201	114	87	123	...
58.	Philippines	796	478	318	510	...
59.	Poland	26	17	9	18	·00075
60.	Portugal	168	41	127	54	·00225
61.	Morocco Tunisia	15	1	14	2	·0001
62.	Yugoslavia	59	59	0	59	·00245
63.	Ukrainian SSR	...	...	...	...	...
64.	South Rhodesia	66	13	53	18	·00075
65.	Roumania	36	...	...	36	·0015
66.	U. K.	846	323	523	375	·0160
67.	Siam	40	41	...	40	·00165
68.	Sweden	124	42	82	50	·00210
69.	Switzerland	103	45	58	51	·00210
70.	Syria	13	...	...	13	·00054
71.	Czechoslovakia	82	...	...	82	·0034
72.	U. S. A. Territories	2,902	904	1,998	1,104	·0770
73.	Turkey	16	5	11	6	·00025
74.	South Africa	49	25	24	27	·0011
75.	USSR	5,302	5,286	16	5,288	·2186

1	2	3	4	5	6	7
76.	Uruguay . . .	102	47	55	525	·0217
77.	Venezuela . . .	156	152	4	152	·0063
78.	Yemen	...	...	...	....	...

ANNEXURE 3

Area, Population and Trade 1947
(From document of Mexico City H. F. Broadcasting Conference)

(*Estimated figures.)

No.	Country	Area in 1000 sq. miles	Population in millions	Population of overseas Territories (Millions)	Imports and Exports in millions U. S. dollars	Remarks
1	2	3	4	5	6	7
1.	Afghanistan . . .	250	10	...	·6	
2.	Albania	10·6	1·12	...	10·9	
3.	Arabia Saudi . . .	1,000	10·0	...	...	Figures not available.
4.	Argentine . . .	1,079	14·0	...	1,566	
5.	Australia . . .	2,974	7·6	1·3	940	
6.	Austria . . .	32·3	7·06	...	20*	
7.	Belgium . . .	12	8·3	10·4	1,840	
8.	Bielorussia . . .	120	10	...	...	Figures not available.
9.	Burma	262	14·7	...	226	
10.	Bolivia	...	...	...	...	Figures not available.
11.	Brazil . . .	3,275	46·2	...	1,612	
12.	Bulgeria . . .	40	6	...	116	
13.	Canada	3,462	11·5	...	4,852	
14.	Chile	286	5	...	400	
15.	China	3,381	457	...	95	
16.	Vatican City . . .	·001	1	...	...	Figures not available.
17.	Colombia . . .	440	9·8	...	279	
18.	Portuguese Colonies . .	803	10·8	...	120	
19.	U. K. Colonies . .	2,750	64·5	...	1,320	
20.	French Colonies . .	3,500	5·6	...	1,100	
21.	Congo-Belgian . .	902	10·4	...	153	

1	2	3	4	5	6	7
22.	Costa Rica . . .	23	0·74	...	38	
23.	Cuba	44	4·2	...	648	
24.	Denmark (Greenland) .	85·7	4·1	...	630*	
25.	Dominican Republic .	19·3	1·8	...	92·5	
26.	Egypt	13·6	16	...	404	
27.	Elslavador . . .	13	2	...	21	
28.	Equador . . .	276	3·1	...	5	
29.	U. S. A.	3,673	132	2·4	14,670	
30.	Ethiopia	765	2	...	51·2	
31.	Finland	130	4	...	275	
32.	France	212	41·8	56	500*	
33.	Greece	50	7·4	...	155	
34.	Guatemala . . .	44	3·3	...	53·8	
35.	Haiti	10	3	...	38·7	
36.	Honduras . . .	44·3	1·2	...	33·7	
37.	Hungary . . .	36	9·3	...	284	
38.	India	1,290*	319*	...	1,009	
39.	Indonesia . . .	735	61.0	...	665	
40.	Iran	628	17	...	179	
41.	Iraq	147	5	....	116	
42.	Ireland	27	2·95	...	300	
43	Iceland	40	0·1	...	80	
44.	Italy	120	46	...	1,500	
45.	Labanon . . .	3	1	...	43	
46.	Liberia	43	1·5	...	17	
47.	Luxemburg . . .	1	·3	...	2·6	
48.	Mexico	764	22·2	...	1,000	
49.	Menaco	...	·02	...	...	Figures not available.

1	2	3	4	5	6	7
50.	Nicaragua . . .	49·4	1·25	...	26·2	
51.	Norway	124	3·1	...	660	
52.	New Zealand . . .	104	1·6	...	550	
53.	Pakistan . . .	336·4*	67·6*	...	330*	
54.	Panama	28	0·62	...	41	
55.	Paraguay . . .	88	1.1	...	45	
56.	Netherlands . . .	12.8	9.3	61.32	1,316	
	Netherlands, West Indies .	52	0·32	...	48	
57.	Peru	482	7 ·0	...	82	
58.	Philippines . . .	115	7·0	...	350	
59.	Poland	120	24	...	250	
60.	Portugal	36	7·7	10·8	300	
61.	Morocco . . .	154	9	...	447	
	Tunisia	48·3	2·6	...	15	
62.	Yugoslavia . . .	100	14	...	210	
63.	Ukrainian SSR .	225	40	...	...	Figures not available.
64.	South Rhodesia . .	150	1·7	...	125	
65.	Roumania . . .	91·6	60·4	...	348	
66.	U. K.	150	47	92·5	9,136	
67.	Siam	200	15·7	...	150	
68.	Sweden	173	6·7	...	200	
69.	Switzerland . . .	15·9	4·2	...	700	
70.	Syria	55	2·9	...	80	
71.	Czechoslovakia . .	48	13·2	...	22	
72.	U.S.A. Territories . .	10	2·4	...	840	
73.	Turkey	296	17·3	...	186	
74.	South Africa . . .	472	8·9	...	550	
75.	USSR	8,400	142	...	1,200	

1	2	3	4	5	6	7
76.	Uruguay . . .	72	2·7	...	330	
77.	Venezuela . . .	3·2	3·8	...	650	
78.	Yemen	...	....	...	...	Figures not available.
	Germany. . . .	373	66	...	1,100	
	Japan	175	75	..	1,766	
	Korea	85	22·8	...	400	
	Mangolia. . . .	1,875	·85	...	...	

ANNEXURE 4.

Factors for Priorities (Paras 2.6.1 to 2·6·3) Sovereign Rights (para 2·6·4) and Reasonable Needs (para 2·6·5)

No.	Priorities $\frac{1}{4}\cdot\frac{p}{\Sigma p}$	Area $\frac{1}{4}\cdot\frac{a}{\Sigma a}$	Population $\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{P}{\Sigma P}$	Trade $\frac{1}{4}\cdot\frac{2}{4}\cdot\frac{T}{\Sigma T}$	Total	Remarks
1	2	3	4	5	6	7
1	·000225	·0013	·0003	·000002	·001627	
2	·00005	·00005	·00003	·000032	·000162	
3	·00005	·0053	·0004	...	·00575	
4	·0049	·0055	·00041	·00500	·01581	
5	·00255	·015	·00022	·00395	·02172	
6	·0003	·00017	·00021	·0000625	·00074	
7	·00220	·00006	·00024	·00560	·00810	
8	...	·00063	·000425	...	·001055	
9	·000225	·00137	·0043	·0007	·006595	
10	·001275	...	...	...	·001275	
11	·02195	·0165	·001425	·0050	·044875	
12	·00005	·00021	·000175	·00035	·000785	
13	·0188	·018	·0003375	·01525	·0523875	
14	·0044	·0015	·000145	·001225	·007270	
15	·0055	·0174	·013125	·0003	·036325	
16	·0001	...	·000325	...	·000425	
17	·0014875	·0023	·00029	·000875	·0049525	
18	·001775	·0042	·000325	·000375	·006675	
19	·00784	·014	·0019	·004125	·027865	
20	·00694	·0185	·0016375	·00345	·0305275	
21	·0002375	·0047	·000305	·000475	·0057175	
22	·0019375	·00012	·00022	·00012	·0023975	
23	·0077	·00023	·0001225	·002025	·0100775	

No.	Priorities	Area	Population	Trade	Total	Remarks
1	2	3	4	5	6	7
24	·0010625	·00044	·00012	·000195	·0018175	
25	·0003875	·0001	·00005	·0002925	·0008300	
26	·0017125	·00007	·000465	·001125	·0033725	
27	·000075	·00007	·00006	·0000675	·0002725	
28	·0003125	·0014	·00009125	·00001575	·00181950	
29	·031625	·019	·003875	·046	·100500	
30	·0005	·0039	·00006	·0001575	·0046175	
31	·00025	·00065	·0001175	·000825	·0018425	
32	·0036	·0011	·0012	·001575	·007475	
33	·00022	·00026	·0002125	·000475	·0011675	
34	·001525	·00023	·0000975	·000165	·0020175	
35	·00015	·00005	·0000975	·0001125	·0004100	
36	·00075	·00023	·000035	·000105	·001120	
37	·00022	·00019	·000275	·00090	·001585	
38	·001625	·0067	·00935	·002925	·020600	
39	·0026625	·0038	·00175	·0021	·0103125	
40	·0001025	·0033	·000495	·00055	·0044475	
41	·00035	·00076	·000145	·00035	·001605	
42	·0001125	·00014	·0000825	·0009	·0012350	
43	·000475	·00021	·0000025	·0002475	·0009350	
44	·00405	·00062	·00135	·00475	·01077	
45	·000225	·000015	·000025	·000135	·000400	
46	·0002375	·00022	·0000375	·0000525	·0005475	
47	...	·000005	·0000065	·0000084	·0000199	
48	·00925	·0039	·000625	·0033	·017075	
49	...	...	·00000075	...	·00000075	
50	·0013625	·0003	·0000375	·0000825	·0017825	

No.	Priorities	Area	Population	Trade	Total	Remarks
1	2	3	4	5	6	7
51	·0013	·0006	·0000875	·002555	·0045425	
52	·00105	·0005	·000045	·001725	·003320	
53	·0004	·0017	·0020	·000975	·005075	
54	·000525	·00015	·000125	·0000125	·0008125	
55	·0003	·0004	·00003125	·0001375	·00086875	
56	·000125	·00026	·00010	·0001575	·0006425	
57	...	·0025	·0002	·00026	·00246	
58	...	·00058	·0002	·0001125	·0008925	
59	·0001875	·00063	·00070	·00080	·0023175	
60	·0005625	·0002	·000225	·00095	·0019375	
61	·000025	·0011	·000345	·000875	·002345	
62	·0006125	·0005	·000425	·0006	·0021375	
63	...	·0013	·001175	...	·002475	
64	·0001875	·00075	·00005	·000875	·0018625	
65	·000375	·00048	·00050	·001075	·002430	
66	·004	·0008	·001375	·029	·035175	
67	·0004125	·001	·0000475	·00045	·0019100	
68	·000525	·0009	·0002	·000625	·002250	
69	·000525	·000088	·0001225	·002200	·0029355	
70	·000135	·0003	·000085	·0000625	·0005825	
71	·00085	·00025	·0003875	·0000675	·0015550	
72	·01925	·00005	·0000725	·002475	·0218475	
73	·0000625	·0016	·0005	·00525	·0074125	
74	000275	·0023	·0002625	·001725	·0045625	
75	·05465	·044	·00415	·00475	·01755	
76	·005425	·0004	·0000825	·0001	·006007	
77	·001575	·00002	·0001	·002	·003695	
78	...	...	...	...	...	

ANNEXURE 5.

Approximate allocation in KCH for 1kw coverage to each country based on the suggested approach for a Skeleton Frequency List.

5 to 10 Mc/s.

Serial No.	Country	Total Factor for the country	5 Mc.		6 Mc.		7 Mc.		9 Mc.		Total 5—9 Mc/s Day and Night KCH	% of each to total a llot-table KCH	Remarks.
			Day KCH	Night KCH	Day KCH	Night KCH	Day KCH	h KCH	Day KCH	Night KCH			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Afghanistan . .	·00163	191	23	48	9	146	23	52	13	505	0·16	
2	Albania . .	·00016	19	2	5	1	15	2	5	1	50	0·016	
3	Arabia Saudi .	·00575	671	80	168	30	516	80	184	45	1,774	0·58	
4	Argentine . .	·01581	1,848	219	463	82	1,419	219	506	123	4,882	1·58	
5	Australia . .	·02172	2,553	302	639	112	1,959	302	699	175	6,741	2·17	
6	Austria . .	·00074	87	10	22	4	67	10	24	6	230	0·07	
7	Belgium . .	·0081	948	112	237	42	728	112	259	63	2,498	0·81	
8	Bielorussia . .	...	...	...	...	...	...	...	...	...	...	...	No figures available.
9	Burma . .	·00660	772	91	193	34	593	91	211	52	2,037	0·66	
10	Bolivia . .	...	...	...	...	...	...	...	...	...	...	...	No figures available.
11	Brazil. . .	·04488	5,250	600	1,313	231	4,030	620	1,436	350	13,850	4·59	

12	Bulgaria . .	·00079	92	11	23	4	71	11	25	6	243	0·08	
13	Canada . .	·05239	6,130	724	1,534	277	4,500	724	4,675	408	15,972	5·24	
14	Chile . .	·00727	850	101	213	38	652	101	232	51	2,238	0·72	
15	China . .	·03633	4,250	502	1,053	187	3,263	502	1,163	283	11,203	3·6	
16	Vatican City .	...	...	...	...	...	...	...	...	...	...	...	No figures available.
17	Colombia . .	·00495	579	69	145	26	445	69	158	38	1,529	0·5	
18	Portuguese Colonies	·00668	782	92	196	35	599	92	214	52	2,062	0·67	
19	U. K. Colonies .	·02787	3,385	385	873	144	2,500	385	892	217	8,781	2·78	
20	French Colonies .	·03053	3,573	422	893	157	2,740	422	977	238	9,422	3·05	
21	Congobelgiam .	·00572	669	79	167	29	513	79	183	44	1,763	·57	
22	Costa Rica . .	·0024	281	33	70	12	215	33	79	19	742	·24	
23	Cuba . .	·01008	1,179	139	293	52	905	139	322	78	3,107	1·01	
24	Denmark . .	·00182	213	25	53	9	163	25	58	14	560	·18	
25	Dominican Republic .	·00083	97	11	24	4	74	11	27	6	254	·08	
26	Egypt . .	·00337	394	46	98	17	303	46	106	26	1,036	·34	
27	El Salvador. .	·00027	31	4	8	1	24	4	12	4	88	·027	
28	Ecuador . .	·00182	213	25	53	9	163	25	58	14	353	·18	
29	U. S. A. . .	·1005	11,706	1,389	2,940	51	9,020	1,389	3,216	780	30,491	10·05	
30	Ethiopia . .	·00462	540	64	135	24	415	64	148	36	1,426	·46	
31	Finland . .	·00184	215	30	53	9	165	30	59	14	575	·18	
32	France . .	·00748	878	103	219	39	671	103	239	58	2,310	·75	

1	2	3	4	5	6	7	8	9	10	11	12	13	14
33	Greece . .	·00117	137	16	34	6	104	16	38	9	360	·12	
34	Guatemala . .	·00202	236	3	59	10	181	3	60	16	568	·20	
35	Haiti . . .	·00041	48	6	12	2	36	6	13	3	126	·04	
36	Honduras . .	·00112	131	15	30	6	100	15	36	9	342	·11	
37	Hungary . .	·00159	186	20	46	8	143	20	51	12	486	·16	
38	India . .	·0206	2,410	285	600	100	1,849	285	659	160	6,368	2·06	
39	Indonesia . .	·01031	1,205	142	300	50	924	144	329	80	3,174	1·03	
40	Iran . . .	·00445	521	61	131	23	399	61	142	35	1,373	·45	
41	Iraq . . .	·00160	187	22	47	8	144	22	51	13	494	·17	
42	Ireland . .	·00124	145	17	36	7	111	17	40	10	383	·12	
43	Iceland . .	·00094	110	13	28	5	84	13	30	7	290	·09	
44	Italy . . .	·01077	1,260	149	315	56	967	149	345	84	3,325	1·08	
45	Lebanon . .	·00040	47	6	12	2	36	6	13	3	125	·04	
46	Liberia . .	·00055	64	8	16	3	49	8	18	4	170	·05	
47	Luxemburg .	N.F.A.	...	...	...	...	...	...	...	...	...	...	No figures available.
48	Mexico . .	·01708	1,998	236	499	83	1,533	236	547	1,333	6,465	1·70	
49	Monaco . .	N.F.A.	...	...	...	...	...	...	...	...	...	...	No figures available.

50	Nicaragua . .	·00178	208	25	52	9	159	25	52	14	544	·18	
51	Norway . .	·00454	531	63	133	24	407	63	145	34	1,400	·45	
52	New Zealand .	·00332	388	46	97	17	298	46	106	26	1,024	·33	
53	Pakistan . .	·00508	594	70	149	26	458	70	163	40	1,570	·51	
54	Panama . .	·00081	95	11	24	4	73	11	26	6	250	·08	
55	Paraguay . .	·00087	102	12	26	5	78	12	28	7	270	·09	
56	Netherlands .	·00064	75	9	19	3	58	9	21	5	199	·06	
57	Peru . . .	N.F.A.	...	...	...	...	...	...	...	...	...	...	No figures available.
58	Philippines . .	N.F.A.	...	...	...	...	...	...	...	...	...	...	No figures available.
59	Poland . .	·00232	271	32	68	12	208	32	74	18	715	·23	
60	Portugal . .	·00194	227	27	57	10	174	27	62	15	599	·11	
61	Morocco, Tunisia	·00235	275	33	82	12	210	33	75	18	738	·24	
62	Yugoslavia .	·00214	251	30	63	11	190	30	69	17	661	·21	
63	Ukrainian S.S.R..	...	...	...	...	...	...	...	...	...	...	...	No figures available.
64	South Rhodesia .	·00186	222	26	55	10	170	26	60	15	584	·19	
65	Roumania . .	·00243	284	34	71	13	220	34	78	19	753	·24	
66	U. K. . .	·03518	4,116	489	1,029	182	3,160	486	1,126	275	10,863	3·52	
67	Siam . .	·00191	223	27	56	10	170	27	61	15	589	·19	
68	Sweden . .	·00225	263	31	66	12	200	31	72	18	693	·23	
69	Switzerland .	·00294	344	41	86	15	270	41	94	23	914	·29	

1	2	3	4	5	6	7	8	9	10	11	12	13	14
70	Syria . . .	·00058	68	8	17	3	50	8	19	5	178	·06	
71	Czechoslovakia .	·00155	186	22	45	8	14	22	50	12	485	·16	
72	U.S.A. Territories	·02184	2,555	302	639	113	170	302	699	170	4,950	2·18	
73	Turkey . .	·00741	867	103	217	38	470	103	35	58	1,891	·74	
74	South Africa .	·00456	534	63	134	24	410	63	146	36	1,410	·46	
75	U. S. S. R. .	·10755	12,583	1,487	3,146	554	9,650	1,487	3,442	839	33,188	10·76	
76	Uruguay . .	·00601	703	83	176	31	540	83	192	47	1,855	·60	
77	Venezuela . .	·00370	433	51	108	19	330	51	118	29	1,139	·37	
78	Yemen . .	...	...	...	...	...	...	...	...	...	...	...	No figures available.

ANNEXURE 6

P. F. B.

Number of Fixed Circuits filed in **1947** *according to First List published in January,* **1948** *(Blue Book)*

(*Vide Para.* **2·8·2**)

No.	Country	No. of Fixed Circuits	Percentage to total
1	2	3	4
1	Afghanistan	22	0·17
2	Albania	5	0·04
3	Saudi Arabia	14	0·11
4	Argentine	696	5·53
5	Australia	462	3·67
6	Austria	47	0·37
7	Belgium	22	0·17
8	Bielorussia	...	...
9	Burma	15	0·12
10	Bolivia	15	0·12
11	Brazil	2	0·17
12	Bulgaria	7	0·06
13	Canada	944	7·49
14	Chile	183	1·45
15	China	1,802	14·30
16	Vatican City	7	0·06
17	Colombia	87	0·69
18	Portuguese Colonies	146	1·16
19	U. K. Colonies	919	7·29
20	French Colonies	1,005	7·96
21	Congo Belgian	383	3·04
22	Costa Rica	50	0·40

1	2	3	4
23	Cuba	115	0·91
24	Denmark	52	0·41
25	Dominican Republic	28	0·22
26	Egypt	238	1·89
27	El Salvador	3	0·02
28	Ecuador	165	1·31
29	U. S. A.	718	5·70
30	Ethiopia	111	0·88
31	Finland	27	0·21
32	France	284	2·25
33	Greece	36	0·29
34	Guatemala	23	0·18
35	Haiti	27	0·21
36	Honduras	60	0·47
37	Hungary	15	0·12
38	India	224	1·78
39	Indonesia	270	2·14
40	Iran	47	0·37
41	Iraq	21	0·17
42	Ireland	12	0·10
43	Iceland	27	0·21
44	Itlay	184	1·46
45	Lebanon	...	...
46	Liberia	...	...
47	Luxemburg	17	0·14
48	Mexico	61	0·48
49	Monaco	20	0·16
50	Nicaragua	9	0·07

1	2	3	4
51	Norway	162	1·29
52	New Zealand	112	0·89
53	Pakistan	68	0·54
54	Panama	44	0·35
55	Paraguay	...	...
56	Netherlands, Curacao and Surinam	91	0·72
57	Peru	135	1·07
58	Philippines	157	1·25
59	Poland	32	1·25
60	Portugal	164	1·30
61	Morocco and Tunisia	54	0·43
62	Yugoslavia	69	0·55
63	Ukrainian SSR	...	...
64	South Rhodesia	35	0·28
65	Roumania	24	0·19
66	U. K.	301	2·39
67	Siam	35	0·28
68	Sweden	48	0·38
69	Switzerland	45	0·36
70	Syria	13	0.10
71	Czechoslovakia	17	0·14
72	U. S. A. Territories	451	3·59
73	Turkey	10	0·08
74	South Africa	482	3·83
75	U. S. S. R.	...	...
76	Uruguay	25	1·50
77	Venizuela	133	1·06
78	Yemen	6	0·05

ANNEXURE 7

Comparative Statement of Percentages to each country

(*Vide Paras* 2·8·1 *and* 2·8·3)

No.	Country	% of No. of Fixed Stns. to total *Vide* priority figure para 2.6.1 to 2.6.3	% of PFB circuits filed to total filings (First Blue Book 1947 filings).	% of KCH allottable to total on proposed basis.
1	2	3	4	5
1	Afghanistan	·09	·17	·16
2	Albania	·02	·04	·016
3	Saudi Arabia	·02	·11	·58
4	Argentine	1·95	5·53	1·58
5	Australia	1·62	3·67	2·17
6	Austria	·12	·37	·07
7	Belgium	·69	·17	·81
8	Bielorussia	...	...	...
9	Burma	·09	·12	·66
10	Bolivia	·51	·12	...
11	Brazil.	8·78	...	4·49
12	Bulgaria	·02	·06	·08
13	Canada	7·52	7·49	5·23
14	Chile	1·36	1·45	·72
15	China	2·20	14·30	3·63
16	Vatican City	·04	·06	...
17	Colombia	·06	·69	·50
18	Portuguese Colonies	...	1·16	·67
19	U. K. Colonies	...	7·29	2·79
20	French Colonies	...	7·96	3·05
21	Congo Belgian	·10	3·04	·57
22	Costa Rica	·48	·40	·24

1	2	3	4	5
23	Cuba	2·87	·91	1·01
24	Denmark	·43	·41	·18
25	Dominican Republic	·16	·22	·08
26	Egypt	·69	1·89	·34
27	El Salvador.	·03	·02	·03
28	Ecuador	·13	1·30	·18
29	U. S. A.	12·65	5·70	10·05
30	Ethiopia	·20	·88	·46
31	Finland	·10	·21	·18
32	France	1·45	2·25	·75
33	Greece	·09	·29	·12
34	Guatemala	·61	·18	·20
35	Haiti	·06	·21	·04
36	Honduras	·30	·48	·11
37	Hungary	·09	·12	·16
38	India	·65	1·78	2·06
39	Indonesia	·87	2·14	1·03
40	Iran	·04	·37	·45
41	Iraq	·14	·17	·16
42	Ireland	·05	·10	·12
43	Iceland	·19	·21	·09
44	Italy.	1·52	1·46	1·08
45	Lebanon	·09	...	·04
46	Liberia	·10	...	·05
47	Luxemburg	...	·14	...
48	Mexico	3·70	·48	1·71
49	Monaco	...	·16	...
50	Nicaragua	·55	·07	·18
51	Norway	·52	1·29	·45

1	2	3	4	5
52	New Zealand	·42	·89	·33
53	Pakistan	·22	·54	·51
54	Panama	·21	·35	·08
55	Paraguay	·12	...	·09
56	Netherlands, Curacao and Surinam	·05	·72	·06
57	Peru	...	1·07	...
58	Philippines	...	1·25	...
59	Poland	·08	·25	·23
60	Portugal	·23	1·30	·19
61	Morocco and Tunisia	·01	·43	·24
62	Yugoslavia	·25	·55	·21
63	Ukrainian SSR	...	...	...
64	South Rhodesia	·08	·28	·19
65	Roumania	·15	·19	·24
66	U. K.	1·60	2·39	3·51
67	Siam	·17	·28	·19
68	Sweden	·21	·38	·23
69	Switzerland	·21	·36	·29
70	Syria	·05	·10	·06
71	Czechoslovakia	·34	·14	·16
72	U. S. A. Territories	4·99	3·59	2·18
73	Turkey	·03	·08	·74
74	South Africa	·11	3·83	·46
75	U. S. S. R.	21·86	...	10·76
76	Uruguay	2·17	·19	·60
77	Venezuela	·63	1·06	·37
78	Yemen	...	·05	...

GIPD—M—24 DGP&T—21-6-51—400