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(ITU) للاتصالات الدولي الاتحاد في والمحفوظات المكتبة قسم أجراه الضوئي بالمسح تصوير نتاج (PDF) الإلكترونية النسخة هذه والمحفوظات المكتبة قسم في المتوفرة الوثائق ضمن أصلية ورقية وثيقة من نقلاً

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European Conference

for the examination of the Television and Broadcasting frequency bands
between 41 and 216 Mc/s

(Stockholm, 28 May-30 June 1952)

by Erik Esping

(Concluded)¹

Committee Work

As mentioned before, the CER Conference was preceded by meetings of Study Groups V, VI and XI of the CCIR. The reports of Study Groups V and XI were handed over to the CER for use at the Conference by the Director of the CCIR, Dr. van der Pol. The Director pointed out that it should be borne in mind that these reports had an interim character but that they might be considered as reflecting the latest available knowledge in the field. The reports turned out to be of the greatest value to the Conference and facilitated considerably the work of the Technical and Plan Committees, which had to perform the most important work of the Conference.

As early as the 30th May, Mr. Gerber was able to convene the Technical Committee for its first meeting, and on the 31st of May Mr. Pedersen was able to hold the first meeting of the Plan Committee.

The Technical Committee.

The work of this Committee was distributed between two sub-committees, 4A under the chairmanship of Mr. Mallein (France) and 4B under the chairmanship of Dr. van der Wyck (Netherlands). The terms of reference of Sub-Committee 4A were to study :

- 1) the lower field strength limit for correct reception ;
- 2) the minimum distance between stations, for television and V.H.F. sound broadcasting.

As regards item 1) it was unanimously agreed to recommend the following figures of minimum field strength to ensure correct reception for *sound broadcasting* in band II :

	Rural	Urban
Frequency modulation	250 μ V/m	1,000 μ V/m
Amplitude	1,500 "	5,000 "

For television in bands I and III no general agreement on the minimum field strength to ensure correct reception could be reached. The views of the delegations were summarized as follows :

Country	Band I	Band III
United Kingdom	100 μ V/m	300 μ V/m
Austria	500 μ V/m	1,000 μ V/m
Belgium		
Denmark		
France		
Federal German Republic		
Italy		
Luxembourg		
Monaco		
Netherlands		
Spain		
Sweden	1,000 μ V/m	1,000 μ V/m
Switzerland		
Turkey		
P.R. of Albania		
Bielorussian S.S.R.		
P.R. of Bulgaria		
Czechoslovakia		
Hungarian P.R.		
Poland		
Ukrainian S.S.R.		
Roumanian P.R.		
USSR		

It was recommended by the sub-committee that all the above field strength values, for both sound broadcasting and television, should as a rule be protected for 99 % of the time.

To be able to study item 2) the sub-committee had to be in possession of the propagation data of the frequency bands in question. While fully realizing that the Tropospheric Wave Propagation Curves presented could not be considered as final, the sub-committee decided to recommend the use of the F (50,50) curves in fig. 3 for transmitters operating in Band I, fig. 4 for Band II and fig. 5 for Band III. In order to facilitate the work of the Plan Committee, the sub-committee worked out tables giving practical examples of the calculation of the distance between desired and undesired transmitters. The calculations showed to what a considerable extent the geographical separation increases when the percentage of the time of protection is raised from 90 % to 99 %. Sub-committee 4A therefore considered that in certain cases, when there are difficulties in the siting of the transmitters, and especially as regards countries with a small area, the percentage time of protection might be reduced from the normal figure of 99 % to 90 %. In order to help the Plan Committee in the first stage of its work, sub-com-

¹ *Telecommunication Journal*, 1953, page 68e.

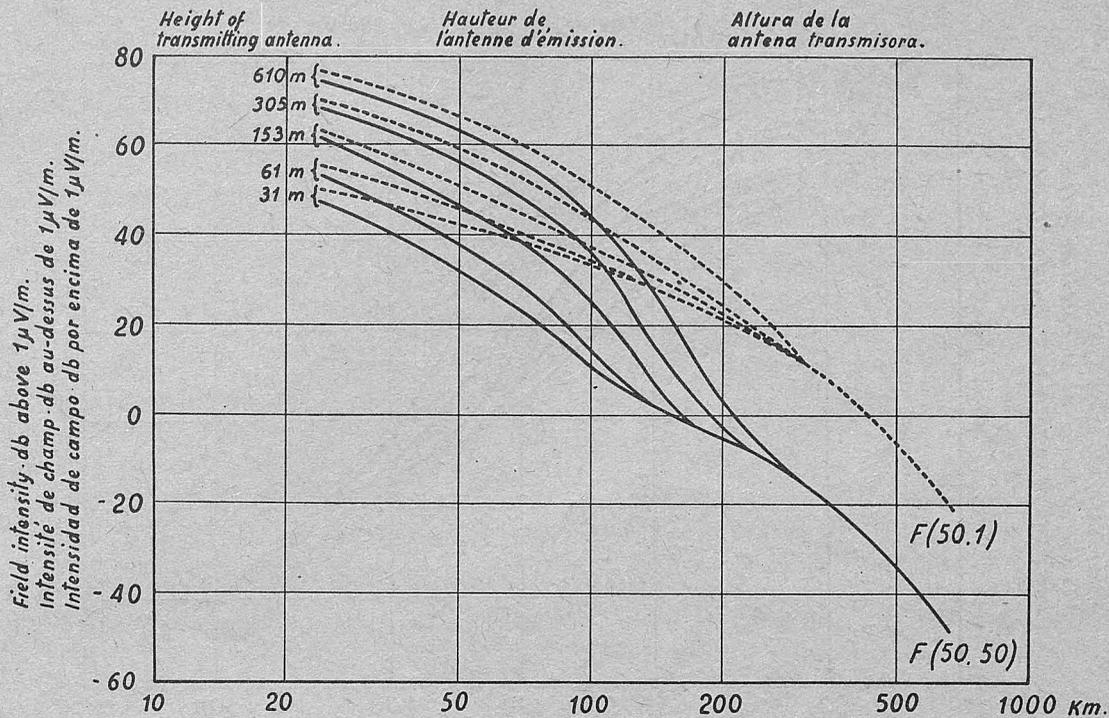


Fig. 3. — Estimated variation with distance of the tropospheric field intensities exceeded at 50 percent of the localities for 1 and 50 percent of the time (FCC ad hoc committee 31.5.49). — Frequency 63 Mc/s — Radiated power 1 kW — Receiving antenna height 9 m.

Variation, suivant la distance, de l'intensité de champ troposphérique pour 50 pour cent des localités pendant 1% et 50% du temps (Comité ad hoc FCC, 31.5.49). — Fréquence 63 Mc/s — Puissance rayonnée 1 kW — Hauteur de l'antenne de réception 9 m.

Cálculo de la variación de las intensidades de campo de la onda troposférica, en función de la distancia, sobrepasadas en el 50% de las ubicaciones, durante 1 y 50% del tiempo (Comisión especial FCC, 31.5.49). — Frecuencia, 63 Mc/s — Potencia radiada, 1 kW — Altura de la antena receptora, 9 m.

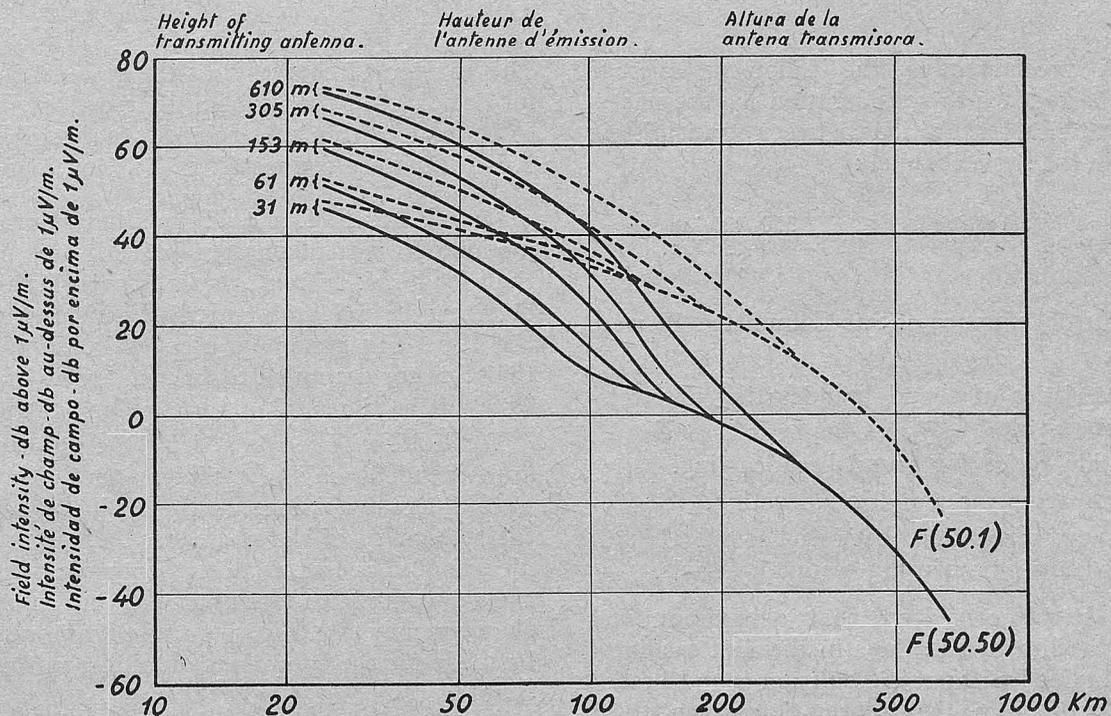


Fig. 4. — Estimated variation with distance of the tropospheric field intensities exceeded at 50 percent of the localities for 1 and 50 percent of the time (FCC ad hoc committee 31.5.49). — Frequency 98 Mc/s — Radiated power 1 kW — Receiving antenna height 9 m.

Variation, suivant la distance, de l'intensité de champ troposphérique pour 50 pour cent des localités pendant 1% et 50% du temps (Comité ad hoc FCC, 31.5.49). — Fréquence 98 Mc/s — Puissance rayonnée 1 kW — Hauteur de l'antenne de réception 9 m.

Cálculo de la variación de las intensidades de campo de la onda troposférica, en función de la distancia, sobrepasadas en el 50% de las ubicaciones, durante 1 y 50% del tiempo (Comisión especial FCC, 31.5.49). — Frecuencia, 98 Mc/s — Potencia radiada, 1 kW — Altura de la antena receptora, 9 m.

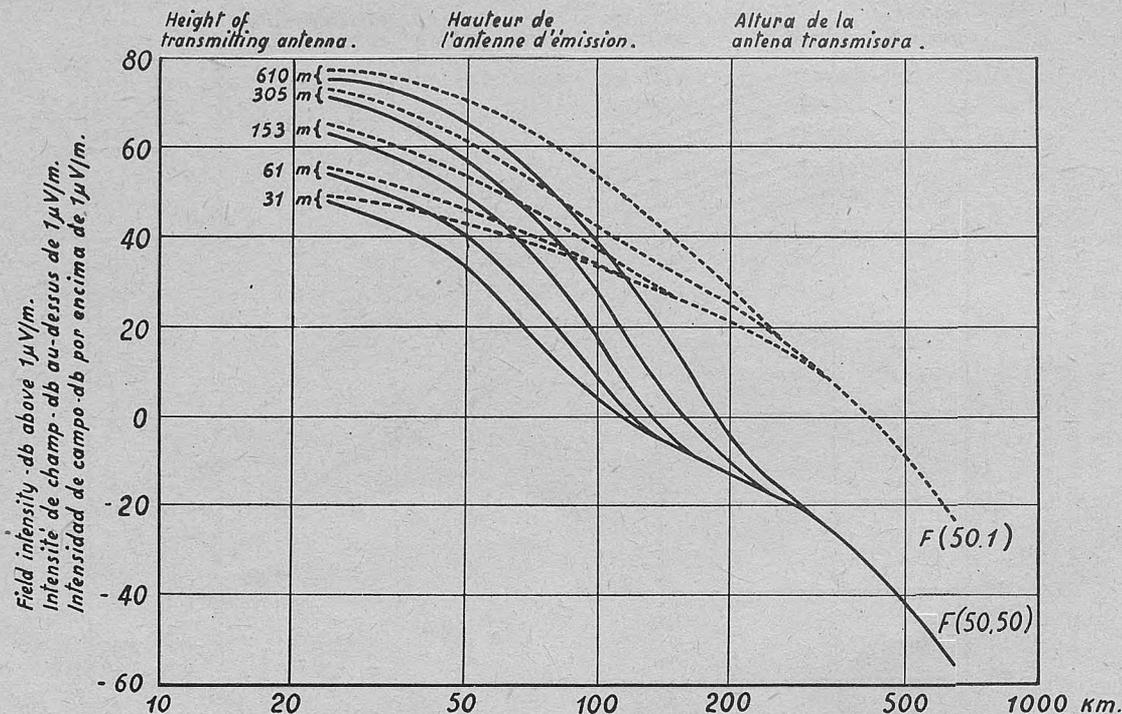


Fig. 5. — Estimated variation with distance of the tropospheric field intensities exceeded at 50 percent of the localities for 1 and 50 percent of the time (FCC ad hoc committee 31.5.49). — Frequency 195 Mc/s — Radiated power 1 kW — Receiving antenna height 9 m.

Variation, suivant la distance, de l'intensité de champ troposphérique pour 50 pour cent des localités pendant 1% et 50% du temps (Comité ad hoc FCC, 31.5.49). — Fréquence 195 Mc/s — Puissance rayonnée 1 kW — Hauteur de l'antenne de réception 9 m.

Cálculo de la variación de las intensidades de campo de la onda troposférica, en función de la distancia, sobrepasadas en el 50% de las ubicaciones, durante 1 y 50% del tiempo (Comisión especial FCC, 31.5.49). — Frecuencia, 195 Mc/s — Potencia radiada, 1 kW — Altura de la antena receptora, 9 m.

mittee 4A recommended the following average figures to be taken into consideration for the necessary geographical separation between transmitters operating in the same channel :

For sound broadcasting	350-400 km
For television	400-450 km.

The terms of reference of Sub-Committee 4B were to study :

- 1) Characteristics of sound broadcasting and television receivers.
- 2) Protection ratios for sound broadcasting.
- 3) Carrier spacing for sound broadcasting.
- 4) Frequency separation between sound broadcasting transmitters using common aerials.

Item 1. It was considered that a maximum frequency instability of $50 \pm$ kc/s in the first oscillator could be obtained without difficulty in sound broadcast receivers. From the information given there resulted a preference for an intermediate frequency of the order of 10 Mc/s for sound broadcast receivers. For television receivers a number of delegates were in favour of an intermediate frequency somewhere between 30 and 40 Mc/s. The question regarding the intermediate frequency bandwidth in sound broadcast receivers gave rise to an interesting discussion.

This matter, of course, is of the greatest importance for deciding on the number of frequency allocations to be made within the assigned frequency bands and it is intimately connected with items 2 and 3.

Item 2. For F.M. a ± 75 kc/s deviation at 100% modulation was taken as a base. It was considered that for F.M. without carrier spacing a 20 db ratio between desired and undesired signal for 99% of the time was generally acceptable. It was agreed that this corresponded to an audio ratio of 30 db for 99% of the time and 40 db for 90% of the time.

For F.M. with carrier spacing the protection ratios are dependent on the receiver selectivity. As there were different opinions on the limits to be fixed for the selectivity of the receivers, both from the technical and, above all, from the economic point of view, the sub-committee recommended that in elaborating the frequency allocation plan proper allowance should be made for the conditions obtaining in the different countries.

Item 3. Proposals were made by various delegations with regard to carrier spacing for sound broadcasting. A basic carrier spacing of 200 kc/s was recommended by some delegations with the object of economy in frequency usage. In consideration of the cost of receivers a 400 kc/s spacing was recommended by one delegation. Some other delegations

proposed a 300 kc/s spacing, and finally it was proposed to use both the 400 kc/s and the 200 kc/s spacing. After some discussion, however, it was agreed that the question of carrier spacing was not a fundamental consideration, inasmuch as a plan could be drawn up using carrier spacings of 200, 300 and 400 kc/s in different areas, as might be required, provided the protection appropriate to the frequency spacing of desired and undesired transmissions was given in all cases.

Item 4. A carrier spacing of a minimum of 2 Mc/s between sound broadcasting transmissions with a common aerial was considered as an adequate figure, taking into account economy and filter losses.

The protection required, in terms of *the ratio of the desired to the undesired signal*, in television had been stated by Study Group XI of the CCIR at its meeting immediately before the CER Conference. These protection ratios are included in the report handed over by the Director of the CCIR to the conference. They are mainly the following :

I. Co-Channel Interference.

- 1) Protection ratio for the picture signal when wanted and unwanted signals have the *same* line frequency.
 - 1 a) Carriers separated by less than 100 c/s but not synchronized. Just tolerable interference : 45 db.
 - 1 b) Carriers separated by 2/3 of the line frequency. Just tolerable interference : 30 db.
 - 1 c) Carriers separated by 1/2 of the line frequency. Just tolerable interference : 27 db.
- 2) Protection ratio for the picture signal when the wanted and unwanted signals have *different* line frequencies.
 - 2 a) Carriers separated by less than 100 c/s but not synchronized. Just tolerable interference : 45 db.
 - 2 b, c) Carriers separated by 1/2 or 2/3 of the line frequency of the desired signal.

As in cases 1 b) and 1c) the offset brings an improvement in the protection of the picture signal ; this improvement is, however, reduced due to the fact that the line frequency of the unwanted signal is different from the line frequency of the wanted signal. The amount of the reduction depends on the relation between the line frequencies. No definite figures could be given.

II. Adjacent Channel Interference.

The worst interference on the picture signal results from the sound in the adjacent channel. The figures below are given for the case when

the separation between the video carrier and the adjacent channel sound carrier is 1.5 Mc/s.

- a) FM – modulated sound carrier. Just tolerable interference : — 6 db.
- b) AM – modulated sound carrier. Just tolerable interference : 0 db.

III. Overlapping channel interference.

In fig. 6 curves are given for the protection ratio required when a television signal, using 819 lines, 625 lines or 405 lines is interfered with by a vision signal of any of the systems or by an FM sound signal. The curves cover the case when the carrier of the interfering signal lies within the vision channel of the desired transmissions. If the interfering signal is an AM-sound signal, 5 db should be added to the protection ratios shown by the curves. The curves are tentative and may require modification in the light of future experience.

IV. Protection ratio for the sound signal (for just tolerable interference).

- a) Wanted and unwanted signals, FM : 20 db
- b) Wanted and unwanted signals, AM :
 1. frequency difference *below* the audio frequency range : 30 db
 2. frequency difference *within* the audio frequency range : 40 db
 3. frequency difference *above* the audio frequency range : 15 db
- c) Wanted signal, AM—unwanted signal, FM :

No frequency difference :	40 db
25 kc/s frequency difference :	30 db
50 kc/s " " " :	12 db
- d) Wanted signal, FM—unwanted, AM : 20 db.

Thanks to the intensive work done within Committee 4 and its sub-committees 4A and 4B and also to the work done within Study Group XI of the CCIR, Dr. Gerber was able to finish the work of his committee as early as June 18th. On the 21st June, he presented a report, unanimous in its main points, to the Plenary Assembly.

The Plan Committee

The task given to this committee was shared between four sub-committees : 5A under the chairmanship of Dr. Joachim (Czechoslovakia), 5B under the chairmanship of Mr. Faulkner (U.K.), 5C under the chairmanship of Mr. Esping (Sweden) and 5D under the chairmanship of Mr. Nicotera (Italy).

Sub-committee 5A had the following terms of reference:

1. To collect channel requirements for sound broadcasting ; the requirements should include details of the modulation system envisaged and the band or bands preferred.

Protection ratios required by vision signal against unwanted vision or frequency modulated sound signal.
 Rapports de protection requis pour le signal d'image, vis-à-vis d'un signal non désiré de vision ou de son modulé en fréquence
 Coeficientes de protección requeridos para la señal video, contra una señal no deseada de imagen o de sonido, modulada en frecuencia.

A = Unwanted signal within full sideband of wanted signal
 Signal non désiré dans la bande non atténuée du signal désiré
 Señal no deseada en la banda no atenuada de la señal deseada.

B = Unwanted signal within vestigial sideband of wanted signal.
 Signal non désiré dans la bande résiduelle du signal désiré.
 Señal no deseada en la banda residual de la señal deseada.

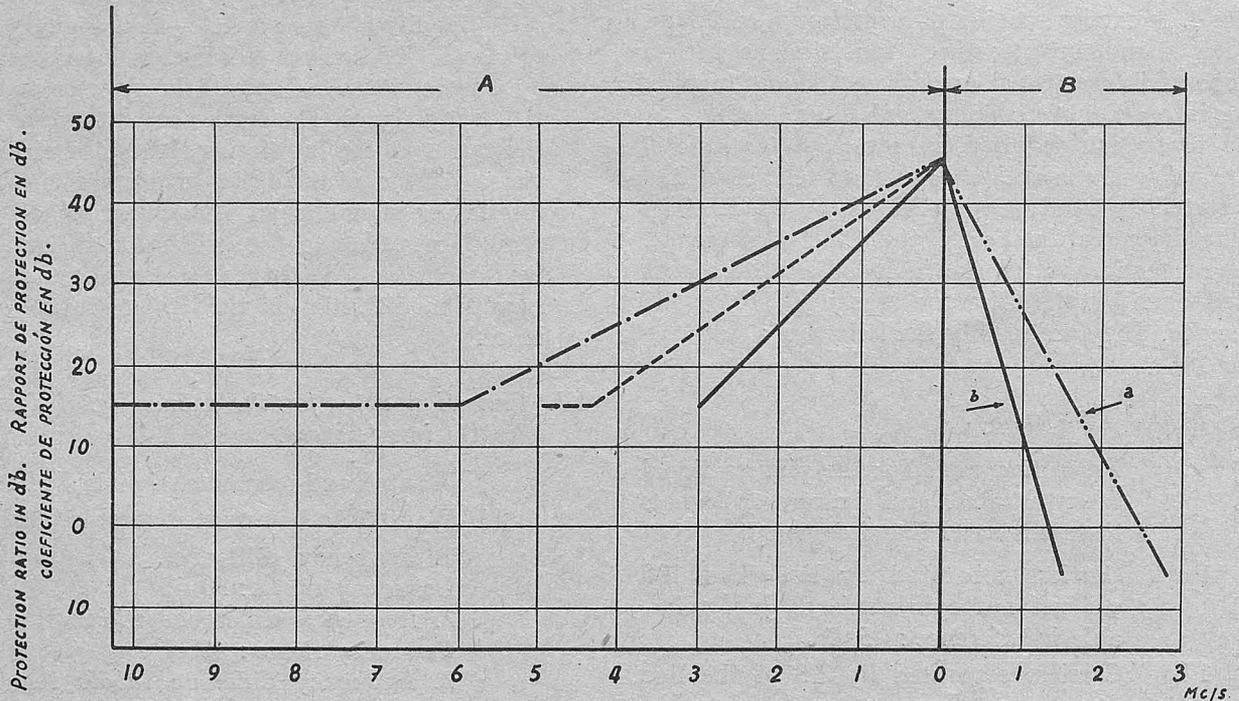


Fig. 6. — Frequency difference between wanted and unwanted signals.
 Différence de fréquence entre les signaux désirés et non désirés.
 Diferencia de frecuencia entre las señales deseadas y no deseadas.

- 405 line system
système 405 lignes
sistema de 405 líneas
- 625 line system
système 625 lignes
sistema de 625 líneas
- · - · - · 819 line system
système 819 lignes
sistema de 819 líneas

- a** = For systems in which the frequency spacing of vision and adjacent channel sound carriers is 2.85 Mc/s.
 Pour les systèmes pour lesquels la séparation entre porteuses vision et son du canal adjacent est 2,85 Mc/s.
 Para los sistemas con 2,85 Mc/s de separación entre las portadoras de video y de sonido del canal adyacente.
- b** = For systems in which the frequency spacing of vision and adjacent channel sound carriers is 1.5 Mc/s.
 Pour les systèmes pour lesquels la séparation des porteuses vision et son du canal adjacent est 1,5 Mc/s.
 Para los sistemas con 1,5 Mc/s de separación entre las portadoras de video y de sonido del canal adyacente.

NOTE — REMARQUE — NOTA :

For an amplitude modulated sound signal the protection ratios required are about 5 db higher.
 Pour un son modulé en amplitude, les rapports de protection requis sont plus élevés de 5 db environ.
 Para un sonido modulado en amplitud, los coeficientes de protección son unos 5 db más elevados.

2. To collect channel requirements for television ; the requirements should include details of the technical characteristics of the television system used and the bands preferred.

3. To submit a report to the plenary Committee as soon as possible.

Through very efficient work the sub-committee succeeded in collecting and preparing material in order that a report could be presented to Committee 5 as early as the 14th June.

The following are the main points covered by the report :

Practically all countries participating in the conference expressed the wish to have the whole of their territory covered by television and VHF broadcast services. Furthermore, the majority of the participating countries wanted frequency allocations for more than two VHF broadcasting programmes. All countries intended to utilize frequency modulation. The deviation was in most cases stated to be ± 75 kc/s. Concerning the channel width and channel separation for sound broadcasting there were different opinions.

Thirteen countries wished to have frequency allocations for double television programmes in their main centres.

All countries wanted to have their television service in Bands I and III and sound broadcasting service in Band II. Ten countries also wished to have channels in Band I for sound broadcasting.

Sub-committee 5B was given the task of preparing a tentative frequency assignment plan for VHF sound broadcasting and Sub-committee 5C was to prepare a tentative plan for television. In their work both sub-committees used the Administrations' estimates of their probable future requirements as a basis and they also studied the "Effective radiated power" limitation.

The tasks of both these sub-committees were rather similar, so their work was organized on the same lines. As propagation of metre waves does not introduce so many and such difficult problems as the propagation of medium and long waves, the plan work was not so complicated as it has been at previous conferences dealing with frequency allocations for broadcast transmitters.

The relatively limited range of the metric waves made it possible to divide the plan work within the two sub-committees on a territorial basis. Within each of the sub-committees five working groups were set up, each with a convener.

Sub-committee 5B included the following groups :

Group 1. Northern. Convener : Mr. Langborger (Sweden). Countries : Denmark, Finland, Iceland, Norway, Poland, Sweden, USSR.

Group 2. Western. Convener : Mr. Chalk (U.K.). Countries : Belgium, France, Germany, Ireland, Luxembourg, Netherlands, United Kingdom.

Group 3. South-West. Convener : Mr. Sponzilli (Italy). Countries : France, Italy, Monaco, Portugal, Spain, Switzerland, Vatican City, French North Africa, Morocco and Tunisia.

Group 4. Central European. Convener : Mr. Werthmüller (Switzerland). Countries : Austria, Bielorussian S.S.R., Czechoslovakia, Germany, Hungarian P. R., Poland, Switzerland.

Group 5. South-Eastern. Convener : Mr. Nicolaenko (Ukrainian S.S.R.). Countries : P. R. of Albania, Austria, P. R. of Bulgaria, Greece, Hungarian P. R., Turkey, Ukrainian S.S.R., USSR, F.P.R. of Yugoslavia.

Within Sub-committee 5C the countries were grouped in the same way. The conveners were : Group 1, Mr. Ekström (Sweden), Group 2, Mr.



Fig. 7. — Part of the Northern Group for Television.

Left : Denmark - Sweden discussing common problems.

Right : Finland - Sweden - USSR discussing common problems.

Un coin du Groupe Nord pour la télévision.

A gauche : Les délégués de la Suède et du Danemark examinant des problèmes d'intérêt commun.

A droite : les délégués de la Finlande, de la Suède et de l'URSS se livrent au même travail.

Parte del Grupo septentrional dedicado a la televisión.

A la izquierda : Los delegados de Suecia y Dinamarca discutiendo problemas comunes.

A la derecha : Los delegados de Suecia, Finlandia y la URSS discutiendo problemas comunes.

Henderickx (Belgium), Group 3, Mr. Latt (Switzerland), Group 4, Dr. Joachim (Czechoslovakia), Group 5, Mr. Popovic (F. P. R. of Yugoslavia).

The ten working groups started their work on the 16th June and then the conference, I feel, entered into its most interesting and exciting stage. Each working group gathered around a map, showing the part of the European area that included the countries participating in the group in question. Then the delegates started to mark their stations with coloured pins and celluloid discs. The covering of the different channels was marked on a big table on the wall. The work proceeded with great intensity practically night and day. When entering the working room one almost got the impression that an international chess tournament was going on. The delegates were sitting there with serious looks, moving their pins; protection ratios were controlled, distances were measured, etc. Maybe there were certain signs of strategy even then, in the moving of the pins. The different conveners, however, did an excellent work in settling differences of opinion and in contributing advice and proposals for good solutions. The preparation of the television plan especially offered many interesting—and often also difficult—problems, as in this case regard had to be paid to several different systems and bandwidths. The 819-lines system, for instance, requires a bandwidth of 14 Mc/s, for the 625-lines system it was necessary to work with two different bandwidths, viz. partly 8 Mc/s and partly 7 Mc/s, and for the 405-lines system the necessary bandwidth was 5 Mc/s. As expected, the difficulties were greatest in Central Europe, where the need of a great number of stations is concentrated in a relatively small area. In many cases it proved difficult strictly to apply the principles concerning protection ratios stated by the Technical Committee, and nevertheless it was not possible to fit in all requirements within the Atlantic City Bands.

Sub-committee 5B was able to give an account of its work to Committee 5 on June 24th, and Sub-committee 5C rendered its account on June 26th.

Draft VHF Frequency Assignment Plan for Television and Sound Broadcasting, prepared by the U.S.S.R. delegation.

A very interesting and valuable contribution consisting of a draft assignment plan for television and broadcasting was submitted to the conference by the U.S.S.R. delegation for study and discussed at an early stage of the conference work. Prof. Siforov gave a very interesting lecture explaining to the delegates the fundamental principles underlying the plan and its possibilities of coping with the different countries' need of channels. The basic aim of the plan was to ensure the possibility of establishing one-program television and two-program VHF broadcasting services for the whole territory of the European Area. One additional television program and a third VHF broadcasting program were also provided for in the plan for part of the territory. The principle

of uniform coverage for the territory of each country in the European Area was applied. The sound broadcasting part of the plan was based on a 0.3 Mc/s channel separation. The television part of the plan was based on an 8 Mc/s channel separation. In view of the fact that the waves of Band I can be propagated, though irregularly, over very long distances, this band had not been used for mass television. The plan, therefore, provided for the utilization of Band I for transmission of additional television and VHF sound broadcasting programmes only, with a comparatively low repetition rate of frequencies.

Band III, i.e. the 174-216 Mc/s band, had been used as a basic band for mass television. This band, however, had proved insufficient, whence the U.S.S.R. delegation proposed that the 144-174 Mc/s band, set aside in the Atlantic City Table for aeronautical, fixed and other services, be used for television, in addition to the 174-216 Mc/s band.

The plan was received with the greatest interest by the conference and two meetings of the Plenary Assembly were devoted to studying and discussing it. Many delegates stated, concerning the plan, that in some respects there was a large measure of agreement on many of the general principles under discussion. However in some other respects the principles could not be accepted. The proposed extra frequency band 144-174 Mc/s contained important services in many countries and could not be assigned to television use. Furthermore, the Conference was not competent to widen the Atlantic City bands. The principle of uniform coverage for the territory of each country could certainly be of value to large homogeneous areas as the Soviet Union but for many other countries other factors also had to be taken into account. For instance, consideration must be given to factors such as national frontiers and centres of population. Furthermore, the plan supposed that one and the same television system would be used in all countries. As this was not the case, the same principle for the allotment of television channels could not be used within the whole European Territory.

Because of the various opinions expressed and the divergent views of the various delegations, the Plenary Meeting decided that the discussion should be continued at committee level in order that certain technical and practical data might be clarified.

In the proposals prepared by the sub-committees 5B and 5C concerning plans of sound broadcasting and television, the principles of the USSR plan were applied to those countries where they were supposed to be suitable.

Discussion concerning Draft Plans, Draft Agreement and Final Protocol in the Plenary Assembly.

When on June 29th Mr. Pedersen, chairman of Committee 5, presented his report to the 8th meeting of the Plenary Assembly, he informed the delegates that the frequency lists for sound broadcasting stations contained assignments for a total of approximately 2,000 stations and the list of Television

Stations contained approximately 700 stations. All the sound broadcasting stations were inside the Atlantic City bands, but nearly 100 of the 700 television stations were outside these bands.

The plans prepared were, to a very high degree, plans for the future. Only about 1-2 % of the television stations were actually in operation and less than 5 % of the sound broadcasting stations were in use. Efforts had been made to keep the assignments inside the Atlantic City bands, but in some cases it had been necessary to assign frequencies outside these bands in order to avoid a serious reduction of requirements.

In most cases the Copenhagen Convention had been used as a model for the agreement worked out by Sub-Committee 5D under the chairmanship of Mr. Nicotera (Italy). In view of the fact that VHF sound broadcasting and television are still at an early stage of development, it proved necessary to facilitate the introduction of modifications to the plans. The question of out-of-band frequencies and how they should be listed had been referred for study to an ad hoc Group under the chairmanship of Mr. van der Toorn.

The discussion during the Plenary Assembly was sometimes rather animated but the whole time it was kept within the limits of facts. The plan proposals naturally had the character of compromises, with the advantages and weaknesses of such. Unfortunately it proved impossible to obtain unanimous decisions either concerning the Plans or the Agreement or the Final Protocol.

The out-of-band frequencies were included in the final protocol as a *Table showing Administrations' proposals for the use of out-of-band frequencies*.

This table contains a list of frequencies for stations which the Administrations signatory to the 1952 Stockholm Broadcasting Agreement propose to operate outside the broadcasting bands of the Table of Frequency Allocations of the Atlantic City Regulations.

In a special column are stated those of the Administrations of neighbouring countries which have been consulted and have indicated their agreement to the proposals. References to the conditions attaching to the agreement are also shown in the table. So far as the radio services of other administrations are concerned, the stations listed will be operated subject to the conditions laid down in para. 88 of the Radio Regulations.

The Final Acts were signed by the following 21 countries :

Austria, Belgium, Vatican City State, Denmark, Spain, Finland, France, Greece, Ireland, Iceland, Italy, Luxembourg, Monaco, Norway, Netherlands, Federal German Republic, Federal People's Republic of Yugoslavia, United Kingdom of Great Britain and Northern Ireland, Sweden, Swiss Confederation and Turkey.

* * *

After 34 hectic days of interesting discussions and hard work the Conference thus had come to an end. The Chairman could declare the conference closed on June 30th, 1952, at 11.55 p.m., five minutes before the time decided in advance was ended.

Finally, if I should venture to give my personal judgment on the conference and its result, I would like to say that the work achieved by the Conference is rather important and comprehensive and that it was done in an extremely short time, thanks above all to the fruitful co-operation between all delegates and to the great efficiency of the Chairmen, vice-Chairmen and conveners of Committees and Working Groups. Especially I wish to express my personal gratitude to Mr. van der Toorn, who was of a very great help to the Conference and to me. Also the Secretariat of the Conference, under the leadership of Mr. Gross and his assistant, Mr. Stead, carried out an admirable amount of work.

E. Esping.