THIRD ANNUAL REPORT

of the

FEDERAL RADIO COMMISSION

to the

CONGRESS OF THE UNITED STATES

Covering the period
from October 1, 1928
to November 1, 1929

▼

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THIRD ANNUAL REPORT OF THE FEDERAL RADIO COMMISSION, COVERING THE PERIOD FROM OCTOBER 1, 1928, TO NOVEMBER 1, 1929

INTRODUCTION

To the Congress of the United States:

The Third Annual Report of the Federal Radio Commission covers the period from October 1, 1928, to November 1, 1929. The financial statement, however, covers only the fiscal year ended June 30, 1929.

After the resignations of Commissioners Sam Pickard, of Kansas, and O. H. Caldwell, of New York, on January 31, 1929, and February 23, 1929, respectively, there were two vacancies on the commission which continued until May 2, 1929.

Maj. Gen. Charles McK. Saltzman, United States Army, retired, former head of the United States Army Signal Corps, and William D. L. Starbuck, an engineer and patent lawyer of New York, were nominated as members of the commission by the President and were confirmed by the Senate on May 2, 1929.

The principal efforts of the commission during the year have been in the fields of eliminating erroneous or impracticable features of the general broadcast allocation, designating frequencies for general communication purposes, and providing a proper regulatory basis for the rapid development of the radio art. In these efforts basic policies have been outlined as clearly as the state of radio technique has permitted and future developments may be expected upon a sound regulatory background.

Efforts have been made, by rules and regulations, to codify the regulatory features for all types of radio stations in order to obtain the widest and most useful public service.

During the year the commissioners personally reviewed and passed upon 6,927 applications. Two hundred and twenty-nine hearings were held before final action on these applications.

The surprising manner of the growth of radio communication during its progress from experimental to established uses has required constant study and research by the commission in order that its decisions may conform to sound principles of law, physical science, and economics.

Applications for use of radio facilities made by newspapers and press associations, public and private point to point telegraph companies, aviation, municipalities for fire and police use, geophysical exploration, Alaska packers, ship and coastal services, and certain portable services have presented important problems of national scope.

In the broadcasting field the commission permits a maximum deviation of one-half kilocycle from the assigned frequency. To meet the requirement, broadcasting stations are being urged to install modern control equipment. This will eliminate much of the heterodyne interference.

Standardized designation of the frequencies above 1,500 kilocycles has been adopted.

The commission, on May 20, 1929, decided that licenses for experimental stations, including relay broadcasting, visual broadcasting, and experimental aircraft, will be issued for periods of one year instead of three months as heretofore.

Experimental stations can be used only for experimental purposes. They are not licensed to conduct message traffic of any kind.

A suitable, economical, and comprehensive plan for the radio requirements of aviation has been adopted. To coordinate the use of radio facilities as an aid to aviation and to secure a maximum of flexibility, certain frequencies were set aside solely for aviation.

The commission has adopted a policy of issuing licenses (as far as practicable) for point to point stations, for general communication purposes, only to individuals or corporations which have assumed a public utility obligation as common carriers.

Television, even in its present experimental stage, requires frequency bands at least 100 kilocycles in width. Some scientists estimate that a band in excess of 1,000 kilocycles in width may be necessary to give satisfactory detail in a moving picture transmitted by radio. Very serious problems will soon confront the commission if frequency bands are to be made available for regular television service.

The problems before the commission are so numerous, important, and ramified that it is possible to give only a mere outline in the space of this report. For reasons of economy, it is thought advisable to include only major acts and policies. Numerous tables of the type included in the second annual report are not included. Many matters of a technical and scientific nature are also omitted in order to confine this report to reasonable size. Detailed information regarding decisions, permits, and licenses, and data on which they are based, are available at the offices of the commission.

The range of radio-frequencies is assumed to extend from 10 to 60,000 kilocycles, although frequencies above 23,000 kilocycles are still in a laboratory or experimental stage of use. The entire range is referred to as the radio spectrum, generally considered as consisting of three major ranges of frequencies, usually described as (1) the low-frequency (long wave) range; (2) the broadcast band, and (3) the high-frequency (short wave) range.

A comprehensive view of this spectrum showing the different "channels" and their uses can be had by reference to the colored chart made a part of this report,[1] which was prepared by the engineering division.

Much attention is given by the commission to the legal aspects of radio regulation. Many important steps taken by the commission are being challenged in the courts. Litigation has, however, had the effect of settling some of the commission's problems.

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[1] See page 14.

While radio broadcasting has made progress, much remains to be desired. Many programs are still of doubtful value. Offensive sales talks are too common. The attitude of the listening public will tend ultimately to cause the correction of such defects.

The radio act specifies that the commission shall exercise no censorship over programs. Nevertheless, the kind of service rendered by a station must be a means of appraising its relative standing and must be considered by the commission in making assignments.

The commission had at all times the hearty cooperation of the radio division, Department of Commerce. The constructive assistance of its head, Mr. W. D. Terrell, and his staff, has been of great value.

The State Department has maintained a constant interest in the international phases of radio regulation, cooperating with the commission as to representation at international conferences, and furnishing it with many comprehensive reports on the progress of radio communication throughout the world.

I. FINANCIAL STATEMENT

(July 1, 1928, to June 30, 1929)

Appropriation

Total appropriation	$355, 182. 88

Expenditures

Total salaries, departmental service	203, 553. 11
Supplies and material	55, 127. 37
Communication service	2, 277. 37
Printing and binding, etc	9, 520. 82
Travel expenses, etc	4, 866. 12
	275, 344. 79

II. PERSONNEL AND ORGANIZATION

Due to the increased number of applications and the greater scope of the commission's regulation it has been necessary during the year to increase the personnel in every section and division. The total personnel on July 1, 1928, was 31, including the commissioners. This had increased to a total of 90 on July 1, 1929.

1928		1929	
Commissioners	5	Commissioners	5
Commissioners' secretaries	5	Commissioners' secretaries	5
Secretary's office	5	Secretary's office	8
Legal division	3	Legal division	16
Engineering division	5	Engineering division	16
Press	1	Press	3
		Investigation division	2
License division	3	License division	17
		Disbursing office	1
Personnel and supplies	3	Personnel and supplies	7
		Correspondence section	4
Files	1	Files	6
Total	31	Total	90

A. ORGANIZATION FOR ADMINISTRATION

The following rules and regulations were passed by the commission on September 10, 1929, to facilitate its work:

For the internal management of the commission the following regulations are adopted:

1. *Legal division.*—One member of the commission will have general supervision over the policies, activities, and conduct of the legal division, and shall consult with the general counsel with reference to the management thereof. * * *

2. *Engineering division.*—One member of the commission will have general supervision over the policies, activities, and conduct of the engineering division, and shall consult with the chief engineer with reference to the management thereof. * * *

3. *Field investigations.*—One member of the commission will have general supervision over investigations made by the commission, and will consult and advise with the general counsel with reference to legal matters thereupon arising. * * *

4. *Liaison.*—One member of the commission is designated as liaison member and in this capacity will be responsible for contacts with governmental and quasi-public bodies interested in the regulation and advancement of radio communication. He shall represent the commission wherever advisable at meetings of the interdepartmental radio advisory committee, and interdepartmental committee for coordination of activities in aid of aviation, the Army Signal Corps, the division of naval communications, the radio service of the Bureau of Standards, etc. He will also keep in contract with proposals for international conferences and conventions.

5. *Secretary.*—Except as above indicated the secretary will be the administrative officer of the commission. In this capacity he will have supervision of the license section, personnel and supply, the disbursing officer, mail and files, the typist pool, the messengers, and the maintenance of records and forms. He shall also be in charge of the information service of the commission, and in

this capacity shall supervise the press service and general correspondence of the commission, and shall conduct personal interviews with those seeking information or desiring action.

The secretary shall serve as budget officer and classification officer of the commission and will have final approval of all leave with the exception of that of the general counsel and chief engineer, whose leave will be approved by the commissioners respectively supervising their activities.

* * * * * * *

6. *Committees of the commission.*—The following four subcommittees are established:

(*a*) Hearings, court and legislation.
(*b*) Budget and personnel.
(*c*) Planning and policy.
(*d*) Procedure and publicity.

Ordinarily hearings will be conducted by a member of the hearings committee, or, preferably, by an examiner assigned to that duty. Such commissioner or examiner shall take and report the evidence for decision thereon by the full membership of the commission or a quorum thereof.

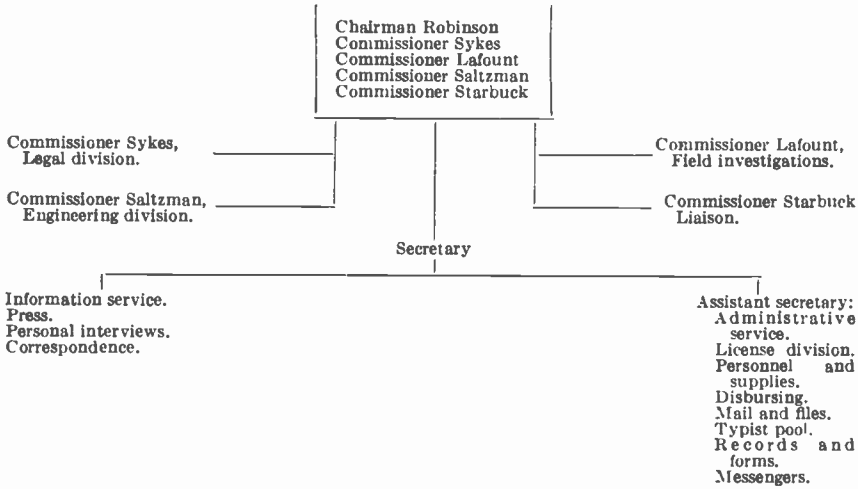
The budget and personnel committee will serve in an advisory capacity to the secretary. The budget and personnel committee will represent the commission in hearings before the Budget Bureau and Appropriations Committee, and before the Personnel Classification Board on the more important positions involving the higher grades and technical personnel.

The planning and policy committee shall actively pursue studies along the line of planning and policy and shall initiate and present definite recommendations to the commission.

The procedure and publicity committee shall interpret and give force and effect to all policies laid down by the commission by the presentation of appropriate orders and regulations, and by the supervision of the publicity policy.

7. The following is adopted as the official organization chart of the commission:

FEDERAL RADIO COMMISSION



B. DIVISIONS OF THE COMMISSION

1. The Secretary's Office

The functions of the office of the secretary have been as follows:

(1) Administrative.
(2) Contacts.
(3) Minutes.
(4) Correspondence.
(5) Information.

The secretary, as administrative officer of the commission, has exercised supervision over clerical personnel, budget relations and disbursements, purchase of supplies, printing and binding, clerical details in connection with handling applications and issuing licenses, and notifications and orders of the commission.

In order to relieve individual commissioners of routine duties, the secretary's office has handled relationships with various Government departments, such as the Bureau of the Budget, Civil Service Commission, Personnel Classification Board, General Accounting Office, Treasury, and the Department of Commerce. As far as possible, the secretary's office has relieved the commissioners of personal interviews with licensees, applicants, and the general public.

The secretary's office recorded the minutes of the commission and made them available to the public.

A great volume of mail from enthusiasts and applicants has been handled.

The secretary has on occasion furnished statistical information to the commissioners and to Members of Congress.

a. LICENSE SECTION

The license section of the secretary's office issues formal authorizations and notifications, based on decisions of the commission.

This section operates as a medium in direct contact with the Radio Division, Department of Commerce, through which all applications are received and all forms of authorization are transmitted to applicants. It also maintains relationship with the airways division, Bureau of Lighthouses, Department of Commerce, to which division all applications for aeronautical and aircraft radio stations are referred for certification, in order that action of the commission on such applications may be in accord with policies of the airways division.

For statistical purposes, several filing arrangements have been installed for the maintenance of records of applications received and the recording of action of the commission relative thereto.

To maintain adequate records, three receiving desks were established to record incoming applications, one for broadcasting, one for ship services, and one for other services. Through these three desks a total of 6,927 applications were received during the year ending June 30, 1929, all of which were entered of record and assigned working file numbers according to service. For identification purposes it was also necessary to assign working file numbers to the large number of applications pending July 1, 1928. The applications were acknowledged and action sheets prepared showing all pertinent facts of existing licenses or construction permits and all changes requested in the current applications. Lists of applications received, with a synopsis of each request, are prepared daily for the information of the commission and the press bureau. All applications received were given a preliminary examination to determine whether or not they were in proper form.

A large number of applications are returned to applicants because they are improperly signed or executed, had alien officers or directors, or were otherwise not in proper form.

A transfer desk was created to record and control the movement of applications to and from the various divisions and offices of the commission and the Department of Commerce.

Forms of authority were prepared and issued to 6,433 approved applicants.

Hearing notices indicating the place and date of hearings were prepared and mailed to 1,744 applicants whose applications were designated for hearing. Applications of those who did not indicate a desire to be heard or who failed to appear at their hearings were submitted to the commission for further consideration. A majority of these applications were denied.

A station history record file was established to show all changes made in the location of apparatus, power, frequency, hours of operation, and ownership. A file was also established to record, in chronological order, all applications received. A master record, by kilocycles, has been kept to date, showing stations assigned to each frequency. A similar record, alphabetically by call letters, has also been kept to date. A register of applications has been established. It was also found necessary to compile and maintain records of broadcasting stations according to the States within each zone.

A large volume of correspondence pertaining to procedure, the filing of applications, incomplete applications, and discrepancies has been conducted. Special lists of pending applications and authorized radio stations by services have been prepared. Lists of frequency assignments have been compiled and transmitted to the international bureau of the telegraph union.

Lists of broadcasting stations have been compiled at the beginning of each license term and mimeographed for distribution, one arrangement being by call letters, and the other, by kilocycles of frequency. Supplements to these lists are prepared for release on the first of each month.

A mailing list of all licensees is maintained for transmitting general orders and rules and regulations of the commission.

b. PRESS SERVICE

This bureau has made available radio information and news originating in the commission. Its activities have increased because of the increasing public interest in radio and the decisions of the commission.

A large number of specialized radio writers and representatives of newspapers located throughout the Nation communicate with the bureau daily. The press is furnished with information about applications awaiting commission action, the commission's decisions, licenses, and construction permits issued and a variety of miscellaneous information. The bureau's activities are confined to news, no propaganda being prepared or encouraged, thereby permitting writers to place their individual interpretations on the acts of the commission.

All applications for the erection of new stations or for the modification of station licenses are announced daily.

Decisions of the commission, with proper details, are announced soon after they are rendered. The aim has been to give the public a correct expression of the commission's problems and policies. The

bureau maintains a mailing list and keeps log-book publishers informed of changes in the broadcasting allocation. It was found necessary to install a special filing system to facilitate instant furnishing of press material.

The general public has also freely used this bureau so that constructive information concerning the work of the commission has been constantly available. Until July 1, 1929, a clipping service was maintained. Radio articles in leading newspapers were clipped and sent to the commissioners to inform them of radio developments. This service was discontinued following a ruling by the Comptroller General that no funds of the commission could be used for such purposes.

c. STATISTICAL RECORDS

In order to facilitate the handling of applications, the commission has compiled the following statistical records:

(1) *World list of stations.*—This list consists of a card index system listing all stations of the world by frequencies. It is kept up to date with the lists published by the International Bureau at Berne and all other proper sources of information.

(2) *Frequency charts.*—These charts are similar to the radio spectrum chart which is made a part of this report. A system of colors is used to define the services to which the frequency bands have been allocated.

(3) *Service charts.*—These consist of large outline maps of the United States on which the various stations are marked to show their location. A separate map is used for each service. All coastal stations, for example are shown only on one map with appropriate symbols to indicate frequencies in use at each location.

Maps of a similar nature will be compiled when time permits, showing the location of transmitting and receiving stations in all parts of the world.

2. Legal Division

The increased work of the commission during the past year has called for an increased personnnel to handle the growing volume of legal problems and has necessitated the establishment of the legal division on a permanent basis. Under the supervision of a general counsel and two assistant general counsels the legal division prepares for all litigation in which the commission is involved, assists in the conduct of public hearings, reviews incoming applications and renders opinions relative thereto. The general counsel further acts as advisor to the commission in the preparation of rules and regulations, in construing and defining provisions of the radio act and in the formulation of commission policies.

For purposes of administration the division is divided into five sections:

(1) Litigation.
(2) Hearings.
(3) Research.
(4) Complaint and investigation.
(5) License and authorization.

(1) *Litigation.*—This section advises the commission in the preparation of its statements of fact and grounds for decision in cases which

are appealed under section 16 of the act. It prepares all briefs and and other court papers necessary in the course of litigation. The presentation of cases to the court is under the personal direction of the general counsel, assisted by an assistant general counsel.

(2) *Hearings.*—One or more members of the legal division are present at each hearing conducted by the commission. The attorney so attending advises the commision as to the status of the matter being heard, the rights of respondents and protestants, the admissibility of evidence and other legal questions. On behalf of the commission, he cross-examines witnesses, avoiding, however, the advocacy of the claims of any applicant, respondent, or protestant. In proper cases he also presents evidence in the commission's interest.

(3) *Research.*—In the absence of legal precedents and codified radio laws, constant research work of a legal nature has been necessary. The problems of other administrative bodies have been studied in minute detail with the view of applying existing principles to situations confronting the commission. The research section drafts and correlates the opinions of the general counsel and arranges for the publication thereof. It has charge of the law library and the collection of all special publications which might be of use to the commission. Correspondence from the radio division of the Department of Commerce requesting a legal opinion in regard to the various kinds of applications filed with it is also referred to this section.

The managing attorney, whose duties are somewhat similar to a clerk of court, sets for hearing all cases to be heard by the commission and keeps a calendar thereof. He is responsible for notifying all respondents and interested parties.

(4) *Complaint and investigation.*—All complaints of violation of the radio act or rules or regulations of the commission are referred to this section which keeps a record thereof and sees that all papers and documents are in proper form for action by the commission or for transmission to the Department of Justice. It cooperates with and advises the chief investigator in respect to all matters requiring field investigation and refers to the commission such cases as in its opinion merit revocation of license, denial of application, setting for hearing, etc.

(5) *License and authorization.*—This section prepares and approves all forms of applications and authorizations. Incoming applications, licenses, construction permits, and other authorizations issued under special terms and conditions presenting legal questions are reviewed by it and opinions furnished to the commission. Proposed orders and minutes of the commission are also examined for legality and accuracy.

a. OPINIONS OF THE GENERAL COUNSEL

The commission is constantly confronted with difficult questions involving interpretation and application of the radio act. Legal questions so arising in the course of the commission's duties are referred to the legal division for opinion and the opinions thus rendered are preserved as Opinions of the General Counsel.

During the year the opinions heretofore rendered by the general counsel have been revised and classified, and new opinions have been written. The following is a list of the titles of the opinion thus far presented to the commision by the general counsel:

No. 1. Broadcasting of programs furnished by one radio station to another station.

No. 2. Construction of sections 13, 15, and 17 of the radio act of 1927 in reference to whether a violation of these sections may be the basis for revoking the license of a broadcasting station.

No. 3. Construction of section 11 in regard to whether advertising and slander over the air may be made the basis for refusing a renewal of license.

No. 4. Interception and publication of messages addressed exclusively from one station to another.

No. 5. Construction of section 11 of the radio act of 1927 in reference to whether transmission of television on a channel in the broadcasting band meets the test of public interest, convenience or necessity.

No. 6. Delegation of power to the Federal Radio Commission and validity of the standard to be applied.

No. 7. Licensing of a State or political subdivision under the radio act of 1927.

No. 8. Assignment of broadcasting frequencies to Government stations.

No. 9. Rights reserved by the countries subscribing to the International Radiotelegraph Convention 1927.

No. 10. Operation of radio transmitter aboard ship station by automatic keying device—necessity of properly licensed operator in attendance.

No. 11. Construction of section 1 with reference to amateur licenses.

No. 12. Construction of the radio act of 1927 involving action by the commission as "licensing authority."

No. 13. Jurisdiction of the Federal Radio Commission over the Island of Guam.

No. 14. Jurisdiction of the Radio Commission over broadcasting stations in regard to private debts and claims.

No. 15. Power of the commission to issue ship licenses prior to inspection.

No. 16. Proper licensee for ship stations as between ship owners and a corporation furnishing services in connection with operation of the station.

No. 17. Construction of that portion of section 10 of the act which relates to the signing of an application by applicant under oath or affirmation—Sufficiency of postmaster's seal.

No. 18. Validity of telegraphic authority as a substitute for a permit or a license.

No. 19. Payment of expenses of witnesses summoned to testify on behalf of the commission in hearings held before the commission.

No. 20. Right of the United States to enjoin the operation of a radio broadcasting station.

No. 21. Construction of section 21 of the radio act of 1927 with reference to terms of licenses issued after issuance of construction permit.

No. 22. Power of the radio commission to suspend licenses.

No. 23. Acknowledgment of telegrams received by broadcasting stations.

No. 24. Amateur mobile stations.

No. 25. Relationship of Federal Radio Commission to the Department of Justice under section 16 of the radio act.

No. 26. Nomination and confirmation of Federal Radio Commissioners.

No. 27. Right of broadcasting stations to contract for exclusive service involving the policy of "block booking."

No. 28. Construction of section 13 of the radio act of 1927, with respect to certain application of the Radio Corporation of America.

No. 29. Construction of ownership provisions (secs. 9 and 29) of the radio act of 1927.

No. 30. Application of the act of June 24, 1910, to motor vessels.

No. 31. Necessity for a hearing when frequency is to be changed in a renewal license.

No. 32. Petition of Adrien M. Kelly—concerning advertisement of Lucky Strike cigarettes.

No. 33. Construction of section 21 of the radio act of 1927.

No. 34. Painting and illuminating radio station towers.

No. 35. Construction of the term "commercial correspondence" as used in amateur regulations of September 1, 1928.

No. 36. Construction of section 21 of the radio act in reference to whether a construction permit is required for a portable station built before the act took effect.

No. 37. Construction of section 12 of the radio act of 1927 in regard to the sale, mortgage, or lease of radio stations.

No. 38. Right of the Federal Radio Commission to compel the attendance of witnesses to testify or produce documentary evidence before it.

3. Engineering Division

At the beginning of the fiscal year organization of the engineering division had just commenced. Only two engineers were on the rolls of the commission. Appropriations for engineers did not become available until July 1, 1928. Soon thereafter the commission engaged a chief engineer and several assistants. Within a period of three months four additional engineers were procured and a working organization was inaugurated. Dr. J. H. Dellinger was placed in charge of the engineering division as chief engineer on August 1, 1928, and served until March 31, 1929. Capt. Guy Hill, Signal Corps, United States Army, was appointed acting chief engineer on April 1, 1929.

The engineering division is divided into three sections:

1. Broadcasting section (550 kilocycles to 1,500 kilocycles).
2. Low and high frequency section (10 to 549 kilocycles and 1,501 to 23,000 kilocycles and above).
3. Statistical, drafting, and clerical section.

In general, the work of the engineering division falls under the classifications given below:

1. Reviewing applications and making recommendations thereon.
2. Furnishing expert technical information to the commission.
3. Making detailed studies and report on allocation of frequencies to various services.
4. Furnishing expert testimony at hearings relative to interference, allocation, equipment, etc.
5. Preparation of technical statistics and data for permanent records and plans for future allocations.
6. Cooperation with the State Department and other governmental departments for the purpose of preparing preliminary material affecting international radio problems.
7. Preparing answers to letters that require engineering study.

Due to the large number of applications received, a great deal of the time of the engineering division is devoted to this work as a memorandum report is submitted on each application received.

If an application is not in conflict with international regulations as to frequency assignments, it is examined to see if it complies with the engineering principles approved by the commission. If it does not conflict with these, careful consideration is then given to determine whether the proposed service will cause interference with existing services.

The entire radio spectrum is becoming crowded and the maximum use can not be made of the facilities available unless the proper type of apparatus is used and unless applications are confined to the bands of frequencies allocated to the various services. The division makes recommendations regarding the portion of the radio spectrum that should be assigned to the various services and recommendations regarding the type of apparatus that should be required.

Since the original organization of the commission the duties of the chief engineer have been performed by an engineer borrowed from some other department of the Government. On account of the importance of the engineering problems of the commission it is believed that the commission should have this position permanently filled by its own engineer, and it is recommended that legislation be enacted establishing the position of chief engineer, with a salary commensurate with the importance of the work.

4. Investigation Division

During the past year the organization of the commission was modified so as to include a separate division devoted to investigation. It is under the direction of a chief investigator, who in turn is under the immediate supervision of one of the commissioners.

The work of this division is divided into two classes: (1) Special legal investigation by direction of the general counsel of the commission, and (2) investigations preliminary to the issuance of a license or permit.

The former are handled under the personal supervision of the assistant general counsel, the result being compiled and given to the commission at and as a part of a hearing.

Investigations of the second class originate in several ways—e. g., by the direction of the commission, by information developed in other investigations, and in some cases on direct information received from a member of the general public.

In order to keep a check on the statements made in applications it is sometimes necessary that a personal examination be made on the premises. Where there is anything questionable about the applicant this can be brought to light by such investigation.

Although the radio division of the Department of Commerce has in the past done police work for the commission, this did not include such work as is now contemplated for the investigation division. The duties of the Department of Commerce have been more specifically defined by the radio act and this new activity of the commission is intended to supplement rather than duplicate those activities. The continued cooperation of the Department of Commerce will, to a marked extent, facilitate the work of this division.

The chief investigator will examine into complaints of interference, the presentation of programs reported not to be in the public interest, and whether licensees are putting their assigned frequencies to a beneficial use, as well as to the use for which they were licensed. In addition, reported violations of the commission's regulations or of the radio act will first be investigated by this particular division before such information is turned over to the Department of Justice for prosecution under the penal provisions of the radio act.

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III. ADMINISTRATION AND POLICY

A. THE RADIO SPECTRUM

There is submitted herewith a graphic representation in chart form of the entire range of radio frequencies from 10 kilocycles to upward of 60,000 kilocycles. The various station bands therein included are blocked in with color symbols indicating the uses to which they are susceptible and the services for which they have been designated by international agreement, rules of law, or by allocations or decisions of the commission.*

Determinations of this character must, of course, have a flexibility sufficient to provide for the changing requirements of the radio technique. However, the degree of certainty thus far attained in the distribution to services must tend to a beneficial stability.

1. Low and Intermediate Frequencies

(10 to 550 kilocycles)

The principles governing the allocation of frequencies in the low and medium frequency bands, 10 to 100 kilocycles and 100 to 500 kilocycles, have been established for many years.

Because of the international character of communication in these bands, study was made of foreign assignments before allocations were made.

In the low-frequency band it has been the commission's policy to consider foreign stations operating on frequencies between 10 and 75 kilocycles to have a prior right to such frequencies.

The low-frequency band (10 to 100 kilocycles) is for fixed (point to point) service, and stations therein are of the superpower type. It is obvious that no duplication on the same channel with high power should be permitted. However, intermediate frequency communication is carried out with transmitters of less power, and duplication of assignments may be allowed on certain of these frequencies whenever it is certain that the ratio of power to distance is such that no interference will result between stations. Ships, for example, operating in the Pacific may use the same working frequencies that are assigned to ships operating in the Atlantic.

*Publisher's Note: The chart referred to is reproduced in black and white.

RADIO SPECTRUM

DISTRIBUTION OF CHANNELS

BROADCASTING

1 Clear Channel
2 Regional, Max. 1000 watts
3 Local, Max. 100 watts
4 Canadian Shared (Regional) Max. 500 watts
5 Canadian Shared (Local) Max. 100 watts.

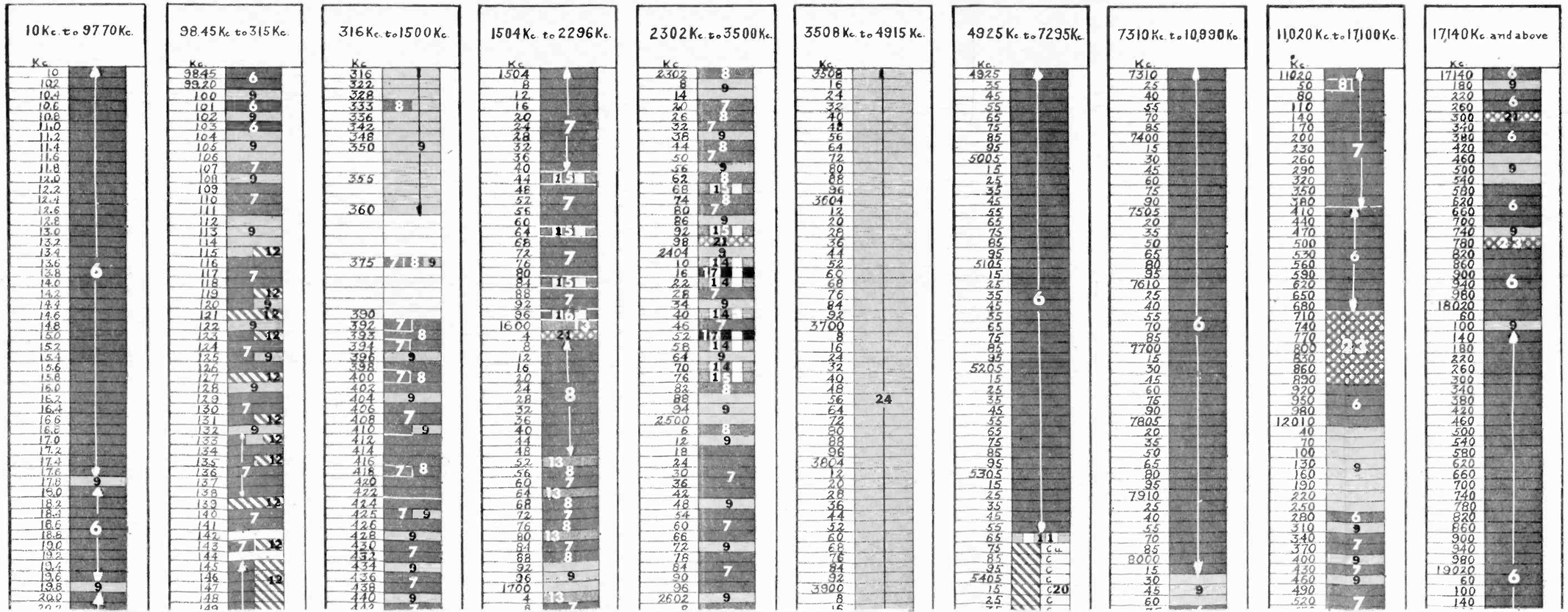
6 Fixed Point to Point
7 Maritime Mobile
8 Aviation
9 Government
10 Emergency
11 Agriculture

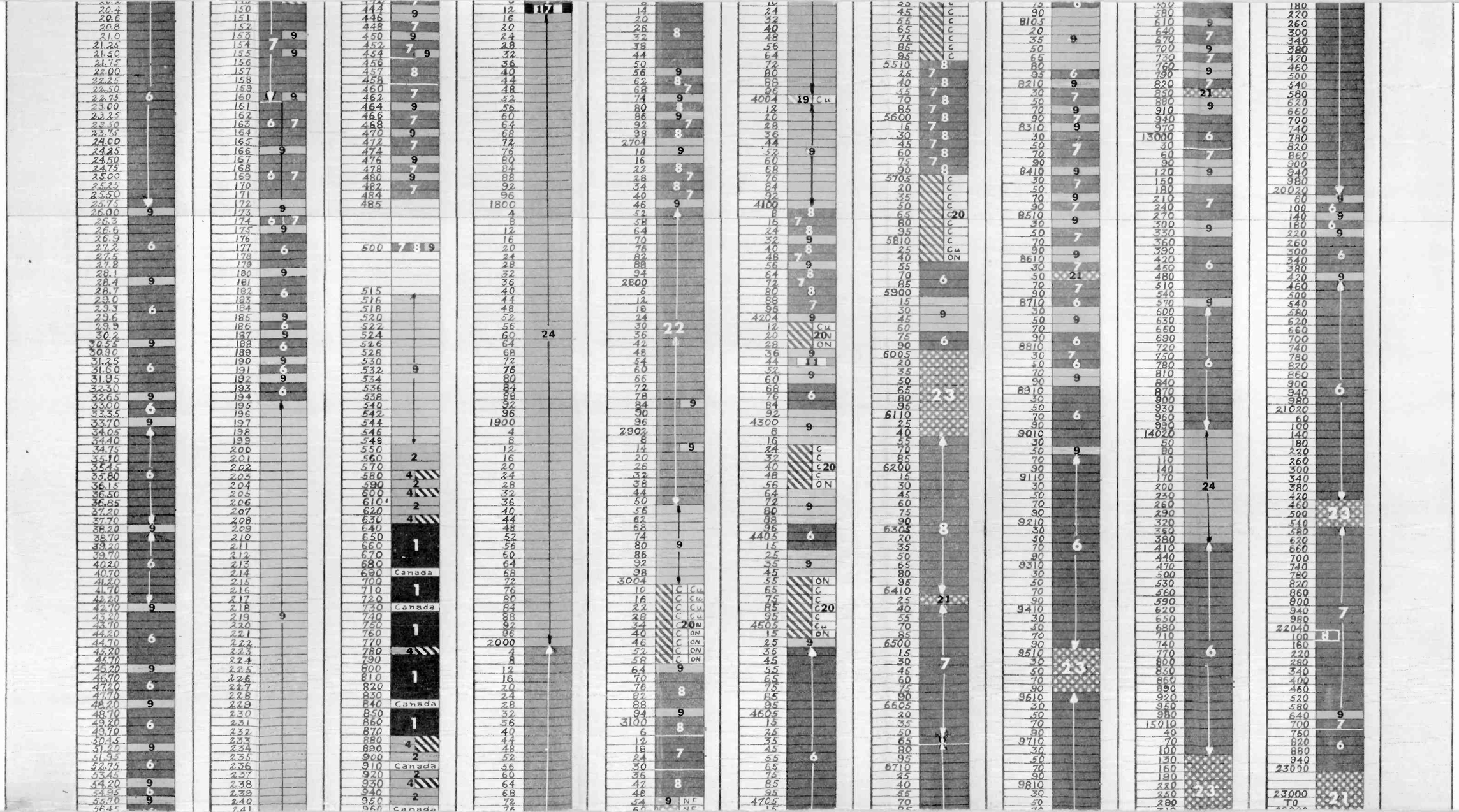
12 Shared with foreign coastal stations
13 Portable (including geophysical)
14 Special Mobile except portable
15 Temporary Mobile
16 Emergency Fire (Marine)
17 Emergency Police

OTHER REGIONS

18, 19, 20 U.S. Stations must not interfere
Priority as follows:
C – Canada Cu. – Cuba
NF – Newfoundland
ON – Other Nations

Channels shared between services, or between the U.S. and other regions are appropriately marked

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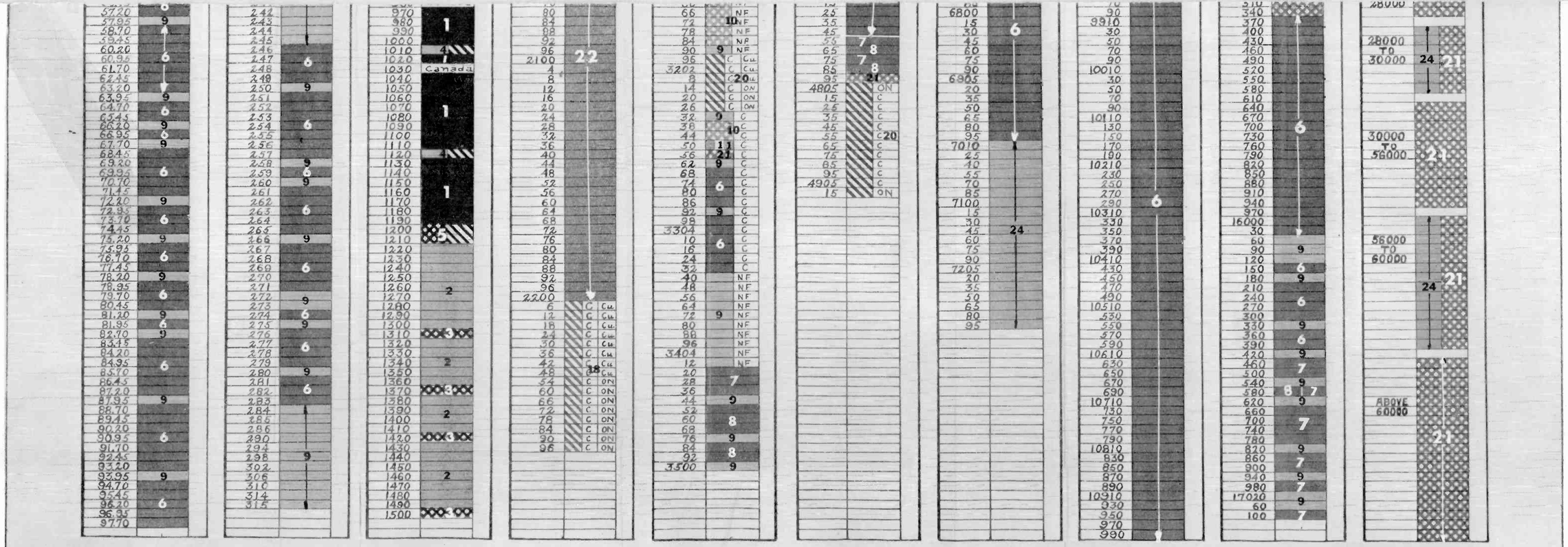

21 General Experimental 22 Exp. Visual Broadcasting 23 Exp. Relay Broadcasting 24 Amateurs

Engineering Division
Federal Radio Commission
Oct. 22, 1929

a. Allocations to services in the low and intermediate frequency bands

[10 to 550 kilocycles]

Kilocycle band	Service	Channel width in kilocycles	Number of channels	Not available to commission		Channels available to commission
				United States	Foreign	
10 to 21	Fixed	0.20	56	2	[1] 26	28
21.25 to 26	do	.25	20	1	[1] 8	11
26.3 to 30.2	do	.30	14	1	[1] 8	5
30.55 to 37.2	do	.35	20	3	[1] 7	10
37.70 to 49.7	do	.50	25	4	[1] 3	18
50.45 to 99.2	do	.75	66	14	[1] 8	44
100 to 109	Fixed and mobile	1	10	6		4
110 to 124	Mobile	1	15	4		11
125 to 149	Mobile (marine P. G.)	1	25	2	[2] 6	17
150 to 159	Mobile	1	10	2		8
160 to 194	Fixed and mobile	1	35	10		25
195 to 245	Fixed and mobile (Government)	1	51	51		0
246 to 284	Fixed services	1	39	9		30
285 to 315	Radio beacon (Government)	5	5 4	5		0
315 to 350	Air mobile (Government)	6	6	6		0
350 to 360	Mobile (Government)	10	1	1		0
360 to 390	Radio compass	[3] 30	1	[4] 1		0
392 to 460	Air mobile and marine	[5] 2	35	8		[5] 27
462 to 484	Mobile (except damped waves and radio telephony).	2	12	4		8
485 to 515	Mobile (distress call, etc.)	30	1	1		0
516 to 550	Mobile (Government)	2	18	18		0
	Total		465	153	66	246

[1] Foreign stations established on frequencies from 10 to 75 kilocycles, with power in excess of 10 kilowatts are considered to have an exclusive right to such frequencies.

[2] Foreign stations in the reserved wave band (125 to 150 kilocycles) are given priority to such channels, but may be assigned to United States stations where no interference will result to foreign stations.

[3] The band, 360 to 390 kilocycles, inclusive, is reserved for radio compass work on 375 kilocycles.

[4] The radio compass frequency, 375 kilocycles, is available to the commission for assignment to ships and aircraft only.

[5] The band 392 to 460 kilocycles contains channels as follows:

Marine 2-kilocycle channels:		Aviation 6-kilocycle channels:		Government 2-kilocycle channels:	
Exclusive	10	Exclusive	2	Exclusive	8
Shared with Government	3	Shared with marine	3	Shared with marine	3
Shared with aviation	4				
Total channels	17	Total channels	5	Total channels	11

2. Broadcast Band

(550 to 1,500 kilocycles)

The broadcast band extends in frequency from 550 to 1,500 kilocycles.

The band is divided into 96 channels or frequencies 10 kilocycles apart, that separation being considered necessary to avoid interference. Six of these channels are given over for exclusive use by Canadian stations and 11 of the remaining channels are shared by Canadian stations and stations in the United States. There are therefore 79 channels available for exclusive use in the United States and possessions, and 11 additional channels available on the sharing arrangement with Canada.

While many channels are still much overloaded, and there is considerable congestion in some sections, the commission has gradually been reducing the number of stations on the air. When the commission was organized on March 15, 1927, there were 732 stations licensed in the broadcast band. That number had been reduced to 677 on July 1, 1928.

During the past year 28 new stations were added and 121 deleted, leaving the number 584 licensed as of November 1, 1929. On that date, however, the licenses of 20 stations were withheld because no applications for renewals had been received.

New stations have been authorized only in sections of the country lacking radio facilities.

The commission has not seen fit during the past year to make any important changes in the reallocation of November 11, 1928, which is discussed in the Second Annual Report.

Some changes were made in the assignments of stations in Florida and the Middle West for the purpose of improving reception.

During the year the commission has made 54 changes in frequency assignments, 162 changes in power assignments, 31 in the time of operation.

a. NOTE ON SYNCHRONIZATION OF BROADCASTING STATIONS

The commission has received applications from several stations for authority to operate simultaneously with the intention of synchronizing their carrier frequencies to prevent heterodyne interference. Ordinarily the distance between stations on the same frequency must be several times greater than the service radius of the stations to prevent heterodyne interfernce.

If synchronizing could be practically carried out in such a manner that the present heterodyne interference which exists on some frequencies might be eliminated, a great public benefit would result.

At the present time the commission has no knowledge of any synchronizing that has proved of real value except where it has been accomplished by direct wire circuits between stations.

The commission has authorized two stations sharing time on a cleared channel to conduct synchronziing tests. The results of these tests have been unsatisfactory.

The commission has recently authorized additional experiments after midnight; results of these tests have not yet been reported.

b. MECHANICAL REPRODUCTIONS

The commission has repeatedly stated that the paramount interest in radio broadcasting is that of the listening public. There can be no conclusion more definitely established from an examination of the radio act of 1927 than the one that any broadcast which tends to deceive the listening public in any respect is contrary to the public interest, convenience, and necessity.

Throughout its examination of the type of broadcasting being conducted the commission has realized that there is no field in which deception can more readily take place than in the nature of announcements preceding the rendition of selections from a recorded medium. The extreme diversity of the announcements which have been from time to time prepared for use in this connection, and the inevitable tendency of the announcer to state the character of the number in the light most favorable to the station, has made it absolutely necessary that the commission indicate a precise form of announcement for phonograph records, player piano selections, and other mechanical and electrical reproductions of the type that can be obtained by the

public for reproduction upon their own instruments. For this purpose General Order No. 52 prescribes that these performances shall be indicated as "phonograph records," "mechanical piano player," etc. The commission has required that every number be so specifically designated as it is well known that a radio audience is transient and that individual listeners enter into a program at different points in its sequence.

The essence of this paragraph of General Order No. 52 is the prevention of deception and experience of the commission in connection with these matters has compelled the commission to indicate the exact language by means of which that deception must be avoided. This paragraph of the general order has not been intended as a disapproval of phonograph records and similar productions. The question of the use of these instrumentalities is one for the station to determine, and each station's record in connection therewith is judged by the commission upon a basis of a number of factors, such as the time and extent of the use of records, the purposes for which they are used, the availability of local talent, etc. The commission has expressed itself as not believing that the excessive use of these instrumentalities is in the public interest.

An entirely different situation is presented by the type of reproduction referred to in the second paragraph of General Order No. 52.

Thus, it is not beyond the range of possibility that American broadcasting stations will consider it desirable to rebroadcast programs originating in Europe. Because of the great difference of time existing between the European and the American continents an international audience could not ordinarily be secured by the simultaneous broadcast of the same program in both countries. There are indications that it may be necessary to record a European program upon wax or film and rebroadcast that program a few hours later in this country at a time when an audience can be secured.

Similarly there are a number of concerns engaged in the preparation of complete programs for the use of stations. These programs are not ordinary phonograph records available to the general public, but they include musical selections, advertising, and other announcements, and in some instances even the call letters of the station. Such programs are recorded specifically for broadcasting purposes, and the commission does not consider it proper to require that they be described as phonograph records. For this reason such programs have been specifically exempted from that requirement by the terms of General Order No. 52.

This does not mean, however, that the commission is any the less intent upon avoiding deception in this connection. Such programs are not original programs; they obviously do not represent the then existing rendition of present artists. They are generally received by mail, and they represent the intervening instrumentality of a mechanical or electrical recording.

The second paragraph of General Order No. 52 does not give the station using such productions the discretion of selecting any type of announcement it wishes. Stations are specifically required by that paragraph to use only such announcements as do not "deceive, or tend to deceive the public as to the character of the reproduction broadcast."

The station is further required to keep a record of the phrases actually used and is required to communicate such phrases to the commission upon request. Thus the obligation is placed upon the station, as it is placed in so many other features of regulation, to maintain the highest standards of accuracy, fairness, and honesty. The broadcasting of programs of this character with announcements that would in any way tend to deceive the public would, of course, be a feature of the station operation which would justify the commission in refusing to renew the license of the station at the termination of any of its license periods.

The commission does not feel called upon to provide stations with an exact form of announcement to use for programs of this character. It realizes that great ingenuity is being exercised in the preparation of these programs; it realizes that use of such programs under proper circumstances may well be in the public interest. It squarely places upon each station the burden of so announcing such programs that no one can possibly be deceived or led to think that they represent an actual rendition by present artists.

3. High Frequencies

a. GENERAL CONSIDERATIONS APPLICABLE

Owing to the undeveloped state of the art, prior to 1927, practically all communication on a commercial scale was carried on at low or medium frequencies; that is, frequencies less than 550 kilocycles; and the equipment required to carry on efficient and continuous long-distance communication was almost prohibitive in cost. Partly for this reason, commercial communication has until recently been unprofitable.

For certain purposes, under certain conditions, and between certain points, low-frequency transmission is still employed. But for ordinary use in commercial service between relatively distant points high frequencies are almost universally used. Modern high frequency transmitters are less expensive and much more efficient. But the use of high frequencies depended upon developments in the art and the transition from the old to the new form of transmission has required time and expense. Practically all available low frequencies were in use for old established services, mobile and fixed, and it was therefore impracticable, if not impossible, to inaugurate new and extensive services requiring additional low frequencies. Hence, development in the art making high frequencies available has made it possible to reconsider and develop programs for service establishment.

Prior to the period covered by this report, high-frequency channels were sparingly assigned for the reasons that the commission did not think it was sufficiently informed to make an allocation in this band; it was the general principle to which the commission had adhered that licenses should not be granted where the projects involved duplication of the communication facilities; it had not been decided how many high frequencies would be required for governmental services, aircraft, ship, etc.; there was no general agreement among engineers as to the number of frequencies which were available, the separation it was necessary to maintain the service and nuisance

ranges of particular frequencies, etc.; and until the proclamation of the International Radiotelegraph Convention in January, 1929, there was no authoritative guide by which frequencies which have an international service and interference range could be administered.

Applications have been before the commission for the assignment of literally thousands of frequencies more than are available, after the depletions required by treaties, governmental services and services having a paramount to assignment.

Administration has therefore gone forward with the utmost caution.

It must, of course, be remembered that the assignment of frequencies to stations can, under no circumstances, be construed as a gift or grant of such a thing as a "channel." The commission believes that in the field of high-frequency communication, the public interest requires a degree of permanence and certainty. It does not, however, take the position that the designation of a frequency is the grant of a facility. The statutory power of the commission is to issue a license for the conduct of a specific communication service for a limited period of time, not to exceed one year. In order to prevent interference, the commission designates the frequency and power to be used by individual transmitters. The licensing authority must always retain control over these features. It can not make any award or grant of nonexisting channels or frequencies and has not attempted to do so.

b. HIGH-FREQUENCY CHANNELING SYSTEM

The commission by General Order No. 62 ordered that in the frequencies exceeding 1,500 kilocycles per second, a channel of radio communication shall be regarded as a band of frequencies, the width of which varies according to its position in the spectrum. The width increases with frequency according to the following table:

Frequency (kilocycles)	Channel width (kilocycles)	Frequency (kilocycles)	Channel width (kilocycles)
1,500 to 2,198	4	8,210 to 10,980	20
2,200 to 3,313	6	10,990 to 16,405	30
3,316 to 4,400	8	16,420 to 21,960	40
4,405 to 5,490	10	21,980 to 32,780	60
5,495 to 8,202.5	15		

NOTE.—A visual broadcasting channel shall not be more than 100 kilocycles in width. A commercial telephone channel below 3,313 kilocycles shall be regarded as 6 kilocycles in width. A relay broadcasting channel between 6,000 and 9,600 kilocycles shall be regarded as 20 kilocycles in width.

In issuing licenses, the commission specifies the frequency in the center of the particular channel licensed to be used, but authorizes the licensee to occupy a center frequency and, in addition, such adjacent frequencies (within the limit indicated on the above table) as may be permitted by the frequency-maintenance tolerance and required by the type of emission the station may be authorized to use.

The channeling system described above represents an approximate 0.2 per cent basis of separation. If, by international agreement, the world should recognize an approximate 0.1 per cent system of channeling, it will be necessary to revise all existing high-frequency licenses to conform with the new system of channeling.

C. CONTINENTAL BAND

(1,500 to 6,000 kilocycles)

By reason of the provisions of the International Radiotelegraph Convention, and because of the physical characteristics of the emissions at these frequencies, the range of frequencies from 1,500 to 6,000 kilocycles is primarily allocated for the purpose of communication within the limits of the North American Continent. The interference range of frequencies of this order is such that their distribution to services and among nations is properly the subject of regional or continental agreement.

The North American Radio Conference affecting the distribution of channels among countries became effective on March 1, 1929. It remains in force until January 1, 1932, and therefore for an intermediate period, and until one year from the day on which the denunciation thereof shall be made by any two of the contracting parties.

The text of the agreement is available at the Government Printing Office as Treaty Series, No. 777–A.

By its terms the United States is assigned 146 exclusive channels; Canada and Newfoundland, 103 exclusive channels; Cuba, 20 exclusive channels; and other countries, 24 exclusive channels.

The following is a summary showing the allocation of frequencies made by the commission based on the North American Radio Conference:

(1) SUMMARY OF CHANNEL DISTRIBUTION IN THE CONTINENTAL BAND

[1,500–6,000 kc.]

Service	Class	Total each class (0.2 per cent channels)
Mobile	Ship and/or coastal stations	54
	Ship stations only	2
	Coastal stations only	8
	Mobile press	2
	Temporary mobile	6
	Portable (including geophysical)	5
	Emergency police	3
	Emergency fire (marine)	1
	Special mobile other than portable	5
	Aircraft and/or aeronautical	62
	Aircraft only	1
	Total mobile services	149
Fixed	Point to point (exclusive)	78
	Point to point (shared)	10
	Point to point (exclusive for other nations; United States stations must not interfere)	66
	Total fixed services	154
Experimental visual boadcasting (four 100-kilocycle channels shared with other nations)		84
Experimental visual broadcasting (one 100-kilocycle channel—other nations priority, United States stations must not interfere)		16
General experimental (shared)		4
Agriculture		3
Emergency (shared)		7
Government (shared with other nations)		54
Government (exclusive)		34
Amateurs		134
Total special services		336
Total all services		639

(2) Summary of Domestic Communication Systems Authorized by the Commission

In addition to the extensive mobile, experimental, and special services provided for in this range of frequencies, the commission has been able to allocate frequencies for the development of general public service communication systems. A view of these systems can best be given in tabulated form. The following table indicates their more important features and includes all systems for domestic communication regardless of the range of frequencies employed:

Licensees	Number of cities	Number 0.2 per cent channels 1,500–6,000	Number 0.1 per cent channels 1,500–6,000	Number 0.2 per cent channels 6,000–23,000 [1]	Number 0.1 per cent channels 6,000–23,000 [1]	Number low and intermediate frequency channels 10–550	Comment
Universal Wireless Communication Co.	112	40	76	0	0	0	General public service, point to point; nation-wide system.
Press	Indefinite.[2]	20	36	0	0	0	Public service to all newspapers and press associations on equal terms, multidirectional; also nation-wide system.
Western Radio Telegraph Co.	13	5	8	0	0	4	General public service, point to point, Southwest.
Intercity Radio Telegraph Co.	8	1	1	1	1	4	General public service, point to point, Great Lakes.
Mackay Radio & Telegraph Co.	4	5	8	4	12	12	General public service, point to point, Pacific coast.
R. C. A. Communications (Inc.).	12	20	33	30	35	0	General public service, domestic and international feeder; nation-wide, trunk-line system.

[1] Auxiliary use.
[2] The number of cities to be served by the domestic press communications service is not ascertained because permits have not yet been issued, this being merely a classification. The number of cities served must always be variable due to the multidirectional service to be offered by press associations and syndicates in the distribution of news items to a great many points.

It should be observed that no analysis is here made of point to point services of small scope or of those for specialized traffic such as for communication between airports, etc.

The number of standard channels at 0.2 per cent separation within the band from 1,500 to 6,000 kilocycles, which are assigned to these systems, is shown by the following table:

	United States exclusive	Canadian shared	Canadian exclusive
Universal	35	5	
Press	20		
R. C. A	15	5	
Western	2		2
Mackay	5		
Total	77	10	2
Total United States exclusive and Canadian shared	87		

A discussion of the principles involved in the making of these allocations and the general considerations which indicated the selection of the agencies to be licensed will be found elsewhere in this report at pages 37 to 43.

Visual broadcasting is also conducted in this frequency range. This enterprise is still in an experimental stage and is governed by the following regulations adopted by the commission February 18, 1929:

(3) EXPERIMENTAL VISUAL BROADCASTING

That visual broadcasting be designated to include both television broadcasting and picture broadcasting, or moving-picture broadcasting and still-picture broadcasting, and that all licenses issued be of an experimental nature for a period of six months only, the licensees to report to the commission the results of their experiments; the transmitters to be located outside the city limits and sufficiently distant from important receiving centers to avoid interference.

For joint use to visual broadcasting licensees, the commission authorizes the following bands of frequencies for experimental use only: 2,000 to 2,200 and 2,750 to 2,950 kilocycles. In addition, the commission will authorize the operation of visual radio broadcasting transmitters in the band between 2,200 and 2,300 kilocycles, on the condition that they do not interfere in any way whatever with the services of any other nation on the North American Continent and in the West Indies, and that licenses be subject to revocation in case there are any complaints from any other nation of any such interference. The commission may continue to issue experimental television or visual licenses in the broadcast band for operation between 1 and 6 a. m. only, in accordance with General Order 50.

The commission adopted the following rules of priority in the granting of applications:

1. Those engaged in experimentation to improve the technique of visual broadcasting.
2. Those who employ methods which give the maximum definition with the minimum radio frequency band widths.

Further discussion of experimental visual broadcasting is found below at page 28.

d. TRANSOCEANIC BAND

(6,000 to 23,000 kilocycles)

The band of frequencies between 6,000 and 23,000 kilocycles has been allocated to fixed services for international and national long-distance communication, and to mobile services for maritime and aeronautical communication, so as to conform with the requirements of the International Radio Telegraph Convention.

The following is a summary as of November 1, 1929, showing the distribution of transoceanic channels by the commission:

(1) *Summary of channel distribution in the transoceanic band*

[6,000 to 23,000 kilocycles]

Service	Class	Total each class (0.2 per cent Ch.)
Mobile	Ship stations [1]	16
	Coastal stations	68
	Mobile press	8
	Aircraft and/or aeronautical [2]	18
	Maritime calling [2]	3
	Total mobile services	113

[1] Ship stations may also use coastal station frequencies when directed to do so by coastal stations controlling the frequency.
[2] Aircraft may use ship frequencies when on sea flights.

(1) *Summary of channel distribution in the transoceanic band*—Continued

Service	Class	Total each class (0.2 per cent Ch.)
Fixed	Point-to-point	370
	Relay broadcasting [3]	34
	Total fixed services	404
Government [4]		70
Amateurs		33
General experimental		4
Total special services		107
Total all services		624

[3] Actually there are 31 relay broadcasting channels which conform with the commission's channeling system prescribed in General Order No. 62.
[4] Designated by Executive order of the President.

This frequency range is primarily suitable for long-distance international communication and the international recognition sought for American enterprises in this field required an early assignment of frequencies of this character. This was discussed in the second annual report of the commission. No important reallocation has been made in this field.

(2) Experimental Relay Broadcasting

Relay broadcasting is also conducted in this range. This enterprise is still in an experimental stage and is governed by the following regulations adopted by the commission February 18, 1929:

Relay broadcasting is defined as the transmission on high frequencies over long distances of broadcast programs from one broadcasting station to another such station or stations which rebroadcast the program to the public on the regular broadcast frequency of the receiving station. Licenses will be issued only when applicants agree to arrange for a rebroadcasting on regular broadcast channels of their program transmitted initially on a high-frequency relay channel.

The frequencies designated to be assigned to relay broadcasting stations in North America are:

6,020	6,120	9,570	11,840	15,250	21,500
6,040	6,140	9,590	11,880	15,290	21,540
6,060	9,510	11,720	15,130	15,340	
6,080	9,530	11,760	15,170	17,780	
6,100	9,550	11,800	15,210	21,460	

The use of these frequencies will not be designated exclusively to licensees but will be shared jointly by the licensees authorized to operate experimental relay broadcast transmitters. The commission requires detailed reports from licensees as to the use made of these frequencies and the results accomplished. Based upon results of the experimental licensees, and others which may be designated, the commission may issue licenses for a longer period than six months to those found qualified after six months' experimental operation. The commission will only issue licenses to applicants who are qualified to operate experimental relay stations over long distances, transoceanic or transcontinental, strictly for relay broadcast use or experimental relay broadcasting. The priority of assignment will be given to applicants who present satisfactory evidence that they will provide (1) adequate power for transoceanic distribution, (2) satisfactory programs for transoceanic distribution, (3) adequate and regular reception and distribution of their programs.

Since local broadcasting would utilize for short distances radio frequencies which should be reserved primarily for long distances and would be a duplication

of a possible service available by wire lines, applications for such a service will be considered only in the exceptional cases where wire-line service is not available.

Local broadcasting on these high frequencies would likewise utilize for short distances radio frequencies which should be reserved primarily for long distances and would furthermore duplicate the service given on 550 to 1,500 kilocycles, thus requiring special receiving apparatus on the part of listeners. Local broadcasting will not be permitted on these high frequencies.

Experimental licenses will be granted only to those who are seriously engaged in improving the technique of the art and show satisfactory evidence of being able to contribute substantially toward its progress.

Further discussion of relay broadcasting is found below at page 28.

4. Special Services

b. AMATEUR STATIONS

Both the radio act of 1927 and the International Radio Telegraph Convention specifically recognize amateur stations as an already existing service. The inference follows that they are to be continued and regulated as such.

An amateur station in the words of the convention and the commission's regulations (General Order No. 24) "is a station operated by a person interested in radio technique solely with a personal aim and without pecuniary interest." It follows that they are not under the head of public utilities or subjected to a common-carrier obligation.

In applying the standard of "public interest, convenience, or necessity" to amateur stations, the commission must obviously consider other elements than in the case of commercial stations. Amateurs should unquestionably continue to be licensed, but on the theory their activities are in the public interest and so reconciled with the legislative standard. In addition, it is quite clear that in the case of amateur stations there is no need for choosing among applicants but only the necessity for recognizing an established radio service. In so doing the commission is acting under a general rather than a legalistic interpretation of the phrase "public interest, convenience, or necessity."

The principles here expressed must necessarily guide the radio supervisors of the Department of Commerce when they are called upon to approve the issuance of amateur-station licenses by the Radio Commission. The administrative organization needed for this phase of the commission's activities was found to be already existing in the organization of the radio division of the Department of Commerce with the result that all amateur licenses are first approved by the department before being issued by the commission. The details of this work would have constituted a tremendous burden for the commission had it not been thus relieved by the radio division.

As various legal questions are presented concerning applications for amateur-station licenses, they are usually referred to the general counsel of the commission for opinion. In this way the status of the amateur under the radio act is being gradually defined so as to permit more certainty.

The latest available figures disclose that during the year ending June 30, 1929, there were 12,646 amateur-station licenses issued. The total number of such station licenses outstanding at the same date was 16,829.

The licensees of amateur stations are not restricted by any regulations other than those embodied in their own code of ethics and the commission's General Order No. 24. These have proved very broad in scope and offer the amateur a wide latitude in the pursuit of his art. The commission having adopted this policy of encouraging the amateur, much greater progress may be expected than ever before.

b. AVIATION

Recent developments make radio an important adjunct to aviation, and of vast assistance to flyers in keeping them on their routes, advising them of weather conditions, and by aiding them to locate airports.

A public hearing was held by the commission on March 11, 1929, for the purpose of coordinating the views of the various aviation operating companies and others interested in establishing and perfecting means for communication between aircraft and ground stations, and between ground stations along aviation routes. As a result of that meeting and subsequent conference with aviation officials, the commission on September 9, 1929, adopted an aviation operating plan.

The plan provides for adequate services, without discrimination, for all aircraft of whatever nature. Point to point service between aeronautical ground stations is authorized only where wire lines are not available, or where the delay in the transmission of wire messages is such as to create a hazard to life or property, and then solely for emergency messages and for meteorological services. All licensees of point-to-point services are required to transmit emergency messages for the general public, relating to the safety of life or property.

The text of the aviation plan is as follows:

It appearing that representatives of the aviation transport companies and agencies have conferred with members of the commission and responsible officials of the Army, Navy, Department of Commerce, and Bureau of Standards, to the end that a suitable, economical and comprehensive plan for the radio requirements of aviation be adopted; and

It appearing that all of the representatives of said companies and agencies and officials of the Government have carefully considered and approved such a plan; and

It further appearing that said plan provides for an economical and scientific use of the frequencies involved, in the public interest, convenience and necessity, now, therefore, acting under section 4 (c) of the radio act of 1927, as amended.

It is ordered that said plan be adopted by the commission to be followed in the designation of frequencies for aviation purposes, as follows:

1. To coordinate the use of radio facilities for the purposes of aviation and to secure a maximum of flexibility in the use of the same, the commission will, and it hereby does, reserve the frequencies now set aside for use in aviation service and, in addition, reserves the frequencies 3,136, 3,142, and 3,148 solely for this use. Upon proper application of any companies or agencies maintaining, or proposing to maintain, aeronautical stations, if the commission is satisfied that the particular applicant is qualified and that the issuance of the license or licenses in question would serve public interest, convenience or necessity, the frequencies will be designated solely for use by all of said stations comprising a continuous series, or chain, along a particular airway. The commission will recognize new or different chains from time to time and frequencies will be designated to them in accordance with this plan.

2. Aeronautical stations licensed pursuant to this plan will provide adequate service, without discrimination, for all and any aircraft of whatever nature. Where the service provided by a chain is a regularly used, as distinguished from casual, incidental, or emergency use, the owners of the aircraft which use such chain or chains, shall cooperate among themselves as to the operation, mainte-

nance, and liability of the stations: *Provided, however,* That nothing herein will impose upon the commission any authority or responsibility whatever with reference to the private business or transactions of any licensee.

3. All frequencies reserved for aviation purposes shall be designated in three classes as follows:

(*a*) Frequencies used by aeronautical or aircraft stations on a chain or chains for communication purposes.

(*b*) Frequencies used for distress, calling, and navigational service.

(*c*) Experimental frequencies which will include all communication frequencies other than those in use on a chain or chains, and all such experimental frequencies shall be subject to change by the commission during the term of the license without advance notice or hearing.

4. Frequencies designated for use by aeronautical stations shall not be used for point to point service: *Provided, however,* That point to point service may be carried on only where wire lines are not available or where the delay in the transmission of wire messages is such as to create a hazard to life or property and then solely for emergency messages and for meteorological service. Any licensee of point to point service shall be required to transmit emergency messages for the general public relating to the safety of life or property.

5. The airways division of the Department of Commerce has established a master map showing (1) the location of all aeronautical stations, (2) all navigational aids, and (3) the frequencies which have been designated by the commission for use on particular chains; and all proposed chains (following, connecting with or independent of existing chains) will be referred to this map, of which the commission will maintain an exact copy.

6. The initial chains will be established as indicated upon this map in colored lines, the colors having the following designations and frequency designations:

Brown	Universal Air Lines Aviation Corporation Braniff Air Lines Central Air Lines Continental Air Lines Northern Air Lines Southern Air Transport Texas Air Transport Gulf Air Lines Interstate Air Lines Clifford Ball Colonial Air Transport	5,600, day, aircraft and aeronautical station. 3,484, night, aircraft and aeronautical station.
Blue	Western Air Express Standard Air Lines Mid-Continent West Coast Air Transport	3,070, point to point, aeronautical. 5,690, point to point, aeronautical and aircraft and aeronautical. 3,460, aircraft and aeronautical station. 8,015, point to point aeronautical, day only.
Green	Transcontinental Air Transport. National Air Transport Northwest Airways Pitcairn Aviation Maddux Air Lines	2,344, day, aircraft and aeronautical station. 1,624, night, aircraft and aeronautical station.
Red	Boeing Air Transport Pacific Air Transport Stout Air Services Varney Air Lines National Parks Airways	5,660, day, aircraft and aeronautical station. 3,142, night, aircraft and aeronautical station.
Pan-American Grace Airways Pan-American Airways		8,015, point to point, aeronautical, day only. 5,690, aircraft and aeronautical station, day only; also point to point aeronautical, night only. 2,662, navigation. 3,070, night, aircraft and aeronautical station.

The distress, calling, and navigational frequencies shall be assigned as follows:

278 kilocycles: Calling and working frequency from all ground stations to itinerant airplanes. Power not to exceed 10 watts.
333 kilocycles: International air calling frequency.
375 kilocycles: Radio compass.
500 kilocycles: International calling and distress frequency for ships and aircraft over the seas.
3,106 kilocycles: National calling frequency for all transport and itinerant airplanes.
5,525, 11,050, 16,580 kilocycles: Primarily for coastal stations and ships; may also be assigned to aircraft only for purpose of calling a U. S. coastal station when aircraft is in flight over the sea.
393, 400, 414, 420, 457 kilocycles: For stations on chains, providing no interference is caused with other services.
333 to 500 kilocycles, calling; 414 to 457 kilocycles, working; 375 kilocycles, compass: For airplanes on sea flights desiring intermediate frequencies. Those desiring high frequencies will use those for maritime calling and working.

7. No aeronautical station will be licensed to use more than 1 kilowatt power on frequencies of 1,500 kilocycles and above.

8. All aeronautical stations will maintain a watch on such frequencies and for such periods as the airways division of the Department of Commerce may designate.

9. For the purpose of the foregoing, two types of aircraft are defined: (*a*) Transport airplanes—those commercially transporting persons and/or property and operating regularly on fixed routes, and (*b*) itinerant airplanes—all those other than transport or Government airplanes. An aeronautical station shall be understood as being capable of giving:

(1) Ground to plane communication.
(2) Point to point communication.
(3) Distress, calling and navigational service.

10. From time to time after the adoption of this order representatives of the aviation companies and agencies mentioned herein, together with representatives of all aviation companies or agencies which wish to participate herein, shall confer with members of the commission and responsible officials of the Army, Navy, and Department of Commerce, to the end that this plan may be modified so as to conform with experience in the operation thereof and developments in the arts of radio and aeronautics.

11. This order is and shall be construed as a regulation of the commission, violation of which will be cause for revocation, as provided by the radio act of 1927, as amended.

On October 1, 1929, the commission adopted the following amendment to the aviation plan of September 9, 1929:

1. That the frequencies 12,180 and 12,210 kilocycles, designated by the President as reserved for Government experimental stations, but available for assignment to commercial companies subject to recall by the Government upon six months' notice, be made available on such temporary basis for emergency aeronautical point-to-point communications on chains during daylight hours only, provided, however, applicants desiring the use of such frequencies can show by reason of distance to be worked that such frequencies are required.

2. That the channels, 6,155 to 6,410 kilocycles, inclusive, heretofore designated for aviation be made available to all chains for primary assignment to plane-to-ground and ground-to-plane communication, and secondarily for emergency aeronautical point-to-point service.

3. That paragraph 6 of the September 9 plan be modified with respect to the blue chain to read as follows:

Blue	Western Air Express	3,070, aeronautical and aircraft.
	Standard Air Lines	3,460, point-to-point aeronautical.
	Mid-Continent	6,350, primarily for aircraft and aeronautical; secondarily for point-to-point aeronautical.
	West Coast Air Transport	8,015, 12,180, point-to-point aeronautical, day only.

4. That such existing licenses for aeronautical and aircraft stations as do not conform to the plan of September 9, and amendment thereto, be so modified as to conform to said plan.

C. EXPERIMENTAL

The commission, in its General Order No. 64, ordered all licensees of experimental stations to file with the commission, reports for each quarter of the year setting forth the nature of the experiments conducted and the results thereof. These reports contain the following statements:

(*a*) The specific hours of operation on each frequency during the period reported, together with a duly authenticated copy of the station log for that period.

(*b*) The general results accomplished in the period.

(*c*) The technical studies and progress at the time of filing.

The following frequencies have been set aside for experimental work:

(*a*) General experimental: 1,604, 2,398, 3,256, 4,795, 6,425, 8,650, 12,850, 17,300, 23,000, and above.

(*b*) Experimental visual broadcasting: 2,000 to 2,100; 2,100 to 2,200; 2,200 to 2,300 [2]; 2,750 to 2,850; 2,850 to 2,950.

(*c*) Experimental relay broadcasting: 6,020, 6,400, 6,060, 6,080, 6,100, 6,120, 6,140, 9,510, 9,530, 9,550, 9,570, 9,590, 11,720, 11,760, 11,800, 11,840, 11,880, 15,130, 15,170, 15,210, 15,250, 15,290, 15,340, 17,780, 21,460, 21,500, 21,540.

The general results accomplished during the year and reported to the commission are briefly as follows:

(*a*) *General experimental.*—Development of directive antennas for long-distance transmission; extension of operation of high-power sets to very high frequencies; frequency stabilization; accurate measurement of frequencies; determinations of the height of the Heaviside layer; transmission data with respect to distance versus frequencies at different times of the day and in different seasons of the year; further development of apparatus for airplane communication; improved antenna design; receiving-set improvements; etc.

(*b*) *Experimental visual broadcasting.*—Important preliminary information has been obtained on received field intensities necessary for adequate scanning of radio motion pictures in various types of apparatus; requisite receiver design and the necessary relation of selectivity and band admission for proper scanning; the relative definition of 24–48–, and 60-line scanning under various conditions; the improvement of light intensity and picture definition obtainable by the use of a special type of scanning now in experimental use, etc. By actual radio transmission and reception, the first dependable information as to the effects of density, contrast, and image-form in special films has been developed.

Tests by radio have been made of a special system of scanner-synchronizing indication and satisfactory results obtained.

(*c*) *Experimental relay broadcasting.*—Information has been obtained on methods of eliminating local disturbances to reception. Skip distance effects as the various distances employed have been definitely calculated for the different hours of the day.

Some programs have been picked up both in this country from foreign stations and by foreign stations from transmitters in the United States and rebroadcast in the ordinary broadcast band with fair fidelity.

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[2] On condition that no interference will result to other North American nations.

The technical studies now in progress are along high order of modulation, skip distance at all times of the day or night and fading with the use of various powers and antenna systems.

d. MARITIME

On May 10, 1929, the commission approved a maritime-mobile allocation plan, listing high, low, and medium frequencies for ship and coastal stations.

Following the adoption of the plan, the commission modified all existing maritime radio licenses to conform with the plan.

The maritime plan is as follows:

MARITIME MOBILE FREQUENCY ALLOCATION PLAN

Ocean-going vessels

143 kilocycles: Calling, CW only.
151 kilocycles: Working, CW, ICW, only.
153 kilocycles: Working, CW, ICW, only.
155 kilocycles: Working, CW, ICW, only.
157 kilocycles: Working, CW, ICW, only.
159 kilocycles: Working, CW, ICW, only.
160 kilocycles: Working, CW, ICW, only.
375 kilocycles: Radio compass.
400 kilocycles: CW, ICW, only; working.
410 kilocycles: CW, ICW, damped; working.
425 kilocycles: CW, ICW, damped; working.
454 kilocycles: CW, ICW, damped; working.
468 kilocycles: CW, ICW only; working.
500 kilocycles: Calling, distress, CW, ICW, damped.
5,525 kilocycles: Calling.
5,555 kilocycles: Working.
5,615 kilocycles: Working.
6,590 kilocycles: Working.
6,605 kilocycles: Working.
6,620 kilocycles: Working.
6,635 kilocycles: Working.
8,290 kilocycles: Working.
8,330 kilocycles: Working.
8,450 kilocycles: Working.
11,050 kilocycles: Calling.
11,110 kilocycles: Working.
11,230 kilocycles: Working.
13,240 kilocycles: Working.
13,270 kilocycles: Working.
16,580 kilocycles: Calling.
16,660 kilocycles: Working.
16,860 kilocycles: Working.
22,100 kilocycles: Calling.
22,220 kilocycles: Working.
22,460 kilocycles: Working.

Also working frequency of individual coastal station when directed to do so by coastal station controlling the frequency.

Great Lakes vessels

143 kilocycles: Calling, CW only.
151 kilocycles: Working, CW, ICW only.
153 kilocycles: Working, CW, ICW only.
155 kilocycles: Working, CW, ICW only.
157 kilocycles: Working, CW, ICW only.
375 kilocycles: Radio compass.
394 kilocycles: Working, CW, ICW only.
410 kilocycles: Calling, CW, ICW, damped.
425 kilocycles: Working, CW, ICW, damped.
5,525 kilocycles: Calling.
5,555 kilocycles: Working.
5,615 kilocycles: Working.
8,330 kilocycles: Working.

GENERAL PUBLIC COASTAL STATIONS

Coastal station calling frequencies

High frequency:
- 5,525 kilocycles.
- 11,050 kilocycles.
- 16,575 (channel 16,580).
- 22,100.

Low frequency:
- 143 kilocycles.
- 410 kilocycles (Great Lakes only).
- 500 kilocycles (except Great Lakes).

Coastal working low frequencies

RADIOMARINE CORPORATION OF AMERICA

111 kilocycles, East Moriches.
117 kilocycles, Marion.
119 kilocycles, Palm Beach.
126 kilocycles, Bolinas.
129 kilocycles, Marion.
131 kilocycles, Port Arthur.
133 kilocycles, Tuckerton, Torrance.
135 kilocycles, New York, Baltimore.
136 kilocycles, Bolinas.
137 kilocycles, East Moriches.
141 kilocycles, Marion.
161 kilocycles, Cleveland, Buffalo.
167 kilocycles, Chicago, Duluth.
394 kilocycles, Palm Beach.
406 kilocycles, Chatham.
408 kilocycles, Torrance.
418 kilocycles, Baltimore, Galveston, Port Arthur.
425 kilocycles, Cleveland, Buffalo, Chicago, Duluth.
436 kilocycles, Bolinas.
442 kilocycles, New York.
454 kilocycles, Cleveland, Chicago, Buffalo, Duluth.
462 kilocycles, Tuckerton.
476 kilocycles, New London.

MACKAY RADIO TELEGRAPH CO.

107 kilocycles, Sayville.
109 kilocycles, Palo Alto.
121 kilocycles, Palm Beach.
123 kilocycles, Palo Alto.
131 kilocycles, New York.
392 kilocycles, Sayville.
392 kilocycles, West Palm Beach.
418 kilocycles, New York, Hillsboro, Clearwater, Palo Alto.

TROPICAL RADIO TELEGRAPH CO.

145 kilocycles, Miami.
147 kilocycles, Boston, Mobile.
149 kilocycles, New Orleans.
436 kilocycles, Boston.
442 kilocycles, Fort Morgan, Mobile.
448 kilocycles, New Orleans.
482 kilocycles, Miami.

OTHER COMPANIES

163 kilocycles, West Coast, Great Lakes.
165 kilocycles, Great Lakes.
169 kilocycles, Great Lakes.
171 kilocycles, Great Lakes.
174 kilocycles, Great Lakes.
425 kilocycles, Great Lakes.
438 kilocycles, East Coast.
454 kilocycles, Great Lakes.
460 kilocycles, West Coast.

Coastal working high frequencies

RADIOMARINE CORPORATION OF AMERICA COASTAL STATIONS

4,188 kilocycles.
4,775 kilocycles.
6,440 kilocycles.
6,455 kilocycles.
6,470 kilocycles.
6,485 kilocycles.
6,500 kilocycles.
8,350 kilocycles.
8,370 kilocycles.
8,390 kilocycles.
8,430 kilocycles.
8,570 kilocycles.
12,430 kilocycles.
12,490 kilocycles.
12,520 kilocycles.
12,550 kilocycles.
12,580 kilocycles.
12,640 kilocycles.
12,670 kilocycles.
12,730 kilocycles.
12,820 kilocycles.
13,210 kilocycles.
16,700 kilocycles.
16,740 kilocycles.
16,780 kilocycles.
21,700 kilocycles.
21,740 kilocycles.
21,780 kilocycles.
21,820 kilocycles.
21,860 kilocycles.
21,900 kilocycles.
21,940 kilocycles.
21,980 kilocycles.
22,040 kilocycles.
22,520 kilocycles.

MACKAY RADIO TELEGRAPH CO. COASTAL STATIONS

4,196 kilocycles.
4,755 kilocycles.
5,675 kilocycles.
6,560 kilocycles.
6,575 kilocycles.
8,670 kilocycles.
8,690 kilocycles.
11,320 kilocycles.
11,350 kilocycles.
11,380 kilocycles.
13,060 kilocycles.
16,900 kilocycles.
16,980 kilocycles.
21,580 kilocycles.
21,620 kilocycles.
21,660 kilocycles.
22,700 kilocycles.

TROPICAL RADIO TELEGRAPH CO. COASTAL STATIONS

4,148 kilocycles.	8,550 kilocycles.	17,100 kilocycles.
4,172 kilocycles.	11,290 kilocycles.	22,280 kilocycles.
6,650 kilocycles.	12,340 kilocycles.	22,340 kilocycles.
6,665 kilocycles.	12,370 kilocycles.	22,400 kilocycles.
8,490 kilocycles.	13,180 kilocycles.	22,580 kilocycles.

FOR ASSIGNMENT TO OTHER COMPANIES

4,116 kilocycles.	11,020 kilocycles.	11,200 kilocycles.
6,515 kilocycles.	11,080 kilocycles.	16,900 kilocycles.
8,630 kilocycles.	11,140 kilocycles.	22,160 kilocycles.

B. GROUNDS FOR DECISIONS OF THE COMMISSION

The following are excerpts from statements of the commission and grounds for its decisions filed in the Court of Appeals of the District of Columbia showing the policy and practice of the commission in the exercise of its licensing power.

1. Broadcasting Cases

Licensee as trustee.

Technical Radio Laboratory *v.* Federal Radio Commission, No. 4835.

* * * This commission considers that the Technical Radio Laboratory, and all other stations operating under Government license, are trustees of public property, this property to be used for the benefit of the public; that the trust so imposed upon this applicant and assumed by it has not been fully kept, in that there have been no regular hours of operation; the programs have not been of the standard to which the public is accustomed, particularly in view of the extensive use of commercial phonograph records; that operations have been suspended entirely at times. * * * This commission further considers that the failure of applicant to report its programs, as required by law, is, alone, sufficient cause for denial of said application. * * *

Broadcasting by municipal corporation.

City of New York *v.* Federal Radio Commission, No. 4898

* * * The commission found that although station WNYC is operated and supported wholly by the City of New York, it is not by reason thereof to be distinguished from those broadcasting stations privately owned. The fact that a political subdivision of the State of New York is engaged in the operation of a broadcasting station does not of itself furnish the commission with any basis for making a determination that public interest, convenience or necessity is served by its operation. * * * The City of New York, in the operation of its radio station WNYC, is subject to the radio act in the same manner and to the same extent as a private individual or corporation. * * *

Portable broadcasting stations.

C. L. Carrell *v.* Federal Radio Commission, No. 4899

* * * Stations having permanent locations can be so spaced geographically that these areas of interference are reduced to a minimum. The operation of a portable station in first one locality and then another does not permit the maintenance of this geographical separation between stations and, consequently, areas of interference will be set up corresponding to the position of the portable stations at any given time. As a result dependable service can not be given by these fixed stations operating on the same channel with migratory portable stations. * * * To permit appellant to rove at will over a portion of the country on any one channel is simply to deprive the public of the economical and beneficial use of a channel to capacity in terms of service to the listener.

Priority, when considered—Public interest, convenience, or necessity, what is.

In the matter of the application of Great Lakes Broadcasting Co. No. 4900; Agriculture Broadcasting Co., No. 4902; Wilbur Glenn Voliva, No. 4901

* * * The first important general principle in the validity of which the commission believes is that, as between two broadcasting stations with otherwise equal claims for privileges, the station which has the longest record of continuous service has the superior right. This is not a doctrine of vested rights or an extension of the property law to the use of the ether; it applies only as between private individuals or corporations operating stations and not as between either of them and the plenary power of the United States to regulate interstate commerce. * * *

Where two contesting broadcastings do not have otherwise equal claims the principle of priority loses its significance in proportion to the disparity between the claims. In a word, the principle does not mean that the situation in the broadcast band is "frozen" and that existing stations enjoying favorable assignments may not have to give way to others more recently established.

One clear instance where priority has had to give way, and in proper cases will continue to have to give way, is where the junior applicant proceeds from a zone or State which is not getting the equal or the fair and equitable share of broadcasting service to which it is entitled under the law. This is a logical corollary of established public utility law. Since the total available broadcasting facilities are so limited, it is axiomatic that all parts of the United States should be afforded at least a fair degree of broadcasting service before the claims of any particular community to a greater share of service can justly be recognized. * * *

Another exception to the rule of priority arises when the controversy is between stations of different classes with respect to power. * * * The point which the commission desires to make is that when a controversy arises between a cleared-channel station and a regional or local station, or between any stations of different classes, the principle of priority can not control. * * *

Is the rule of priority, however, to govern in all controversies between stations of the same power class, located in and serving the same region? The present controversy is of this character; all three stations are located in the Chicago area and have power of 5,000 watts or more. If the service given by such stations were equal under the standard of public interest, convenience, or necessity, then the commission believes that the rule of priority should control; if there is a substantial disparity between the respective service, the commission believes that on a proper showing the claim of priority must give way to the superior service. * * *

Broadcasting stations are licensed to serve the public and not for the purpose of furthering the private or selfish interests of individuals or groups of individuals. The standard of public interest, convenience, or necessity means nothing if it does not mean this. The only exception that can be made to this rule has to do with advertising; the exception, however, is only apparent because advertising furnishes the economic support for the service and thus makes it possible. As will be pointed out below, the amount and character of advertising must be rigidly confined within the limits consistent with the public service expected of the station.

The service to be rendered by a station may be viewed from two angles, (1) as an instrument for the communication of intelligence of various kinds to the general public by persons wishing to transmit such intelligence, or (2) as an instrument for the purveying of intangible commodities consisting of entertainment, instruction, education, and information to a listening public. As an instrument for the communication of intelligence, a broadcasting station has frequently been compared to other forms of communication, such as wire telegraphy or telephony, or point-to-point wireless telephony or telegraphy, with the obvious distinction that the messages from a broadcasting station are addressed to and received by the general public, whereas toll messages in point-to-point service are addressed to single persons and attended by safeguards to preserve their confidential nature. If the analogy were pursued with the usual legal incidents, a broadcasting station would have to accept and transmit for all persons on an equal basis without discrimination in charge, and according to rates fixed by a governmental body; this obligation would extend to anything and everything any member of the public might desire to communicate to the listening public, whether it consist of music, propaganda, reading, advertising, or what-not. The public would be deprived of the advantage of the self-imposed censorship exercised by the program

directors of broadcasting stations who, for the sake of the popularity and standing of their stations, will select entertainment and educational features according to the needs and desires of their invisible audiences. In the present state of the art there is no way of increasing the number of stations without great injury to the listening public, and yet thousands of stations might be necessary to accommodate all the individuals who insist on airing their views through the microphone. If there are many such persons, as there undoubtedly are, the results would be, first, to crowd most or all of the better programs off the air, and second, to create an almost insoluble problem, i. e., how to choose from among an excess of applicants who shall be given time to address the public and who shall exercise the power to make such a choice.

To pursue the analogy of telephone and telergaph public utilities is, therefore, to emphasize the right of the sender of messages to the detriment of the listening public. The commission believes that such an analogy is a mistaken one when applied to broadcasting stations; the emphasis should be on the receiving of service and the standard of public interest, convenience or necessity should be construed accordingly. This point of view does not take broadcasting stations out of the category of public utilities or relieve them of corresponding obligations; it simply assimilates them to a different group of public utilities, i. e., those engaged in purveying commodities to the general public, such, for example, as heat, water, light, and power companies, whose duties are to consumers, just as the duties of broadcasting stations are to listeners. The commodity may be intangible but so is electric light; the broadcast program has become a vital part of daily life. Just as heat, water, light, and power companies use franchises obtained from city or State to bring their commodities through pipes, conduits, or wires over public highways to the home, so a broadcasting station uses a franchise from the Federal Government to bring its commodity over a channel through the ether to the home. The Government does not try to tell a public utility such as an electric-light company that it must obtain its materials such as coal or wire, from all comers on equal terms; it is not interested so long as the service rendered in the form of light is good. Similarly, the commission believes that the Government is interested mainly in seeing to it that the program service of broadcasting stations is good, i. e., in accordance with the standard of public interest, convenience, or necessity.

It may be said that the law has already written an exception into the foregoing viewpoint in that, by section 18 of the radio act of 1927, a broadcasting station is required to afford equal opportunities for use of the station to all candidates for a public office if it permits any of the candidates to use the station. It will be noticed, however, that in the same section it is provided that "no obligation is hereby imposed upon any licensee to allow the use of its station by any such candidate." This is not only not inconsistent with, but on the contrary it supports, the commission's viewpoint. Again the emphasis is on the listening public, not on the sender of the message. It would not be fair, indeed it would not be good service, to the public to allow a one-sided presentation of the political issues of a campaign. In so far as a program consists of discussion of public questions, public interest requires ample play for the free and fair competition of opposing views, and the commission believes that the principle applies not only to addresses by political candidates but to all discussions of issues of importance to the public. The great majority of broadcasting stations are, the commission is glad to say, already tacitly recognizing a broader duty than the law imposes upon them. * * *

An indispensable condition to good service by any station is, of course, modern efficient apparatus, equipped with all devices necessary to insure fidelity in the transmission of voice and music and to avoid frequency instability or other causes of interference. * * *

There are a few negative guides to the evaluation of broadcasting stations. First of these in importance are the injunctions of the statute itself, such, for example, as the requirement for nondiscrimination between political candidates and the prohibition against the utterance of "any obscene, indecent, or profane language" (sec. 29). In the same connection may be mentioned rules and regulations of the commission, including the requirements as to the announcing of call letters and as to the accurate description of mechanical reproductions (such as phonograph records) in announcements. * * *

For more positive guides the commission again finds itself persuaded of the applicability of doctrines analogous to those governing the group of public utilities to which reference has already been made. If the viewpoint is found that the service to the listening public is what must be kept in contemplation in con-

struing the legal standard with reference to broadcasting stations, the service must first of all be continouus during hours when the public usually listens, and must be on a schedule upon which the public may rely. * * *

Furthermore, the service rendered by broadcasting stations must be without discrimination as between its listeners. Obviously, in a strictly physical sense, a station can not discriminate so as to furnish its programs to one listener and not to another; in this respect it is a public utility by virtue of the laws of nature. Even were it technically possible, as it may easily be as the art progresses, so to design both transmitters and receiving sets that the signals emitted by a particular transmitter can be received only by a particular kind of receiving set not available to the general public, the commission would not allow channels in the broadcast band to be used in such fashion. By the same token, it is proceeding very cautiously in permitting television in the broadcast band because. during the hours of such transmission, the great majority of the public audience in the service area of the station, not being equipped to receive television signals, are deprived of the use of the channel.

There is, however, a deeper significance to the principle of nondiscrimination which the commission believes may well furnish the basic formula for the evaluation of broadcasting stations. The entire listening public within the service area of a station, or of a group of stations in one community, is entitled to service from that station or stations. If, therefore, all the programs transmitted are intended for, and interesting or valuable to, only a small portion of that public, the rest of the listeners are being discriminated against. This does not mean that every individual is entitled to his exact preference in program items. It does mean, in the opinion of the commission, that the tastes, needs, and desires of all substantial groups among the listening public should be met, in some fair proportion, by a well-rounded program, in which entertainment, consisting of music of both classical and lighter grades, religion, education and instruction, important public events, discussions of public questions, weather, market reports, and news, and matters of interest to all members of the family find a place. With so few channels in the spectrum and so few hours in the day, there are obvious limitations on the emphasis which can appropriately be placed on any portion of the program. There are parts of the day and of the evening when one type of service is more appropriate than another. There are differences between communities as to the need for one type as against another. The commission does not propose to erect a rigid schedule specifying the hours or minutes that may be devoted to one kind of program or another. What it wishes to emphasize is the general character which it believes must be conformed to by a station in order to best serve the public. * * *

In such a scheme there is no room for the operation of broadcasting stations exclusively by or in the private interests of individuals or groups so far as the nature of the programs is concerned. There is not room in the broadcast band for every school of thought, religious, political, social, and economic, each to have its separate broadcasting station, its mouthpiece in the ether. If franchises are extended to some it gives them an unfair advantage over others, and results in a corresponding cutting down of general public-service stations. It favors the interests and desires of a portion of the listening public at the expense of the rest. Propaganda stations (a term which is here used for the sake of convenience and not in a derogatory sense) are not consistent with the most beneficial sort of discussion of public questions. As a general rule, postulated on the laws of nature as well as on the standard of public interest, convenience, or necessity, particular doctrines, creeds, and beliefs must find their way into the market of ideas by the existing public-service stations, and if they are of sufficient importance to the listening public the microphone will undoubtedly be available. If it is not, a well-founded complaint will receive the careful consideration of the commission in its future action with reference to the station complained of.

The contention may be made that propaganda stations are as well able as other stations to accompany their messages with entertainment and other program features of interest to the public. Even if this were true, the fact remains that the station is used for what is essentially a private purpose for a substantial portion of the time, and in addition, is constantly subject to the very human temptation not to be fair to opposing schools of thought and their representatives. By and large, furthermore, propaganda stations do not have the financial resources nor do they have the standing and popularity with the public necessary to obtain the best results in programs of general interest. The contention may also be made that to follow out the commission's viewpoint is to make unjustifiable concessions to what is popular at the expense of what is important and serious. This

bears on a consideration which the commission realizes must always be kept carefully in mind and in so far as it has power under the law it will do so in its reviews of the records of particular stations. A defect, if there is any, however, would not be remedied by a one-sided presentation of a controversial subject, no matter how serious. The commission has great confidence in the sound judgment of the listening public, however, as to what types of programs are in its own best interest.

If the question were now raised for the first time, after the commission has given careful study to it, the commission would not license any propaganda station, at least, to an exclusive position on a cleared channel. Unfortunately, under the law in force prior to the radio act of 1927 (see particularly Hoover *v.* Inter-City Radio Co., 286 Fed. 1003), the Secretary of Commerce had no power to distinguish between kinds of applicants and it was not possible to foresee the present situation and its problems. Consequently there are and have been for a long time in existence a number of stations operated by religious or similar organizations. Certain enterprising organizations, quick to see the possibilities of radio and anxious to present their creeds to the public, availed themselves of license privileges from the earlier days of broadcasting, and now have good records and a certain degree of popularity among listeners. The commission feels that the situation must be dealt with on a common-sense basis. It does not seem just to deprive such stations of all right to operation and the question must be solved on a comparative basis. While the commission is of the opinion that a broadcasting station engaged in general public service has, ordinarily, a claim to preference over a propaganda station, it will apply this principle as to existing stations by giving preferential facilities to the former and assigning less desirable positions to the latter to the extent that engineering principles permit. In rare cases it is possible to combine a general public-service station and a high-class religious station in a division of time which will approximate a well-rounded program. In other cases religious stations must accept part time on inferior channels or on daylight assignments where they are still able to transmit during the hours when religious services are usually expected by the listening public.

It may be urged that the same reasoning applies to advertising. In a sense this is true. The commission must, however, recognize that, without advertising, broadcasting would not exist, and must confine itself to limiting this advertising in amount and in character so as to preserve the largest possible amount of service for the public. The advertising must, of course, be presented as such and not under the guise of other forms on the same principle that the newspaper must not present advertising as news. It will be recognized and accepted for what it is on such a basis, whereas propaganda is difficult to recognize. If a rule against advertising were enforced, the public would be deprived of millions of dollars worth of programs which are being given out entirely by concerns simply for the resultant good will which is believed to accrue to the broadcaster or the advertiser by the announcement of his name and business in connection with programs. Advertising must be accepted for the present as the sole means of support for broadcasting, and regulation must be relied upon to prevent the abuse and overuse of the privilege.

It may be urged that if what has heretofore been said is law, the listening public is left at the mercy of the broadcaster. Even if this were so, the commission doubts that any improvement would be effected by placing the public at the mercy of each individual in turn who desired to communicate his hobby, his theory, or his grievance over the microphone, or at the mercy of every advertiser without regard to the standing either of himself or his product. That it is not so, however, is demonstrable from two considerations. In the first place, the listener has a complete power of censorship by turning his dial away from a program which he does not like; this results in a keen appreciation by the broadcaster of the necessity of pleasing a large portion of his listeners if he is to hold his audience, and of not displeasing, annoying, or offending the sensibilities of any substantial portion of the public. His failure or success is immediately reflected on the telephone and in the mail, and he knows that the same reaction to his programs will reach the licensing authority. In the second place, the licensing authority will have occasion, both in connection with renewals of his license and in connection with applications of others for his privileges to review his past performances and to determine whether he has met with the standard. A safeguard which some of the leading stations employ, and which appeals to the commission as a wise precaution, is the association with the station of an advisory board made up of men and women whose character, standing, and occupations will insure a well-rounded program best calculated to serve the greatest portion of the population in the region to be served.

Evidence before commission, weight attached—Station catering to a group.

Chicago Federation of Labor *v.* Federal Radio Commission, No. 4972

* * * Station WCFL based its application for modification of its broadcasting license on the ground that it is owned by the Chicago Federation of Labor and broadcasts programs of interest to organized labor. Applicant claimed there are many people, all members of some labor organization, who are interested in these programs. At the hearing on the application a large number of verified resolutions adopted by various labor organizations were filed with this commission. Nearly all these resolutions were duplicate mimeographed forms, sent out by the applicant, identical in purport. They indorsed the application for modification of applicant's license, but stated no facts to support their conclusions. It is well known that petitions and resolutions are easily procured. Those who sign them never have all the facts before them, and this is especially true in a technical matter such as the licensing and regulating of radio stations. To evidence in such form, the commission, like a court of law, must attach very little weight. Radio is a highly technical subject, and this commission must be extremely cautious in getting the facts with respect to any application. Cases heard before it are appealable to the Court of Appeals of the District of Columbia, and for that reason resolutions stating conclusions without giving the facts on which they are based can be given but little probative value before this commission. No court would consider a resolution by any organization or association which indorsed one side or the other of a suit pending before it and asked that a judgment be rendered in favor of some party to such case, and this would be especially true when such resolution merely stated a conclusion in an ex parte way with no opportunity afforded for cross-examination.

The applicant insisted that the membership of various bodies constituting the American Federation of Labor is large enough to warrant the allocation by this commission of a frequency to be used for the exclusive benefit of organized labor. It was the opinion of this commission, and it so found, that there are numerous groups of the general public that might similarly demand the exclusive use of a frequency for their benefit. There are nearly five million Masons in the United States and about as many Odd Fellows. Their fraternal interests might be urged as a reason for having specific frequencies set aside for them, if it could be demanded of this commission that it set aside a frequency for every large group of citizens having common interests. This classification could be carried on until more classes than frequencies would be found. It is the opinion of this commission, and it so found, that there are not enough frequencies within the broadcast band to give to each of the various groups of persons in the United States a channel on which to operate a broadcasting station. It must follow as a natural consequence that if one large group is entitled to such privilege, others are entitled to the same privilege. If this commission should grant the exclusive right to the use of a specific frequency to a central organization of Methodists to further the interests of that church and the millions who belong to it, the Baptists, Catholics, and others would by the same token be entitled to the same right.

Since there is only a limited number of available frequencies for broadcasting, this commission was of the opinion, and so found, that there is no place for a station catering to any group, but that all stations should cater to the general public and serve public interest as against group or class interest.

Davis amendment—Use of words "fair and equitable."

The Head-of-the-Lakes Broadcasting Co. *v.* Federal Radio Commission, No. 4976

* * * The use of the words "fair and equitable" in the Davis Amendment precludes any argument that the distribution of facilities between States must attain an absolute numerical ideal based on population. The commission here have a discretionary authority. In the exercise of such discretion, the licensing authority, in order to determine whether the granting or modification of a license is fair and equitable, must consider whether or not public convenience, interest or necessity will be served by the granting of such license or modification. * * *

The standard of public interest, convenience, or necessity can only be applied on a comparative basis so that here the decision of the commission could not be made simply on the basis of service rendered by station WEBC. The granting of unlimited time of operation to station WEBC means that station WDAY must either be denied the right to continue its broadcasting service or be assigned

to another frequency occupied by other stations. The rights of other stations must necessarily be considered whenever privileges are granted to any single station. But since the rights of the listening public are superior to the rights of any individual broadcaster, the commission considers that the creation of an area of interference where none previously existed and depriving the people of a large area of radio service, is opposed to the public interest. * * *

Application of Davis amendment—Letters and resolutions not sworn to incompetent evidence.

Norman Baker *v.* Federal Radio Commission, No. 5004

* * * the commission could not grant appellant's application for modification of station KTNT's license seeking full time, with 10,000 watts power, on 1,170 kilocycles, a cleared channel assigned to the second zone. To do so would result in adding a cleared channel to a state and zone already over quota, while interfering with and destroying the effectiveness of the broadcasting of a station of high quality already licensed by the commission to operate full time on 1,170 kilocycles, located in a State and zone having less than the quota of radio facilities to which they are entitled under the law, and in direct violation of General Order No. 40. * * *

It is an established rule of the commission, to which it has adhered in every case, that letters and resolutions not sworn to are not competent to be received as evidence by the commission. * * *

2. General Communication Cases

Application for short waves by corporation for private point to point communication.

By-Products Coal Co. *v.* Federal Radio Commission, No. 4984

* * * Those applicants proposing to engage in the communication business serving the entire public or a particular class of the entire public, and assuming the duties, obligations and responsibilities of common carriers are deemed to be in a better position to meet the standard of public interest than any of the other applicants. * * *

Application for short waves by corporation for public point to point communication—Individual press communication companies—Uneconomic.

Universal Service Wireless (Inc.) *v.* Federal Radio Commission, No. 5005

* * * The issuance of construction permits for press public service to one general public utility corporation to serve all the press rather than to a number of companies organized by a subsidiary to individual newspapers and press associations is in the public interest, convenience and necessity, because:

(*a*) It will permit the constant lessening of frequency separation between stations as the radio science develops and hence most economically exploit the use of radio facilities.

(*b*) Only thus can General Order No. 62 of the commission be taken advantage of to increase the number of frequencies in use.

(*c*) It will promote a more efficient management of press communication.

(*d*) It will provide the only means for flexibility of frequency use to take care of the changing situs of important news events.

(*e*) It will prevent an uneconomic duplication of facilities.

(*f*) It will prevent ruinous competition between communications agencies of the same character, while at the same time creating an agency of sufficient strength to engage in healthy competition with other large radio communication companies.

(*g*) It will be the only means of preserving a reserve of radio facilities for use in case of important news events or great need for emergency communication.

(*h*) It will guarantee neutrality of use and will prevent the otherwise certain monopoly of a subsidiary's facilities by the parent newspaper companies.

(*i*) It will avoid congestion in some frequencies and idleness on others by a proper distribution of traffic.

(*j*) It will provide for the assignment of radio facilities from a national standpoint as distinguished from a local assignment based upon needs of individual newspapers.

(*k*) It will provide the only practical guarantee that facilities will be available for newspapers and press associations hereafter desiring to use radio facilities.

(*l*) It will provide increased facilities for multi-directional transmission to large numbers of newspapers served by press associations.

(*m*) It will afford an opportunity for the participation of agencies prevented by their charters from forming subsidiary public utility companies.

(*n*) It will provide the only method for the grouping of adjacent frequencies in one transmission to give to newspapers the advantage of facsimile transmission by radio. * * *

Intercity Radio Telegraph Co., appellant, *v.* Federal Radio Commission, No. 4987; Wireless Telegraph & Communications Co., appellant, *v.* Federal Radio Commission, No. 4988; R. C. A. Communications (Inc.), appellant, *v.* Federal Radio Commission, No. 4900; Mackay Radio & Telegraph Co., appellant, *v.* Federal Radio Commission, No. 4991.

Basis of the licensing power.—The radio act of 1927, as amended, creates the Federal Radio Commission to license the construction and operation of radio transmitting stations. The practical basis upon which the licensing power rests is the physical fact of interference. The legal basis is the fact that transmissions and interference have an interstate effect. Were it not for interference, there would be no necessity for the exercise of the licensing function, and were it not for the effect of that interference upon the interstate transmission of messages and intelligence, there would be no legal validity to the Federal control.

Necessity for a licensing standard.—The mere prevention of interference, however, can not be the criterion for the licensing of stations. If it were, radio communication would be permanently hampered. A condition of fixation would result wherein existing stations, regardless of merit, would remain permanently established, in that new services could not be permitted to interfere. No test of merit would be available.

It is therefore necessary that a standard be developed to govern licensing. The standard by which applications are to be tested must be in accord with the nature of the art to which it is applied. To be applicable to radio communication it must be broad enough to cover all the aspects of that art. It must provide a full control of technical standards while at the same time encouraging scientific development. It must provide the utmost of protection and facilities to the public which uses radio. The essential characteristics of such a standard must be breadth and flexibility. * * *

Undisputed rules for the application of the standard.—The commission must apply the standard prescribed by law to the innumerable applications before it for licenses and construction permits for domestic service. It is the application of the standard by the commission which the appellants seek to have reviewed in their several appeals to this court.

It has been determined what facilities remain for consideration after the legal and technical depletions of the spectrum. * * *

Press communication classification.—It is well known that in the wire-communication business it is the practice of the telegraph companies to lease wires to newspaper services. One of the reasons for this situation is that the flow of press traffic is practically continuous. By far the largest part of published news is telegraphic news, the essence of news being the smallness of the time intervening between the event and the publication. From this it follows that, in so far as radiotelegraphic communication is capable of either supplanting or supplementing the wire telegraph services, news traffic will form a large part of the material transmitted by radio.

Where a wire telegraph company, with its special facilities, has constructed telegraph lines at great expense, there can be no objection to the lease of those lines so long as others are available for public use. The medium of radio communication is not created or constructed by communication companies. It is a natural facility. The commission can not believe that station bands may be assigned to one for lease to another. Any such lease would inevitably involve a compensation to the lessor, not only for apparatus and personnel but also for the channel itself. Hence the commission does not feel that it can permit leased radio circuits. Therefore, if this important press traffic is to have its proper share of radio facilities, assignments should be made to press communication agencies.

In this manner, important economies in the use of station bands can be effectuated. The situs of important news events changes from day to day and from hour to hour. An important governmental event in Washington may be followed by a noteworthy sporting event in New York City, to be in turn supplanted in the public eye by local floods, tornadoes, or earthquakes. The proper utilization of radio in the collection and distribution of news will thus require a rapid shifting of the number of operating station bands from point to point entirely from a standpoint of news values. The general public service communications company with its requirements for constant availability of facilities throughout its system, is unable to accommodate itself to news events. The economies of utilization thus indicated as available through press assignments will benefit both the press and the general communications companies, relieving the latter of the necessity for complying with heavy and sporadic demands for service at individual localities. The public must benefit both as a user of the general communication service and as a "consumer" of news.

Another consideration indicates the desirability of a reasonable designation of facilities to the press. Radio is a multidirectional service, the wires are not. Press associations, distributing news to hundreds of member and subscriber newspapers, can take extensive advantage of this natural phenomenon by the multidirectional distribution of news service to innumerable newspapers which are unable to obtain those services by wire because of excessive expense. This can only be accomplished by the designation of station bands for the use of the press—if leased circuits are to be avoided—inasmuch as general communications companies are compelled to keep their facilities open for the demands of unidirectional traffic.

These are some of the considerations underlying the commission's classification of June 20, 1929, for limited public service, open to all newspapers and press associations on equal terms, and in no way representing an abandonment of the public service principle. * * *

Statutory standard must be applied from a national viewpoint.—The principle that the standards of public interest, convenience, and necessity must be applied from a national or nation-wide point of view would seem to follow logically from the undisputed principles heretofore discussed. It is particularly imposed upon the commission by the facts of scarcity of station bands and of the nation-wide interference effect of transmissions in the band 3,154 to 5,990 kilocycles wherein the United States general communications channels are located.

The band scarcity requires that the utmost utilization be made of facilities to accomplish the greatest possible communication both in distance and geographical breadth. These considerations are fortified by the fact that, in any event, the transmissions are apt to extend for large distances.

Moreover, the utility to the public of a radio-communication system increases in geometric proportion as the number of communities are increased. A system between two cities, A and B, can accept messages from A to B and from B to A, a total of two services. But if the circuits are doubled, the range of the system for public use is increased by the multipler 6. By adding cities C and D, messages can be sent from A to B, A to C, A to D, B to A, B to C, B to D, C to A, C to B, C to D, D to A, D to B, and D to C, a total of 12 services.

All considerations would seem to point, therefore, to the desirability, generally speaking, of establishing systems of comprehensive scope.

There are, however, certain very important limiting factors to be considered in the application of this test, which may be briefly summarized as follows:

(1) The geometric increase of service range involves also a geometric increase of the amount of traffic handled. Hence a system using a restricted number of station bands can not increase the number of cities served beyond the point at which the station bands will be completely saturated. Thus any given communication system is self limited, the point of limitation in the case of any system being determined by (*a*) the amount of radio traffic available at the cities chosen for station location, and (*b*) the number of stations the system is able to operate upon a standard station channel because of technical ability, duplication, and band shifting.

(2) The comprehensiveness of the system must be scrutinized to determine its effect upon other services, its reasonableness and its choice of cities with respect to other factors to be considered in determining the requirements of public interest. * * *

The application of the statutory standard to point to point domestic communication.—It has been pointed out how fixed physical and legal factors limit the number of station bands assignable for domestic communication.

The general rules for the application of the standard of public interest, convenience, or necessity have been pointed out in so far as they are agreed to by

the commission and all appellants. Certain limitations on and exceptions to these general rules, which have encountered but litte objection on the part of any appellant, have been indicated.

It is plain that the commission could not by extended discussion prescribe a definite set of rules by means of which the statutory standards can be applied to all contemplated systems of domestic communication. Controlling features, as has been pointed out, differ from case to case.

The commission can here present only a general outline of considerations of public interest in so far as it has conceived them to be applicable to applications here involved or mentioned.

Existing communication facilities must be considered.—It has already been pointed out that the commission takes into consideration the availability of wire-communication facilities in considering applications for licenses for the establishment of a regional radiotelegraph system.

In March, 1927, when the commission was organized, the position was taken that applications would not be granted for service which would duplicate that already furnished by land-line companies. The public was well and widely served with facilities operated on a public-utility basis, and the commission's decision that, for the time being at least, parallel radio service would not be authorized, was dictated by a desire to conserve the limited number of frequencies available for domestic service until such time as a provident allocation could be made.

It may be that the commission owes the wire telegraph companies no duty to protect them from competition by radio services. But there is a much broader consideration than this. The commission, while encouraging the development of radio, should nevertheless, in applying the statutory standard, take into consideration the possibility of a radio company competing unfairly with a wire service to such an extent that the general public may suffer. On December 31, 1928, the Western Union Telegraph Co. service extended to 24,842 offices. The Postal System reaches 2,127 offices in the United States. Telegrams can be sent by wire to and from thousands of hamlets and remote villages. These systems cover almost the entire United States, and they must do so in order to be of great importance in national communication.

No commercial enterprise can be expected to operate at a loss. A wire system is entitled to a reasonable profit from its operations.

Obviously there is no constant relationship between the capital, personnel, and maintenance expenses of a wire circuit on the one hand and its volume of traffic on the other. The company's cost of a wire circuit between small communities is not always justified by the income from traffic. The offices in small communities must be maintained to preserve the utility of the entire service to all the people of the Nation. The charges for message traffic over the more profitable circuits between large centers of population must include some charge for the maintenance of the less profitable circuits. The wire companies' charges for their readiness to serve are thus equitably distributed.

With the wire communication companies thus situated, the commission can not, from the standpoint of the national welfare, encourage the establishment of radio communication systems based solely upon the selection of the most profitable points of communication. Radio companies taking the "cream" of the business at reduced rates might impair the utility and the economic structure of the wire companies, for the latter, in order to meet competition, might be compelled to abandon unprofitable circuits.

On the other hand, this principle is limited by physical factors which, in the present state of the radio-communication technique, prevent the establishment of radio services in any way approaching the extent of the wire systems.

This being true, the commission must exercise a discrimination between the penetrating radio system and the selective one, between the radio system offering service on a nation-wide basis and that offering a service only on the most profitable circuits.

Upon the same considerations, the commission must not lend itself to the establishment of radio circuits which will rely upon the handling at reduced rates of the bulk traffic of individual large corporations between their various offices, to the practical exclusion of the less profitable occasional traffic of the general public, especially under circumstances where the wire communication companies are prevented by law or regulation from making such preferential and discriminatory arrangements. To this extent, where there are wire communication facilities available, the commission must carefully scrutinize the location of the proposed stations of any radio communication company.

This discussion is not intended to indicate that proper competition by radio with wire lines is not desirable.

The international communications of an applicant for domestic service must be considered.—Early in the commission's consideration of the problems of licensing in the higher frequency ranges it became apparent that it must proceed with the allocation of frequencies for transoceanic service if a fair share of the high frequencies useful for long distance communication were to be reserved for use by the United States. A substantial portion of the useful frequencies have an international service and interference area, which means that, generally speaking, they must be used exclusively by one station in order to avoid interference in other parts of the world. And the commission was bound by international agreement—if not by its own interest in similarly protecting the use of frequencies it allocated—not to designate such frequencies if they had been registered by another country at Berne. Moreover, because of the competition factor, viz, the desire on the part of the American companies to maintain leadership in world communication, the projects before the commission for this type of service were mature and satisfactory. Therefore, in May, 1927, applications were granted on the following basis:

Tropical Radio Telegraph Co., 7 station bands.
American Publishers Committee, 20 station bands.
Robert Dollar Steamship Co., 8 station bands.
American Telephone & Telegraph Co., 14 station bands.
Radio Corporation of America, 65 station bands.
Mackay Radio & Telegraph Co., 37 station bands.

Intercity Radio Telegraph Co., Wireless Communications Co., and Universal Wireless Communications Co. were not applicants for this type of service.

All these were standard 0.2 per cent station bands in the international range, use of which has now been materially expanded by General Order 62 permitting the subdivision of station bands.

Two station bands were similarly designated for shared use by Firestone Planations Co. for service to Liberia and by Standard Oil Co. for service to Bolivia, but it was stipulated that such frequencies should be used on a public-service basis.

On May 24, 1928, in granting applications for transoceanic service, the commission announced the following principle: All construction permits issued for transoceanic short-wave service are to be for general service stations.

Radio Corporation of America Mackay Radio & Telegraph Co., and the American publishers committee also filed applications for permits and licenses authorizing their entry into domestic communication. They intend to operate in connection with the designations made in May for transoceanic communication. Though it can not be said that the two types of service are absolutely independent, since the Intercity and other companies were willing to attempt operation without the use of foreign circuits, it was nevertheless apparent that the two services are interrelated.

The interrelationship, of course, lies in the fact that international facilities are useless without international traffic. It is not possible for a communication agency to successfully operate international circuits on the basis of traffic available to and from the seaboard cities in which its transmitters are located. The success of the company's operation and its utility to the Nation as a whole depend upon its having facilities for the collection and delivery of messages to and from foreign countries.

Hence, in applying the statutory standard to problems of licensing domestic communication, the commission must consider the status of agencies licensed to conduct international communication with respect to facilities available to them for the collection and distribution of their traffic domestically.

Competition between radio services must be considered.—If there were a sufficient number of station bands available to make frequency designations possible to all applicants desiring to establish domestic communication services, economic considerations would nevertheless make it contrary to the statutory standard to permit the establishment of too many such systems.

A very small fraction of available domestic telegraph business is now handled by radio. It is plain that a profitable quantity of such business will not be available overnight upon the opening of radio circuits. The volume of traffic must be developed in competition with existing circuits upon the bases of rates, service, popular appeal, and the development of new traffic.

The field from which radio traffic will come is, to some extent, a selective field. Too many competing radio services can not be established to serve the same localities. Ruinous competition between radio companies for a limited volume

of traffic would impair the development of radio communication. The public is the ultimate loser from competition of this character.

At the same time the commission can not lend itself to the creation of a monopoly in radio communication. While it is true that wire companies will preserve competitive conditions in the communication field, the commission should, so far as station bands are available, bear in mind the desirability of fostering a healthy competition between radio services.

It is hardly necessary to mention that factors of competition can not be considered from an individual or local standpoint, but that the considerations must be applied in the broadest manner. Nor may these considerations control, so as to require the granting or denial of licenses regardless of other aspects of public interest.

It is equally plain that tests and standards can be applied only to actual applications before the commission, and that a competitive ideal can only be approached to the extent that there are proper proposals on file.

A proposal should conform generally to sound economic principles.—As was mentioned above, this statement can not point out all the factors which enter into the determination of whether a communication system complies with the statutory standard, particularly with reference to the very important economic principles involved.

The radio act contemplates that the commission shall consider the "financial ability" of an applicant to carry out its proposal. This is due not only to the large expense of installing apparatus but also to the necessity of continuous operation in the paramount interest of the public. It may, and probably will, be necessary for domestic communication systems to operate at a loss during a developmental period. Such has been the experience of radio companies in the past. The mere fact of loss must not interfere with efficient operation if public interest is to be served.

However, the testimony before the commission indicates that all the applicants have the necessary finances for this purpose. Some, it is true, might be able to so continue for a longer time than others, but the commission does not expect any interminable period of unprofitable operation. The conduct of a losing system for too long a period would be inimical to the public interest and convenience.

It may be a restatement of this same principle to say that a proposed communication system must be economically feasible. Part of the burden resting on an applicant before the commission is to convince it that the proposed system will succeed, for certainly considerations of public interest prevent the commission from licensing a system doomed to failure. Various factors which may be taken into consideration in this connection are proposed rate schedules, the availability of message traffic, and the demand for service, the location of the circuits with respect to railroads, waterways. and air routes, and similar matters.

Technical considerations.—In testing proposals by a technical standard, it first became apparent to the commission that the technical proficiency of any scheme could not be tested only on the basis of what the proponent had done on a large scale in the past. The rapid development of the radio technique, the radio patent situation, and many other factors require the commission to hold an open mind in connection with plans outlined by new enterprises.

Any other attitude would result in a frozen condition in the communication field, because the extensive demonstration of technical proficiency in actual practice involves the holding of licenses. A probability of monopoly inheres in the granting of licenses to only those who have been already engaged in communication.

A technical program must, of course, be severely scrutinized, particularly if new. In this connection the commission is fortunate in having within its organization a competent engineering division with a large personnel of trained radio technicians who are able to give the commission impartial scientific advice on the engineering aspects of communication systems, existing or proposed. The commission has also availed itself of the advice available to it from the radio experts attached to the Army, the Navy, and the Bureau of Standards.

Service to station band ratio.—Other factors being equal, it is plain that an applicant is most entitled to assignments who, by reason of advanced equipment or methods, is able to furnish the most service on the fewest number of station bands. Otherwise expressed, that applicant should prevail whose plan will provide the highest ratio of service to number of station bands.

This rule should apply in any event from economic principles but it becomes of the utmost importance in the present field because of the scarcity of station bands, the variety of circuits and channelling proposed by various applicants,

the economic necessity of providing comprehensive national systems, and the general principles underlying the commission's General Order 62.

Development possibilities.—Another important consideration in subjecting any proposed communication system to technical test is the possibility which it contains for development. Radio communication systems must develop and grow. No system can be said to be in the public interest unless it has reasonable provisions for growth. That growth must take place internally to accommodate the increase in traffic which may be reasonably expected to occur. To accommodate this, there must be provision for decreasing frequency separation (or some similar expedient) in step with growth, or the system must originally provide for that growth. As between different plans, in this regard, the commission should prefer that which is most economical of station bands. There should also be a corresponding plan for a geographical growth by the reasonable addition of new points of communication as those may be required for the efficiency of the system and the needs of the Nation.

Here, also, the development feature must be gauged by the service-station band ratio.

Obviously the development potentialities of a system must be appraised independently of any suggested request for the assignment of additional station bands. With the recognized scarcity of bands, no plans should be made for the growth of one system at the expense of another. The merit of a system in this connection lies in is ability to grow within its assignments.

Technical resources of the applicant.—The radio act contemplates the consideration by the commission of the "technical ability" of an applicant. The commission should not only consider the technical merit of the applications and plans themselves but it must look to the actual installation and establishment of facilities, and their operation throughout the license period. It must, so far as they are material in any case, determine the facts with reference to the applicant's ability technically to carry out the meritorious proposals. In so doing it should consider:

(1) The personnel of the applicant organization.

(2) The ability of the applicant to obtain the apparatus and equipment necessary for the proper installation and operation of its system and its rights under patents or licenses to make use of the apparatus.

Technical feasibility of the plan.—The test of practicability must, of course, be applied to any plan submitted to the commission. The various expedients to which an applicant proposes to resort in order to make its plan conform to the general rules must be examined and their feasibility determined.

The American committee of technical experts, in its material submitted to the C. C. I. R., says:

"In order that maximum world-wide use may be made of the available frequencies throughout the radio spectrum it is necessary that full consideration be given to such factors as:

"a. Geographical location and hours of operation.

"b. Directional communication.

"c. Multiplexing.

"d. Other factors."

As other factors, the committee refers to power and skip-distance effect.

Possibilities of the shifting of station bands from one point to another as traffic needs may require must also be considered and tested.

The merit of an application is enhanced by its recognition of sound engineering principles and the application of those principles to the plan proposed. Similarly the merit of an application is decreased, other factors being equal, by its failure to take advantage of expedients which are feasible.

Coherence.—The commission has always followed the policy, as far as its routine permits, of indicating apparent defects in applications presented to it. Ample opportunity is given for the amendment of applications. Its engineering division has often discussed proposals with applicants and has made suggestions when consistent with the policy and impartiality of the commission.

Nevertheless, the commission does not consider itself in a position to draw up operation plans for applications. Neither can it revise the plans presented. It feels that it may deny an application or grant it, or it may grant it in part. But applications must stand on their own bases. Otherwise the commission can not act as the standard applying body. Hence preference must be given to that plan which is presented as a complete and coherent entity over that which is incoherent, inconsistent, or haphazard. The technical problems which require solution in any plan of operation must be solved by the applicant, not by the commission. * * *

IV. PROCEDURE

A. HEARINGS

During the period October 1, 1928, to November 1, 1929, 266 hearings were held at the offices of the commission in Washington. Of this number 67 applications were granted and 167 denied while 32 remain undecided. The following tables indicates the kinds of applications upon which hearings were held:

Summary of hearings before commission

Total number of cases heard	224
Number of applications granted after hearing	67
Number of applications denied after hearing	167
Number of cases undecided after hearing	32
Total	[3] 266

Hearings were held on the following classes of applications:

Broadcasting station assignment of license	1
Broadcasting station license	3
Broadcasting station construction permit	74
Broadcasting station modification of license	68
Broadcasting station renewal of license	25
Commercial station construction permit	28
Commercial station license	17
Commercial station renewal license	1
Experimental station construction permit	20
Experimental station license	8
Experimental station renewal license	1
Geophysical station construction permit	9
Television station construction permit	8
Television station license	1
High frequency broadcasting station construction permit	2
Relay broadcasting station construction permit	3
Total	266

The managing attorney, under the direction of the general counsel, performs duties similar to a clerk of court and is responsible for the expeditious handling of the docket of pending cases.

Formal hearings are held on every day of the week except Monday, which is usually reserved for the closed meetings of the commission. It was formerly the rule to have a quorum of the commission present at the hearings but under present procedure one commissioner has been designated to conduct hearings and make his report thereon. After the conclusion of the hearings it is the practice to enter an order either granting or denying the applications.

There follows a complete list of the hearings held by the commission during the period.

[3] In each of 2 cases 1 application was granted and 1 denied.

Hearings held by the commission during the period October 1, 1928, to November 1, 1929

[Symbols: B, broadcasting; C, commercial; E, experimental; G, geophysical; F, television; A, relay broadcasting; Lic., license; Mod. L., modification of license; Ren. L., renewal license; A. of L., assignment of license; C. P., construction permit]

Date of hearing	Call letters	Applicant and location	Nature of application	Power and frequency	Decision (granted or denied)
1928					
Oct. 16	WJAR	The Outlet Co., Providence, R. I.	(B) C. P.	1,000 w.	Granted.
Do	WEPS	Matheson Radio Co. (Inc.), Gloucester, Mass.	do	500 w.	Denied.
Do	WLBH	Jos. J. Lombardi, Farmingdale, Long Island, N. Y.	do	290 kc., 250 w.	Do.
Do		State Federation Joint Marketing Service, Sacramento, Calif.	(C) C. P.		Granted.
Do	WOV	International Broadcasting Corporation, New York, N. Y.	Mod. L. (B)		Denied.
Do		Pickwick Broadcasting Corporation, San Francisco, Calif.	(B) C. P.	50,000 w.	Do.
Do	KNRC	Pickwick Broadcasting Corporation, Los Angeles, Calif.	do	1,000 w.	Do.
Do	KFSD	Airfan Radio Corporation, San Diego, Calif.	(B) Ren. L.	600 kc., 1 kw.; day, 500 w.; night	Granted.
Do	WBNY	Baruchrome Corporation, New York, N. Y.	(B) Mod. L.	900 kc.	Denied.
Oct. 17	WNAC, WBIS	The Shepard Stores, Boston, Mass.	do	1,230 to 590 kc., 500 w.	Do.
Do	WEAN	The Shepard Co., Providence, R. I.	do	250 w., 550 kc.	Granted.
Oct. 22	WIBS	New Jersey Broadcasting Corporation, Elizabeth, N. J.	do	1,450 kc., 250 to 500 w.	Denied.
Do	WHAD	Marquette University, Milwaukee, Wis.	do	1,120 to 900 kc.; 250 to 1,000 w. day; 750 w. night.	Do.
Oct. 25	WLTH	Voice of Brooklyn (Inc.), Brooklyn, N. Y.	do	1,400 to 920 kc.; 250 to 1,000 w.	Do.
Oct. 29	KWK	Greater St. Louis Broadcasting Corporation, St. Louis, Mo.	do	1,350 kc., one-half to full time	Granted.
Oct. 30		The Robert Dollar Co., San Francisco, Calif.	(C) C. P.		Denied.
Nov. 16	WKBO	Camith Corporation, Jersey City, N. J.	(B) C. P.	1,450 kc., 1,000 w.	Do.
Oct. 30	WMBJ	Rev. John W. Sproul, Pittsburgh, Pa.	do	1,500 kc., 100 w.	Granted.
Nov. 1	KFJZ	Henry Clay Allison, Fort Worth, Tex.	(B) Mod. L.	1,370 to 1,240 kc., 100 to 2,000 w.	Denied.
Do	WCGU	United States Broadcasting Corporation, New York, N. Y.	do	1,400 to 920 kc., 500 to 1,000 w.	Do.
Do	WSSH	Tremont Temple Baptist Church, Boston, Mass.	do	1,420 to 1,360 kc., 100 to 500 w.	Do
Do	WODA	Richard E. O'Dea, Paterson, N. J.	do	920 kc.	Do.
Do	WNJ	Radio Investment Co., Newark, N. J.	do	145 to 1,120 kc., 250 w.	Do.
Nov. 2	WNAX	Gurney Seed & Nursery Co., Yankton, S. Dak.	do	890 to 570 kc. 890 to 570 kc.; 500 to 1,000 w.	Granted.
Do	WIBO	Nelson Bros. Bond & Mortgage Co., Chicago, Ill.	do	1,480 to 570 kc.; 1,000 to 5,000 w.	Do.
Do	WHT	Radiophone Broadcasting Corporation, Chicago, Ill.	do	1,480 to 570 kc., 1,000 to 5,000 w.	Denied.
Nov. 8	WMES	Massachusetts Educational Society, Boston, Mass.	do	1,500 to 1,120 kc., 50 to 100 w.	Do.
Do	KOOS	H. H. Hanseth, Marshfield, Oreg.	(B) C. P.	1,450 kc., 50 w.	Granted.
Nov. 9	WGES	Oak Leaves Broadcasting Station (Inc.), Chicago, Ill.	(B) Mod. L.	1,360 kc., 500 to 1,000 w.	Denied.
Nov. 13		McCollum Geological Explorations, Washington, D. C.	(G) C. P.		Do.
Do		Geophysical Research Corporation, New York, N. Y.	do		Granted.
Do		Humble Oil & Refining Co., Houston, Tex.	do		Do.
Do		The Texas Co., Houston, Tex.	do		Do.
Do		Geophysical Exploration Co., Beaumont, Tex.	do		Do.
Do		Marland Production Co., Ponca City, Okla.	do		Do.
Do		F. Cushing Moore, Spokane, Wash.	do		Denied.
Do		Interstate Geophysical Exploration Co., St. Louis, Mo.	do		Granted.

Hearings held by the commission during the period October 1, 1928, to November 1, 1929—Continued

Date of hearing	Call letters	Applicant and location	Nature of application	Power and frequency	Decision (granted or denied)
1928					
Nov. 14	WENR WBCN	Great Lakes Broadcasting Co., Chicago, Ill.	(B) Mod. L.	870 kc.; one-half time 5,000-50,000 w	Granted power. Denied operating hours.
Do.	WLS	Edward L. Bill, Chicago, Ill.	do.	870 kc., 5,000 w.; from five-seventh to full time.	Denied.
Do.	WCBD	Wilbur Glenn Voliva, Zion, Ill.	do.	1,080 to 870 kc., 5,000 w.; change hours operation.	Do.
Nov. 15		The Shepard Norwell Co., Boston, Mass.	(F) C. P.		Do.
Do.		Frank L. Carter, Long Island City, N. Y.	do.		Do.
Do.		Aero Products Co., Chicago, Ill.	do.		Granted.
Do.		Brooklyn Broadcasting Co., Brooklyn, N. Y.	do.		Denied.
Do.		Walter J. Allen, Salina, Kans.	do.		Do.
Nov. 16	WNYC	Department of Plant and Structures, New York, N. Y.	(B) Mod. L.	Full time; 570 kc., 500 w.	Do.
Nov. 20		Raymond Concrete Pile Co., Hayward, Calif.	(C) C. P.		Do.
Do.		United Artists Corporation, Hollywood, Calif.	do.		Do.
Do.		Iowa Nebraska Light & Power Co., Lincoln, Nebr.	do.		Do.
Nov. 21	KQP	Inland Waterways Corporation, New Orleans, La.	do.		Granted.
Nov. 23	WODA	Richard E. O'Dea, Paterson, N. J.	(B) Mod. L.	Full or one-half time; 1,250 kc., 1,000 w.	Do.
Do.	WAAM	Radio Station WAAM (Inc.), Newark, N. J.	do.	One-half or full time; 1,250 kc., 250 to 500 w.	Do.
Nov. 24	WOAI	Southern Equipment Co., San Antonio, Tex.	do.	Full time (divides with WRK, 1, 190 kc., 5000 w.	Do.
Do.	KFDM	Magnolia Petroleum Co., Beaumont, Tex.	do.	560 to 1,190 kc., 500 to 1,000 w.	Denied.
Nov. 26	WFAA	Dallas News and Dallas Journal, Dallas, Tex.	do.	Full time (divides with KRLD), 1,040 kc., 5,000 to 25,000 w.	Do.
Nov. 27		Elwood W. Lippincott, Long Beach, Calif.	(B) C. P.	1,010 kc., 50 to 500 w.	Do.
Dec. 4	WRNY	Experimenter Publishing Co., New York, N. Y.	(B) Mod. L.	One-half time 1,010 kc., 250 to 500 w.	Granted 3/7 time.
Dec. 5		James A. Bennett, Chester, Pa.	(B) C. P.	1,500 kc., 100 w.	Denied.
Dec. 6	WEY	Boston Fire Department, Boston, Mass.	(C) C. P.		Granted.
Dec. 7		Francis X. Eberle, Los Angeles, Calif.	(B) C. P.	2,000 or 3,300 kc., 50 w.	Denied.
Dec. 11		William Thompson, Bridgeport, Ohio.	(E) C. P.	1,500-1,666 kc., 75-250-500 w.	Do.
Do.		Caw Packing Co., Seattle, Wash.	(C) C. P.	3,333 kc., 50 w.	Do.
Do.	WSAR	Doughty & Welch Electric Co., Fall River, Mass.	(B) C. P.		Do.
Do.		Sun Oil Co., Beaumont, Tex.	(G) C. P.		Granted.
Do.		Chester Radio Laboratories, Chester, Pa.	(E) C. P.	1,000-5,000 w.	Denied.
Dec. 12	WKBG	C. L. Carrell, Chicago, Ill.	(B) Ren. L.; portable.		Do.
Do.	WHBM	do.	do.		Do.
Do.	WIBJ	do.	do.		Do.
Dec. 14	KPK	Merchants Exchange, Portland, Oreg.	(C) Lic.	476 kc., 750 w.	Do.
Dec. 18		The Texas Co., Houston, Tex.	(C) C. P. (2 applications.).	140	Granted.

Do		Illinois Pipe Line Co., Findlay, Ohio	(C) Ren. L. (6 applications).		Denied.
Do		Boyd Phelps, Jamaica, N. Y	(F) C. P		Do.
Dec. 20		Richmond Development Corporation, Roanoke, Va	(B) C. P (2 applications).		Do.
1929					
Jan. 16	KFCB	Nielson Radio Supply Co., Phoenix, Ariz	(B) C. P. Mod. L	1,310 to 1,440 kc., from 100 w, 250 d, to 500 w	Granted.
Jan. 22	New	E. V. Rideout Co., San Francisco, Calif	(C) C. P	250–2,700 kc., 5 w	Denied.
Do	do	Robert M. Riculfi, Tuscon, Ariz	(B) C. P	1,150 kc., 1,000 w	Granted.
Feb. 14		L. Bamberger & Co., Kearney, N. J	(E) C. P		Do.
Feb. 12	New WCT WBO.	Ford Motor Co., Detroit, Mich	(C) C. P. (1 application), Lic. (5 applications).		Denied.
Do	New	Southern Radio Corporation, New York, N. Y	(C) C. P	8,000 kc., 1,000 w	Do.
Feb. 13	do	S. Ernest Philpitt & Son, Miami, Fla	(B) C. P	25 w., kc. not specified	Do.
Do	KFT	American Tug Boat Co., Everett, Wash	(C) Mod. L		Do.
Do	WLI	The J. P. Button Coal Co., Cleveland, Ohio	(C) Lic	From 250 to 500 w	Do
Do	WLG	The By-Products Coal Co., Bypro, Ky	do	do	Do.
Do	KPE	City of Seattle, harbor department, Seattle, Wash	do		Do.
Do	KOFH	Frederick Robinson, Glendale, Calif	(B) C. P		Do.
Feb. 15		Chicago Federation of Labor, Chicago, Ill	(C) Lic	8,050 kc., 500 w	Do.
Do	New	Intercity Radio Tel., Chicago, Ill	(C) Assignment C. P	8,050 kc., 1,000 w	Do.
Feb. 19	KZE	Grays Harbor Stevedore Co., Aberdeen, Wash	(C) Lic	200 w	Granted.
Do	New	The N. Y. Central R. R. Co., New York, N. Y	do	50 w	Denied.
Do	WCV	Wyandotte Trans. Co., Detroit, Mich	do	From 750 to 500 w	Do.
Do		City of New York, department of plants and structures, New York, N. Y.	(C) C. P	500, 429.9, 410.9 kc., 200 w	Granted.
Feb. 20	KVOO	Southwestern Sales Corporation, Tulsa, Okla	(B) Mod. L	From 1,140 to 850 kc., 5,000 w	Denied.
Feb. 26	WRAK	Clarence R. Cummins, Erie, Pa	(B) Ren. L	1,370 kc., 50 w	Granted.
Feb. 27	New	C. C. Crawford, Roxana Pet. Co., Haynesville, La	(B) C. P	710 kc., 50 w	Denied.
Do	KOCW	Oklahoma College for Women, Chickasha, Okla	(B) Mod. L	From 1,140 to 1,220 kc., from 100 to 1,000 w	Granted.
Mar. 5	KFWI	Radio Entertainments (Inc.), San Francisco, Calif	do	930 kc., 500 w	Denied.
Mar. 6	WCLB	Arthur Faske, Long Beach, N. Y	(B) Ren. L	1,500 kc., 100 w	Granted.
Do	WKBO	Camith Corporation, Jersey City, N. J	do	1,450 kc., 250 w	Do.
Do	WIBS	New Jersey Broadcasting Corporation, Elizabeth, N. J	do	do	Do.
Do	WLBX	John N. Brahy, Long Island City, N. Y	do	1,500 kc., 100 w	Do.
Mar. 7, 8, 9		Consolidated Press Association, Washington, D. C	(C) C. P		Denied.
Do		New York Herald-Tribune, New York City	do		Do.
Do		International News Service (Inc.), New York City	do		Do.
Do		Illinois Publishing & Printing Co., Chicago, Ill	do		Do.
Do		New York Times, New York City	do		Do.
Mar. 12	WLAC	Life & Casualty Insurance Co., Nashville, Tenn	(B) Mod. L	1,490 kc., 5,000 w.; full time	Granted.
Do	New	M. L. Cates, Georgetown, Tex	(B) C. P	1,370 kc., 200 w	Denied.
Do	WEBC	Head of the Lakes Broadcasting Co., Superior, Wis	(B) Mod. L	1,280 kc., 1,000 w.; full time	Do.
Do	New	A. Torigian, Rockham, S. Dak	(B) C. P		Do.
Mar. 13	do	Charles P. Hewitt, Oak Harbor, Ohio	do	1,500 kc., 15 w	Do.
Do	WAAT	Bremer Broadcasting Corporation, Jersey City, N. J	(B) Mod. L	1,070 kc., 300 w	Do.
Mar. 14	WABF	Markle Broadcasting Corporation, Kingston, Pa	(B) Ren. L		Do.
Do	WMBR	F. J. Reynolds, Tampa, Fla	(B) C. P	1,210 kc., from 100 to 1,000 w	Do.
Do		do	(E) C. P	15,000 to 7,500 kc., 100 w	Do.
Do	W8GH W8DA	Amateur Radio Specialty Co., Brooklyn, N. Y	(B) Ren. L	1,400 kc., 500 w	Granted.

Hearings held by the commission during the period October 1, 1928, to November 1, 1929—Continued

Date of hearing	Call letters	Applicant and location	Nature of application	Power and frequency	Decision (granted or denied)
1929					
Mar. 19	WLTH	Voice of Brooklyn (Inc.), Brooklyn, N. Y.	(B) Mod. L.	1,400 kc., from 500 to 5,000 w. night, 1,000 day	Denied.
Do	WBBC	Brooklyn Broadcasting Corporation, Brooklyn, N. Y.	do	1,400 kc., from 500 to 5,000 w. night, 1,000 day	
Mar. 20	WNW	Tidewater Wireless Telegraph Co., Philadelphia, Pa.	(C) C. P., 1-P-C-512; 2-P-C-538 and 2-L-C-38.		Denied in part. Granted in part.
Do	New	Wired Radio, Ind., New York, N. Y.	(E) C. P.	20,000 w.	Denied.
Do		Don Lee (Inc.), Los Angeles, Calif.	(B) C. P.	5,500 kc., 250 w.	Do.
Do	WPF	U. S. Shipping Board, Washington, D. C.	(C) C. P.	2,000 w.	Granted.
Mar. 21	New	Babin & Boyett-Radio Co., Trees, La.	(B) C. P.	1,360 kc., 50 w.	Denied.
Do		F. L. Beglin, Tacoma, Wash.	do	750 kc., 100 w.	Do.
Do	New	J. L. Echols & J. W. Fondren, The Music Shoppe, Goose Creek, Tex.	do	1,360 kc., 100 w.	Do.
Do	do	Kidd-Russ Trunk & Bag Co., Beaumont, Tex.	do	do	Do.
Mar. 27		Great Lakes Broadcasting Co., Chicago, Ill.	do	6,000 kc., 5,000 w.	Granted.
Do		Baltimore Radio Show (Inc.), Baltimore, Md.	(E) Lic., Exp. Dev.	500 w.	Do.
Do	New	Great Lakes Radio Broadcasting Co., Chicago, Ill.	(F) C. P.	20,000 w.	Do.
Do	do	The Associated Broadcasters, Oakland, Calif.	(E) C. P.	9,600 kc., 100 w.	Denied.
Do		R. J. Rockwell, Omaha, Nebr.	(E) Lic.	2,800 kc., 100 w.	Do.
Apr. 2	WBMH	Braun's Music House, Detroit, Mich.	(B) Ren. L.	1,310 kc., 100 w.	Do.
Do	WIBZ	Alexander D. Trum, Montgomery, Ala.	do	1,500 kc., 15 w.	Do.
Apr. 3	New	Clarence Leonard Nelson, Corpus Christi, Tex.	(B) C. P.	1,300 kc., 250 w.	Do.
Do	KFUL	Will H. Ford, Galveston, Tex.	(B) Mod. L.	1,290 to 1,120 kc., 500 to 1,000 w. night, 1,000 day.	Do.
Do	KTSA	Lone Star Broadcasting Co. (Inc.), San Antonio, Tex.	(B) C. P.	1,290 kc., 1 kw. night, 2 kw. day	Do.
Apr. 4	WHBQ	Broadcasting Station WHBQ (Inc.), Memphis, Tenn.	do	1,370 to 1,290 kc., from 100 to 500 w.	Do.
Apr. 16	WCFL	Chicago Federation of Labor, Chicago, Ill.	(B) Mod. L.	970 to 770 kc., 1½ kw. to 25,000 w., and 25,000 exp.	Do.
Do		do	(E) C. P.	15,000, 10,000, 5,000 kc., 500 w.	Granted.
Apr. 18		R. H. Macy & Co., New York City	do	500 w.	Denied.
Do		Davison-Paxon Co., Atlanta, Ga.	do	do	Do.
Do	New	Moeller's Radio Shop, Bastrop, La.	(B) C. P.	1,420 kc., 100 w.	Do.
Do	do	Universal Pictures Co. (Inc.), New York City	(E) C. P.	15,000 and 7,500 kc., 500 w.	Do.
Do	WRBC	Immanuel Lutheran Church, Valparaiso, Ind.	(B) Mod. L.	1,240 kc., 500 w.	Do.
Do	New	The LaSalle & Koch Co., Toledo, Ohio	(E) C. P.	70,000-6,500 kc., 500 w.	Do.
Do	do	The C. Reiss Coal Co., Sheboygan, Wis.	(C) License	500 w.	Do.
Apr. 23	do	Arizona Appliance Co., Glendale, Ariz.	(B) C. P.	1,210 kc., 100 w.	Do.
Apr. 24	WPR	South Porto Rico Sugar Co., Ensenada, P. R.	(C) License	10,000 w.	Granted.
Do	KPA	Lincoln L. Jackson, Seattle, Wash.	do	500 w.	Denied.
Do	KFZ; KGV	Russell Reed, Los Angeles, Calif.	do	2,050 kc., 50 w.	Do.
Do	New	Lamson Outfitting Co., Brooklyn, N. Y.	(E) C. P.	9,600 kc., 250 w.	Do.

Apr. 25	KTAB	The Associated Broadcasters (Inc.), San Francisco, Calif.	(B) C. P.	500 kc., 500 to 1,000 w.	Granted in part.
Do	New	Richard Preece, jr., St. Petersburg, Fla.	do	1,400 kc., 25 w.	Denied.
Do	KELW	Earl L. White, Burbank, Calif.	(B) Mod. L.	780 kc., 500 w.	Do.
Apr. 30	KFOR	Howard A. Shuman, Lincoln, Nebr.	do	From 1,210 to 1,120 kc., 100 to 1,000 w. day, 500 night.	Granted.
May 1	KOH	Jay Peters (Inc.), Reno, Nev.	do	1,370 to 1,350 kc., 100 to 250 w.	Denied.
May 2	KGKO	Wichita Falls Broadcast Co., Wichita Falls, Tex.	do	570 kc., 250 to 1,000 w.	Do.
Do	New	Dr. Edward H. Cunningham, San Antonio, Tex.	(B) C. P.	1,500 kc., 100 w.	Do.
May 7	do	C. Merwin Dobyns, Long Beach, Calif.	(E) C. P.	2,857, 4,690 kc., 250 w.	Do.
Do		Universal Broadcasting Co., Philadelphia, Pa.	(B) C. P., high frequency.	6,000 and 9,600 kc., 500 w.	Granted.
Do		Pacific-Western Broadcasting Fed., Pasadena, Calif.	do	15,130, 9,530 kc., 15,000 w.	Do.
May 8		Aviation Radio Station (Inc.) (Experimenter Publishing Co.), New York City.	(E) License	6,040, 9,550, 11,860, 15,250, 17,780, 21,460 kc., 500 w.	Do.
May 8		Harold E. Smith, Beacon, N. Y.	(F) License	Any frequency in television band, 50 w. and higher as needed.	Do.
May 9	WNBQ	Gordon P. Brown, Rochester, N. Y.	(B) Ren. L.	1,460 kc., 15 w.	Denied.
Do		The Edison Electric Illuminating Co., Boston, Mass.	(E) License	Variable	Do.
Do	WATT	do	(B) Ren. L.	1,490 kc., 100 w.	Do.
Do	KMTR	KMTR Radio Corporation, Hollywood, Calif.	(B) Mod. L.	500-100 w., 570 kc.; full time on 570 kc., present assigned hour.	Granted in part.
Do	WNBQ	Gordon P. Brown, Rochester, N. Y.	do	1,500 kc., 15 to 100 w.	Denied.
May 14	WSSH	Tremont Temple Baptist Church, Boston, Mass.	do	1,420 to 1,360 kc., 100 to 500 w.	Do.
May 15	WNJ	Radio Investment Co., Newark, N. J.	do	1,450 to 950 kc., 250 w.	Do.
Do	New	Winter Jones and Hugh H. Jones, jr., Catonsville, Md.	(B) C. P.	1,210 kc., 100 w.	Do.
Do		Radio Investment Co., Newark, N. J.	do	1,450 to 950 kc., 250 w.	Do.
May 21	WEBR	Howell Broadcasting Co. (Inc.), Buffalo, N. Y.	do Mod. L.	550 kc., 1,000 w. 1,310 to 550 kc., from 100 to 1,000 w.	Do. Do.
May 22		Intercity Radio Telegraph Co., Cleveland, Ohio	(C) C. P.		Do.
Do		Radio Corporation of America, New York City	do		Granted in part.
Do		Mackay Radio Telegraph Co., San Francisco, Calif.	do		Denied.
Do		The Wireless Telegraph & Communication Co., Northbrook, Ill.	do		Do.
Do		do	do		Do.
Do		Western Radio Telegraph Co. (203, 205, 206, 207, 208 consolidated).	(C) 1 C. P., 4 licenses		Granted in part.
May 24	WHBW	D. R. Kienzle, Philadelphia, Pa.	(C) Ren. L.	1,500 kc., 100 w.	Denied.
Do	WSRO	Harry W. Fahrlander, Hamilton, Ohio	(B) Ren. L.	1,420 kc., 100 w.	Do.
Do	WHB	Sweeney Automobile School Co., Kansas City, Mo.	do	950 kc., 500 w.	Granted.
May 28	New	A. H. Nigocia, New Orleans, La.	(B) C. P.	1,420 kc., 100 w.	Denied.
May 29	KGHI	Berean Bible Class, Little Rock, Ark.	do	1,500 to 620 kc., 100 to 500 w.	Granted.
Do	New	Leonard P. Brant, Klamath Falls, Oreg.	do	1,200 kc., 100 w.	Denied.
Do	KFHA	Western State College of Colorado, Gunnison, Colo.	(B) Ren. L.	1,200 kc., 50 w.	Granted.
June 4	New	Mrs. Anna E. Stewart, Carterville, Mo.	(B) C. P.	1,340 kc., 50 w.	Denied.
Do	KFXF	Pikes Peak Broadcasting Co., Denver, Colo.	(B) Mod. L.	940 kc., 250 to 1,000 w.	Do.
June 5		News Syndicate Co. (Inc.), New York City	(C) License, 2 applications. (C) C. P. 1		Do. Do.
June 6	New	Ralph A. Powers and Maynard Smith, Port Huron, Mich.	(B) C. P.	860 kc., 200 w.	Do.
June 12	do	Hilliard Co. (Inc.), Scottsbluff, Nebr.	do	1,210 kc., 1,000 w.	Do.
Do	KTNT	Norman Baker, Muscatine, Iowa	(B) Mod. L.	1,170 kc., from 5,000 to 10,000 or 5,000 w.	Do.

Hearings held by the commission during the period October 1, 1928, to November 1, 1929—Continued

Date of hearing	Call letters	Applicant and location	Nature of application	Power and frequency	Decision (granted or denied)
1929					
June 13	WREC	WREC (Inc.), Memphis, Tenn	(B) Mod. L	600 kc.; 500 w night, 1 kw. day	Granted.
Do	New	The John Brown Schools, Siloam Springs, Ark	(B) C. P	1,140 kc., 250 w	Denied.
June 14	do	C. L. Morris, P. E. Morris, G. E. Wray, O. W. Wray, Almena, Kans.	do	1,420 kc., 50 w	Do.
Do	KGCN	The Concordia Broadcasting Co., Concordia, Kans	(B) Ren. L	do	Do.
Aug. 26, 27	WRUF	University of Florida, Gainesville, Fla. (heard in Florida)	(B) Mod. L	From 1,470 to 560 kc., 5,000 w	Granted.
Sept. 3	WSIS	Sarasota Chamber of Commerce, Sarasota, Fla	(B) Ren. L	1,010 kc., 250 w	Denied.
Do	WSMD	Tom F. Little, Salisbury, Md	do	1,310 kc., 100 w	Do.
Do	KGHD	Elmore-Nash Broadcasting Corporation, Missoula, Mont	do	1,420 kc., 50 w	Do.
Sept. 4	New	Dr. F. P. Cerniglia, Monroe, La	(B) C. P	1,100 kc., 50 w	Do.
Do	do	Harry E. Soxman, Dunbar, Pa	do	1,500 kc., 15 w	Do.
Do	do	Austin-Morris Co., Brownwood, Tex	do	1,460 kc., 100 w	Do.
Sept. 5	KWK	Greater St. Louis Broadcasting Corporation, St. Louis, Mo.	(B) Mod. L	1,350 kc., 5,000 w	Do.
Do	KCRC	Champlin Refining Co., Enid, Okla	(B) C. P	1,190 kc., 5,000 w	Do.
Sept. 12	New	Elgin Motor Inn (Inc.), Elgin, N. Dak	do	1,400 kc., 25 w	Do.
Do	do	Mission Orphans' Home Mission, Dyersburg, Tenn	do	1,210 kc., 50 w	Do.
Sept. 11	do	Norwood's Music Store, Biloxi, Miss	do	1,310 kc., 15 w	Do.
Sept. 17	do	The Ozark Radio Corporation, Sulphur Springs, Ark	do	1,500 kc., 50 w	Denied (order of denial set aside continued to Nov 14, 1929.)
Do	do	A. L. Smith and J. M. Hamilton, Missoula, Mont	do	1,280 kc., 50 w	Denied.
Do	do	Portsmouth Broadcasting Co., Portsmouth, Ohio	do	600 kc., 500 w	Do.
Do	do	Gardner-Hohlfeldt Music Co., Mitchell, S. Dak	do	890 kc., 500 w	Do.
Sept. 19		Elgin National Watch Co., Elgin, Ill	(E) Lic	8,950 kc., 500 w	Granted.
Do		Public Service Electric & Gas Co., Newark, N. J	(E) Ren. L		Denied.
Do	New	Jesse P. Lutz, South Hampton, N. Y	(E) C. P	1,190 kc., 250 w	Do
Sept. 24	WTBO	Cumberland Broadcasting Co., Cumberland, Md	(B) Mod. L	620 kc., 500 w	Do.
Do	KGIR	Symons Broadcasting Co., Butte, Mont	do (B) C. P	950 kc., 500 w 950 kc., 1,000 w	Do. Do.
Sept. 25	KWSC	State College of Washington, Pullman, Wash	do	1,100 kc., 5 kw	Granted.
Do	New	C. V. Hunter, Kennett, Mo	do	1,050 kc., 100 w	Denied.
Oct. 1	do	Oliver L. Ayers, Springfield, Mo	do	1,340 kc., 500 w	Do.
Oct. 1	do	Rev. Lannie W. Stewart, Carterville, Mo	do	do	Do.
Do	do	do	(B) Lic	do	Do.
Oct. 3	KGRC	Eugene J. Roth, San Antonio, Tex	(B) Mod. L	From 1,370 to 600 kc.; from 100 to 500 w. day, 250 w. night.	Do.
Oct. 15		The Chicago Daily News, Chicago, Ill	(F) C. P	2,140 kc., 5 kw	Granted.
Do		do	(A) C. P	5,900 kc., 1 kw	Do.
Do		Atlantic Broadcasting Corporation, New York City	(E) Ren. L	6,120 kc., 5 kw	Do.
Do		do	(A) C. P	6,120, 11,800, and 15,290 kc., 20 kw	Do.

Oct. 22		Pilot Electric Manufacturing Co., Brooklyn, N. Y.	(E) License airplane channels.	250 w.	Denied.
Oct. 23	W3XB	Merril D. Beam, Haddon Heights, N. J.	(E) C. P., for change in location Norberth, Pa., to Haddon Heights, N. J.	100 w.	Do.
Do.	W3XB	do	(E) License variable	100 w., 36,580–2,000 kc.	Do.
Do.		Southern Radio Corporation, New York City	(E) C. P.	23,060, 25,000, 27,500, 30,000 kc., 1 kw.	Granted.
Do.		Ward Leonard Electric Co., Mount Vernon, N. Y.	do	1,604, 2,398, 3,208, 4,795 kc., 250 w.	Do.
Do.		Doble Engineering Co., Medford, Mass.	do	1,500 kc., and 500 w.	Denied.
Oct. 24		Michigan College of Mining and Technology, Houghton, Mich.	do	7,500 kc., 250 w.	Granted.

Cases heard but not decided

Date of hearing	Call letters	Applicant	Power and frequency	Nature of application
1928				
Dec. 11		Northern Seed & Nursery Co., Ipswich, S. Dak	550 kc., 1,000 w	C. P. (B).
1929				
June 6	New	Edward A. and Philip P. Allen, Lynchburg, Va	1,310 kc., 100 w	Do.
Do	do	Clarke Electric Co., Danville, Va	do	Do.
June 11-12-13	WMBI	The Moody Bible Institute Radio Station, Chicago, Ill	From 1,080 to 870 kc., 5,000 w	Mod. L. (B).
June 13	WIBW	Topeka Broadcasting Association (Inc.), Topeka, Kans	From 1,300 to 680 kc.; from 2,500 day and 1,000 night to 5,000 w.	Do.
June 14	KFH	Hotel Lassen, Wichita, Kans	1,300 kc., 1,000 w	Do.
Sept. 4		Wyandotte Trans. Co., Detroit, Mich	750 w	Assignment (C).
Do		Michigan Wireless Telegraph Co., Wyandotte, Mich	do	License (C).
Sept. 10	KMBC	Midland Broadcasting Co., Kansas City, Mo	950 kc.; 2,500 w. day, 1,000 w. night	Mod. L. (B).
Sept. 11	New	Joseph E. McCormack, Gadsden, Ala	1,310 kc., 10 w	C. P. (B).
Do	do	W. J. Beard's Temple of Music, Paragould, Ark	1,200 kc., 100 w	Do.
Oct. 1	do	Ber, Killmer & Bailey, Rayne, La	1,120 kc., 150 w	Do.
Oct. 8		Wilmington Trans. Co., Wilmington, Calif	2,610 kc., 100 w	Ren. L. (C).
Do		Alaska Packers Association, San Francisco, Calif	7,600 kc., 500 w	Lic. (C).
Oct. 16	WQAO	Calvary Baptist Church, New York City	1,010 kc.; 1 kw. day, 500 w. night	Mod. L. (B).
Do	WFBR	The Baltimore Radio Show (Inc.), Baltimore, Md	1,270 kc., 1 kw.; unlimited time	Do.
Do	New	Lynchburg Radio Broadcasting Co., Lynchburg, Va	590 kc., 500 w.; unlimited time	C. P. (B).
Do	KTBR	M. E. Brown, Portland, Oreg	710 kc., 500 w.; from 1,300 kc.; limited time	Mod. L. (B)
Oct. 17	WGBS	General Broadcasting System (Inc.), New York City	From 1,180, 500 w., to 970 kc.; full time	Do.
Do	WOV	International Broadcasting Co., New York City	1,130 kc., 1 kw.; requests change from daylight to full-time operation.	Do.
Do	KFXR	Exchange Avenue Baptist Church, Oklahoma City, Okla	1,230 kc , 500 w.; unlimited time	C. P. (B).
Do	WRNY	Aviation Radio Station, New York City	970 kc., 5,000 w	Do.
Do	do	do	From 1,010 to 970 kc ; from 250 to 5,000 w	Mod. L. (B).
Oct. 29	New	Raymond C. Hammett, Talladega, Ala	1,420 kc., 100 w.; unlimited time	C. P. (B).
Do	WKBZ	K. L. Ashbacker, Ludington, Mich	1,200 kc., 100 w.; from 1,500 to 50 w	Mod. L. (B).
Do	WABY	General Broadcasting Corporation, Philadelphia, Pa	1,310 kc., 50 w	Lic. (B).
Do	do	General Broadcasting Corporation, Philadelphia, Pa. (John Magaldi, jr., to General Broadcasting Co.).	do	Assignment of License (B).
Do	do	John Magaldi, jr., Philadelphia, Pa	do	Ren. L. (B).
Do	WSSH	Tremont Temple Baptist Church, Boston, Mass	1,360 kc., 500 w	C. P. (B).
Do	WMAF	Round Hills Radio Corporation, South Dartmouth, Mass	do	Ren. Lic. (B).
Oct. 30	WFBE	Geo. M. Schott, Louis Schott, Wm. C. Schott, and Peter Miller, d/b as Parkview Hotel, Cincinnati, Ohio.	1,200 kc., 100 w.; unlimited time	Lic. (B).
Do	do	do	1,120 kc., 250 w.; unlimited time	C. P. (B).

B. PRACTICE AND PROCEDURE BEFORE THE COMMISSION

The radio act of 1927 designates four kinds of applications to be passed upon by the commission under the standard of public interest, convenience, or necessity, viz: Applications for construction permits, licenses, renewals of licenses, and modifications of license. In addition, there may be included applications for the commission's consent to assignment of construction permits and licenses.

All applications under the act must be filed with the Department of Commerce. As a matter of practice this is done through the branches of the radio division scattered over the country (divided into nine districts, in each of which a radio supervisor is located). The applications are forwarded to the radio division of the Department of Commerce at Washington which, after making records of them, turns them over to the commission.

Upon receipt by the commission each application is given a file number indicating the zone, the kind of application, and the order in which applications are filed. Thus the file number 1-M-B-111 shows that the application is one for modification of broadcasting license of a station in the first zone.

The first examination of the application is made by the license division for the purpose of finding and eliminating obvious faults or irregularities. Frequently the application will not be upon the proper form, will not be properly executed before a notary public, or questions therein will not be answered. These irregularities are made the subject of correspondence with the applicants, and corrections secured, if possible.

The engineering division next makes its examination and attaches to the file its report and recommendation. In cases where setting for hearing is recommended, it sets forth in full the facts upon which the report is made.

In this connection it may appear that the applicant requests the use of relatively low power on a frequency assigned to high-powered stations. For example, the request may be for 100 watts power on a frequency of 660 kilocycles. This frequency under the commission's General Order No. 40 is designated as a clear channel and assigned to the first zone for stations in excess of 1,000 watts power. Or a station in the first zone may apply for a clear channel assigned to the fifth zone in violation of the commission's regulations. A great many of the applications are from States or zones which already have broadcasting facilities in excess of the allocation prescribed by the Davis amendment. The foregoing presents only examples of difficulties arising with relation to the broadcast band.

The legal division of the commission next receives the application and submits its recommendations.

If setting for hearing is recommended for some legal reason, a full statement of the reasons therefor is prepared and attached to the file.

It may appear that the applicant is not a proper licensee under the provisions of the radio act, such as an alien, a corporation controlled by alien interests, a representative of a foreign government, a person or corporation found guilty of violation of the antimonopoly laws, or a person who has violated the provisions of the radio act or the regulations of the commission. The examination will also cover any matters which tend to show that the granting of the application would not be in the public interest, convenience, or necessity.

Upon recommendation of either of the last-named divisions that the application be set for hearing, the memoranda attached to the file are made the basis of a letter written by the secretary of the commission to the applicant advising him of the reasons for the recommendations, to the end that he may have every opportunity of showing to the commission why those recommendations should not be followed, or may make amendments to the application. This correspondence may result in a further reference to one of the divisions named, or, as in case of failure of the applicant to respond, submission of the application to the commission.

The secretary of the commission is charged with the duty of submitting applications for consideration of the commission. If it be satisfied that public interest, convenience, or necessity would be served thereby, the commission grants the application and orders that the formal authorization thereunder (license or construction permit) be issued.

Failing to make this finding, the commission designates the application for hearing, and a notice is sent to the applicant advising him of the commission's preliminary finding and of the proposed date for a hearing. The applicant is then to notify the commission at least 10 days before the date set whether or not a hearing is desired. Other licensees or applicants who have an interest in the matter or who would be adversely affected by the granting of the application are notified and given an opportunity to be heard and oppose the action. The commission has not only given notice to parties shown by its records to be interested but has given general notice to the public of pending applications and hearings through its press bureau. The fact that practically every application requests the use of a frequency or frequencies already in use by some other licensee makes such procedure expedient.

Should the applicant not give notice to the commission of a desire to be heard, or, having given such notice, fails to appear, an order is entered by the commission denying the application. Otherwise the matter is placed on the hearing docket.

Under present procedure, hearings are conducted before one commissioner and stenographically reported. An applicant appears, either personally or by counsel, and presents his evidence, tending to show that the requested action would be in the public interest, convenience or necessity. The burden of proof is necessarily upon him as the commission is without authority to take any action unless it is satisfied that the standard prescribed by law is met. Other stations which have been notified of the hearing have the privilege of appearing and submitting evidence in opposition to the application and are afforded the opportunity to cross-examine witnesses. Counsel for the commission is present for the purpose of bringing out by cross-examination all relevant matters which should be considered by the commission, regardless of whether such evidence is in favor of or against the applicant. He also presents to the commission any evidence of frequency deviations, violations of the law and regulations, and other matters which should enter into consideration of the application.

Affidavits of relevant facts may be submitted at a hearing under the regulations of the commission, or the case may be submitted entirely upon affidavits.

It has become a regrettable practice for broadcasting stations appearing before the commission to comb their listening public for affidavits, signers of petitions, letters, and telegrams to support their claims. In the opinion of the commission this, in most cases, results only in an encumbrance of the record without particular significance. Even a comparatively unimportant and unpopular station can, by announcements from the station and recourse to the friends of the licensee, make a formidable showing which is usually more indicative of the diligence of the broadcaster than of the popularity of the station.

The commission has followed the practice of other administrative bodies and admits testimony which it considers relevant to the issue even though such evidence might have been rejected in a court of law. When an appeal is taken to the court of appeals under section 16 of the act, an excessive record may be cut down before it is printed, by stipulation of the parties.

The transcript of the hearing is read and carefully considered by each commissioner, and thereafter the commission as a body makes its findings of facts and renders its decision, a formal order being entered thereon. Where the application is granted after hearing, the order directs that the formal authorization be issued, this being subsequently signed by the chairman for the commission. In the case of an application denied after hearing, the applicant is notified by transmitting a copy of the commission's formal order to him.

C. RULES AND REGULATIONS (GENERAL ORDERS)

The commission has from time to time adopted rules and regulations pertaining to the operation of stations, assignment of frequencies, and issuance of licenses, as well as for its own procedure and internal management. These appear in general orders [4] and minutes of the commission and include not only matter which has the character of rules and regulations but also administrative action of miscellaneous nature, such as general extensions of licenses, etc.

There is now in course of preparation a complete set of rules and regulations which will be ready for adoption by the commission some time in November. More immediate action has been delayed because of uncertainty of the continuance of the commission's administrative function, and lack of sufficient funds to cover the cost of printing and distribution.

The general orders [4] of the commission, Nos. 50 to 74, inclusive, issued from October 31, 1928, to October 11, 1929, are here included:

General Order No. 50

October 31, 1928.

Picture and television transmission for general reception by the public will be referred to herein by the commission as picture broadcasting and television broadcasting.

Picture broadcasting and television broadcasting will be permitted (but only upon written application to and formal authority from the commission) on frequencies above 1,500 kilocycles, the exact frequencies or bands of frequencies to be determined by further order of the commission.

Between the date of this order and January 1, 1929, picture broadcasting and television broadcasting will be permitted to a limited extent (but only upon

[4] General Orders Nos. 1 to 15, inclusive, were published in the commission's first annual report while General Orders Nos. 16 to 49, inclusive, were published in the Second Annual Report.

written application to and formal authority from the commission) in the broadcast band between 550 and 1,500 kilocycles, subject, however, to rigid conditions designed to prevent interference with reception from broadcasting stations. Among such conditions will be the following:

1. That the band of frequencies occupied by any such transmission shall be be not wider than 10 kilocycles; and

2. That such picture broadcasting and television broadcasting be limited to periods of not more than one hour per day at a time of the day other than between 6 p. m. and 11 p. m.

The extent to which picture broadcasting and television broadcasting in the broadcast band of frequencies will be permitted to take place after January 1, 1929, if at all, will be determined by later orders of the commission, which will depend on investigation by the commission of the results of permitting such operation with respect to interference and the popularity of such transmission with the general public, and will further depend upon the interpretation which the commission shall be advised is proper of the obligations of the United States under the International Radio Telegraph Convention of 1927, with respect to permitting anything other than telephonic transmission in the broadcast band.

General Order No. 51 [5]

October 31, 1928.

On and after January 1, 1929, no license will be issued for the operation of any radio station (other than ship stations) having a transmitter employing damped wave emissions.

All such stations now operating under authority granted by the Federal Radio Commission, and having transmitters employing damped wave emissions shall discontinue such use and shall replace such transmitters with apparatus employing continuous waves or modulated continuous wave emissions, prior to January 1, 1929. Any licensee who is unable to comply with this order within the period specified because of reasons beyond his control may, upon application and a proper showing to the commission, obtain a reasonable extension of said period.

All radio supervisors are requested to make inspections and reports where necessary to the end that the terms of this order may be strictly complied with.

General Order No. 52

November 26, 1928.

It is ordered that General Order No. 49 heretofore issued by the commission on October 26, 1928, be, and the same is hereby, amended to read as follows:

"All broadcasting stations shall announce clearly and distinctly the character of all mechanical reproductions broadcast by them, the announcement to precede each such program item. In such announcements each phonograph record used, whatever its character, shall be described as a "phonograph record"; each piano player selection used shall be described as played by "mechanical piano player"; every other mechanical reproduction shall be similarly described by the term generally used and understood by the public as meaning such mechanical reproduction:

"*Provided, however,* That where a recording or electrical transcript is made exclusively for broadcasting purposes and is neither offered nor intended to be offered for sale to the public, the words "phonograph record" may be replaced by any phrase which accurately describes such transcription and which is of such a nature as not to deceive or tend to deceive the public as to the character of the reproduction broadcast. Every station taking advantage of this proviso shall keep a record of the phrases actually used by such station and shall communicate such phrases to the commission on request by the commission."

General Order No. 53

November 26, 1928.

Whenever a broadcasting station which, under its license from the commission is permitted to operate both during daytime hours and during evening hours, is, under said license or any modification thereof, permitted to use a greater amount

[5] Amended by General Order No. 70, q. v.

of power during the daytime hours than during the evening hours, the station will not be permitted to use its daytime power after the average time for sunset at the station during any particular month. In no event will such a broadcasting station be permitted to use its authorized daytime power at any time or in such manner as to cause greater heterodyne interference during the daytime than exists during evening operation from the use of the amount of power permitted for such evening operation.

This order supersedes General Order No. 10, which is hereby repealed.

General Order No. 54

December 22, 1928.

It is ordered that all existing licenses covering coastal, point-to-point, experimental, and ship radio transmitting stations, heretofore extended by the commission's General Orders Nos. 1, 3, 26, 39, and 47, be, and the same are hereby, further extended for a period of 31 days to terminate at 3 o'clock a. m., eastern standard time, January 31, 1929. This order, however, is subject to the conditions that it shall not be deemed or construed as a finding or decision by the commission, or as any evidence whatsoever, that the continued use or operation of any of said stations serves, or will serve, public interest, convenience, or necessity, or that public interest, convenience, or necessity would be served by the granting of any pending application for a renewal of any of said licenses; and any licensee subject to this order who continues to use or operate his station during the period covered by this order shall be deemed to have consented to said conditions. The commission reserves the right to change the frequency assignment of any station, the license of which is affected by this order, during the extension herein provided if, in the opinion of the commission, such changes are advisable.

This order is only subject to the following exception:

(1) It shall not apply to any licenses heretofore issued by this commission (as distinguished from licenses issued by the Department of Commerce prior to the establishment of the commission under the radio act of 1927, approved on February 23, 1927), all licenses in such cases to be governed by the terms and conditions of their respective licenses from the commission.

General Order No. 55[6]

December 22, 1928.

The commission, in order to carry out the provisions of the radio act of 1927, having determined that public interest, convenience, or necessity requires the allocation of certain frequencies, within the band of frequencies between 1,500 and 6,000 kilocycles, to those services and classes of stations hereinafter enumerated, hereby enters the following order.

It is ordered:

Paragraph I. That of those frequencies between 1,500 and 6,000 kilocycles, the following are hereby allocated to those services and classes of stations enumerated herein, for assignment to individual stations in conformity with this order:

(*a*) *Mobile services.*—1. Ship stations and coastal stations: The frequencies 1,504, 1,508, 1,512, 1,516, 1,520, 1,524, 1,528, 1,532, 1,536, 1,540, 1,544, 1,548, 1,552, 1,556, 1,560, 1,564, 1,568, 1,572, 1,576, 1,580, 1,584, 1,588, 1,592, 1,596, 1,660, 1,672, 1,684, 1,708, 2,320, 2,332, 2,350, 2,368, 2,380, 2,416, 2,428, 2,446, 2,452, 2,476, 2,482, 2,554, 2,566, 2,584, 2,596, 2,614, 2,626, 2,632, 2,638, 2,644, 2,668, 2,692, 2,728, 2,740, 3,076, 3,106, 3,118, 3,130, 3,142, 3,420, 3,428, 3,436, 4,116, 4,148, 4,172, 4,188, 4,196, 4,755, 4,775, 5,525, 5,555, 5,585, 5,615, 5,645, 5,675.

2. Aircraft and aeronautical stations: The frequencies 1,608, 1,612, 1,616, 1,620, 1,624, 1,628, 1,632, 1,636, 1,640, 1,644, 1,648, 1,656, 1,668, 1,676, 1,688, 2,302, 2,326, 2,344, 2,362, 2,374, 2,392, 2,506, 2,518, 2,524, 2,530, 2,536, 2,542, 2,560, 2,578, 2,590, 2,608, 2,620, 2,650, 2,662, 2,680, 2,698, 2,722, 2,734, 3,070, 3,082, 3,100, 3,112, 3,124, 3,136, 3,148, 3,452, 3,460, 3,468, 3,484, 3,492, 4,108, 4,124, 4,140, 4,164, 4,180, 4,765, 4,785, 5,510, 5,540, 5,570, 5,600, 5,630, 5,660, 5,690.

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[6] Amended by General Order No. 74, q. v.

3. Portable stations: The frequencies 1,600, 1,652, 1,664, 1,680, 1,704, 1,712.

4. Railroad rolling-stock stations and railroad harbor and tug stations: The frequencies 2,410, 2,422, 2,440, 2,458, 2,470.

(*b*) *Fixed services.*—1. Point to point: The frequencies 3,202, 3,208, 3,214, 3,220, 3,226, 3,238, 3,244, 3,250, 4,212, 4,220, 4,228, 4,244, 4,268, 4,276, 4,284, 4,396, 4,405, 4,415, 4,455, 4,465, 4,475, 4,485, 4,495, 4,505, 4,515, 4,535, 4,545, 4,865, 4,875, 4,885, 4,895, 4,905, 5,115, 5,125, 5,135, 5,145, 5,155, 5,165, 5,175, 5,185, 5,195, 5,205, 5,215, 5,225, 5,235, 5,245, 5,255, 5,265, 5,275, 5,285, 5,295, 5,305, 5,405, 5,415, 5,425, 5,435, 5,445, 5,455, 5,465, 5,475, 5,485, 5,720, 5,735, 5,750, 5,765, 5,780, 5,795, 5,900, 5,975, 5,990.

2. Amateur: The band of frequencies between 1,715 and 2,000 kilocycles, inclusive, and that band of frequencies between 3,500 and 4,000 kilocycles, inclusive.

3. Experimental visual broadcasting: The frequencies 2,002 to 2,300, inclusive, and 2,750 to 2,950, inclusive.

4. Experimental: The frequencies 1,604, 2,398, 3,088, 4,795.

The following frequencies allocated to fixed services, point-to-point stations, are to be assigned exclusively to stations devoted to promoting the interests of agriculture in addition to such assignments as may hereafter be made above 6,000 kilocycles.

Frequencies 3,202, 4,244, 5,485.

The following frequencies are reserved for assignment to stations rendering emergency services:

Frequencies 3,208, 3,214, 3,220, 3,226, 3,238, 3,244, 3,250.

PAR. II. No license shall be granted to any applicant for a fixed station, coastal station, or aeronautical station who is unable to satisfy the commission that he can maintain the assigned station frequency with an accuracy of 0.5 per cent or better at all time.

PAR. III. Licensees of fixed, coastal, or aeronautical stations shall obtain and use for tuning and checking the tuning of their transmitters suitable frequency-measuring equipment which shall be accurate within 0.025 per cent on the frequencies on which the transmitter is licensed to operate. Furthermore, such licensees shall, at frequent intervals, take steps to have the frequency-measuring instruments calibrated or compared with the standards made available by the Department of Commerce.

PAR. IV. Licensees must use radio transmitters, the emissions of which, by reason of actual decrement high-speed signaling modulation, spacing waves, harmonics, frequency modulation, key clicks, and mush, do not cause interference detrimental to traffic and programs being carried out on other authorized channels of communications.

GENERAL ORDER NO. 56

JANUARY 14, 1929.

From and after the date hereof and until further order of the commission, neither picture broadcasting nor television broadcasting will be permitted in the broadcast band between 550 and 1,500 kilocycles, except upon written application to and formal authority from the commission, and then only between the hours of 1 a. m., and 6 a. m., local time at the location of the transmitter. The written applications shall be on forms provided for that purpose by the commission.

For the purpose of determining whether picture broadcasting and/or television broadcasting may be permitted in the broadcast band in the future either at all or to a greater extent than above authorized, the commission has determined to hold a hearing for the presentation of evidence as to whether such broadcasting can be accommodated on a 10-kilocycle band of frequencies; whether such transmission will result in undue interference with the broadcasting of other stations; whether there is any general public interest in having such transmission take place in the broadcast band rather than in the high-frequency band, and such other questions as will bear upon the issue of whether permission of such transmission in the broadcast band will serve public interest, convenience, or necessity. This hearing will be held at the office of the commission at Washington, D. C., on February 14, 1929.

General Order No. 57

January 18, 1929.

The Federal Radio Commission hereby postpones the effective date of General Order No. 43, limiting duplicated operation on cleared channels to stations more than 300 miles apart, until March 1, 1929.

General Order No. 58

January 28, 1929.

It is ordered:

(1) That all existing licenses covering coastal, point-to-point, experimental, and ship radio-transmitting stations, heretofore extended by the commission's General Orders, Nos. 1, 3 26, 39, 47, and 54, be, and the same are hereby, further extended for a period of 45 days to terminate at 3 o'clock a. m., eastern standard time, March 16, 1929;

(2) That all licenses of these classes which have expired since December 22, 1928, and upon which renewal applications have been filed but not acted upon by the commission, be, and the same are hereby, extended from expiration date to 3 o'clock a. m., eastern standard time, March 16, 1929.

This order, however, is subject to the conditions that it shall not be deemed or construed as a finding or decision by the commission or as any evidence whatsoever that the continued use or operation of any said stations serves or will serve public interest, convenience, or necessity, or that public interest, convenience, or necessity would be served by the granting of any pending application for a renewal of any of said licenses; and any licensee subject to this order who continues to use or operate his station during the period covered by this order shall be deemed to have consented to said conditions. The commission reserves the right to change the frequency assignment of any station the license of which is affected by this order, during the extension herein provided if, in the opinion of the commission, such changes are advisable.

This order is subject to the following exception:

(1) It shall not apply to any existing licenses heretofore issued by this commission (as distinguished from licenses issued by the Department of Commerce prior to the establishment of the commission under the radio act of 1927, approved on February 23, 1927); all licenses in such cases to be governed by the terms and conditions of their respective licenses from the commission.

General Order No. 59

February 16, 1929.

The Federal Radio Commission hereby further postpones the effective date of General Order No. 43, limiting duplicated operation on cleared channels to stations more than 300 miles apart, 90 days, until June 1, 1929.

General Order No. 60

March 9, 1929.

It is ordered:

That all existing licenses covering coastal, point-to-point, and experimental radio-transmitting stations, heretofore extended by the commission's General Orders, Nos. 3, 26, 39, 47, 54, and 58 be, and the same are hereby, further extended for a period of 75 days to terminate at 3 o'clock a. m., eastern standard time, June 1, 1929.

This order, however, is subject to the conditions that it shall not be deemed or construed as a finding or decision by the commission or as any evidence whatsoever that the continued use or operation of any of said stations serves or will serve public interest, convenience, or necessity, or that public interest, convenience, or necessity would be served by the granting of any pending application for a renewal of any of said licenses; and any licensee subject to this order who continues to use or operate his station during the period covered by this order, shall be deemed to have consented to said conditions. The commission reserves the right to change the frequency assignment of any station, the license of which is affected by this order, during the extension herein provided if in the opinion of the commission such change is advisable.

This order shall not apply to any existing license heretofore issued by this commission (as distinguished from licenses issued by the Department of Commerce prior to the establishment of the commission under the radio act of 1927, approved February 23, 1927); each license in such cases to be governed by its own terms and conditions.

This order shall not apply to any existing license, application for renewal of which shall not have been made to the commission prior to March 16, 1929.

This order shall not apply to any existing license, application for the renewal of which has been denied by the commission.

General Order No. 61

March 23, 1929.

It is ordered that the following regulations will govern the hours of operation of all broadcasting stations where such time of operation may be affected by daylight-saving time:

(1) Where the local time is changed from standard time to daylight-saving time at the location of all the stations sharing time on the same frequency, the hours of operation of all said stations on said frequency shall be understood to have reference to daylight-saving time and not standard time so long as day light-saving time is so observed. This provision shall govern whether the time is changed by provision of law or by the general observance of daylight-saving time by the local business community, and whether the time of operation of said stations is specified in the licenses or is mutually agreed upon between the licensees.

(2) Where the local time is not changed from standard time to daylight-saving time at the location of all the stations sharing time on the same frequency, the hours of operation of all said stations on said frequency shall be understood to have reference to standard time and not daylight-saving time, unless said licensees mutually agree upon a new schedule which shall be effective only while daylight-saving time is observed at the location of some of said stations. This provision shall be effective whether the time of operation of said stations is specified in the licenses or is mutually agreed upon between the licensees.

(3) The time of operation of all broadcasting stations which do not share time with other stations on the same frequency shall be understood to have reference to standard time whether the local time is changed as referred to herein or not, unless and until modification of such licenses with reference to hours of operation is made by the commission. This provision shall be effective where the time of operation of said stations is specifically stated in the licenses.

General Order No. 62

April 5, 1929.

It is ordered:

That in the frequencies exceeding 1,500 kilocycles per second, a channel of radio communication shall be regarded as a band of frequencies, the width of which varies according to its position in the spectrum. The width of these channels increases with the frequency according to the following table:

Frequency (kilocycles)	Channel width (kilocycles)	Frenquency (kilocycles)	Channel width (kilocycles)
1,500–2,198	4	8,210–10,980	20
2,200–3,313	6	10,990–16,405	30
3,316–4,400	8	16,420–21,960	40
4,405–5,490	10	21,980–32,780	60
5,495–8,202.5	15		

Note.—A visual broadcasting channel shall not be more than 100 kilocycles in width.

A commercial telephone channel below 3,313 kilocycles shall be regarded as 6 kilocycles in width.

A relay broadcasting channel between 6,000 and 9,600 kilocycles shall be regarded as 20 kilocycles in width.

In granting licenses, the Federal Radio Commission will specify the frequency in the center of the particular channel licensed to be used, but the licensee may occupy the center frequency and in addition such adjacent frequencies (within

the limit indicated on the above table) as may be permitted by the frequency maintenance tolerance and required by the type of emission the station may be authorized to use, all of which will be specified in the instrument of authorization, Furthermore, the licensee, upon application to the commission, may have the privilege of occupying the whole channel on condition that the emission from the station does not exceed the limits of the channel at any time, and provided that fixed stations shall maintain the constancy of any single emission of a carrier frequency to within 0.05 per cent or better at all times.

Fixed stations shall make full use of the channels that may be assigned them to the end that channels are occupied in the most effective and economical manner, and yet their limits not exceeded. The following uses are recognized and will receive encouragement: High-speed telegraphy, facsimile transmission, telephony, multiplex modulation, polyphase transmission, multiple emission on separate frequencies closely spaced.

In order that channels may be utlized to the fullest extent, licensees who have been granted two different channels for use at two or more stations will be granted the use of these same channels at any of the stations in their own system if such use will not create interference with stations of other systems.

Licensees of fixed stations who, at the expiration of the licenses, can not demonstrate that they are using a channel to the fullest capacity consistent with the average state of the radio art, may be required to either occupy a channel of lesser width or to share the channel on a part-time basis with others.

Licensees of fixed stations who have been granted the use of a channel for communications with specified points, upon application to the commission for license, may be granted the use of the same channel for communications with other points on the condition that the public interest, convenience, and necessity will be served by such a grant.

General Order No. 63

May 15, 1929.

The commission hereby further postpones the effective date of General Order No. 43, limiting duplicated operation on cleared channels to stations more than 300 miles apart, 122 days to October 1, 1929.

General Order No. 64

May 20, 1929.

It is ordered:

All licenses for experimental stations, including experimental relay broadcasting, experimental visual broadcasting, general experimental, and experimental aircraft stations, shall be issued for a period of one year.

It is further ordered:

(1) Experimental stations may be used only for experimental purposes. They are not licensed to conduct message traffic of any kind.

(2) All licensees of experimental stations shall file with the commission reports as to each such station for each quarter of the year, ending March 31, June 30, September 30, and December 31, setting forth the nature of the experiments conducted and the results thereof during the preceding period of three months. These reports shall be mailed in time to reach the commission within 15 days after the end of each quarter.

Each such report shall contain statements of—

(*a*) The specific hours of operation on each frequency during the period reported, together with a duly authenticated copy of the station log for that period.

(*b*) The general results accomplished in said period.

(*c*) The technical studies in progress at the time of filing thereof.

It is also ordered that this general order be made a part of each experimental license hereafter to be issued by the commission, and that failure to comply with this order or any provision contained herein shall be ground for the revocation of any such license.

General Order No. 65

May 27, 1929.

It appearing that the commission has declared a recess from June 15, 1929, to September 3, 1929, for the purpose of permitting the members of the commission to visit the several zones from which they were appointed, and

It further appearing that applications (including applications for construction permits, for licenses, for renewal of licenses, and for modification of licenses) have heretofore been filed, and that similar applications will be filed during the period of said recess, and

It further appearing that certain of said applications may warrant hearing to determine whether public interest, convenience, or necessity will be served by the granting thereof, and that conditions in said zones may also warrant investigation and hearing, now, therefore,

It is ordered that members of the commission be, and they are hereby, authorized both as commissioners and examiners, to travel to, from, and within the zones from which they were appointed for the purpose of making such investigations and conducting such hearings as circumstances may warrant, with full power to taken and report testimony for the consideration of the commission, and

It is further ordered that the general counsel and any assistant he may designate for such purpose be, and they are hereby, authorized both as attorneys and examiners, to travel to, from, and within any of the several zones, for the purpose of assisting or advising members of the commission in connection with the hearings or investigations hereinabove mentioned, or for the purpose of making any investigations which may be necessary in connection with the legal work of the commission, and

It is further ordered that the chief engineer and the secretary be, and they are hereby, authorized, at the request of members of the commission or the general counsel, to designate qualified employees of the commission to assist in the hearings and investigations contemplated in this order, and

It is further ordered that members of the commission and examiners be, and they are hereby, empowered to summon witnesses, administer oaths, and compel the production of books, documents and papers, and

It is further ordered that members of the commission, the general counsel, and employees duly designated to render assistance in the hearings and investigations authorized herein, be, and they are hereby, authorized to incur expenses for travel and for stenographic and clerical assistance which are reasonably necessary to fulfill the purpose of this order, and the secretary is hereby directed to provide such transportation requests and issue such travel orders as may be required for the proper administration of this order.

General Order No. 66 [7]

June 10, 1929.

It is ordered, for the purpose of carrying out the provisions of section 22 of the radio act of 1927, that the following rules and regulations be, and the same are hereby, adopted and promulgated by the Federal Radio Commission.

(1) Each broadcasting station shall give absolute priority to radio communications or signals relating to ships or aircraft in distress and shall cease broadcasting upon such frequencies, and at such times, when such broadcasting may, in any way, interfere with the reception of radio distress signals or traffic relating thereto.

(2) Each broadcasting station, operating on any frequency in any location shall cease transmitting immediately upon notification by any Government or commercial marine station, for the purpose of clearing the air of interference for distress signals or distress traffic.

(3) Stations operating on 550 to 1,000 kilocycles, inclusive, and of the following powers and within the following distances from the seacoast, Great Lakes, or from any commercial or Government radio receiving station engaged in marine communication, shall keep and maintain an effective, continuous watch by a licensed operator, on the frequencies used for distress calls, during the entire period the transmitter of said station is in operation:

[7] In process of revision.

Transmitter powers	Transmitter distances—miles
To and including 5 kilowatts	30
From 5 kilowatts to and including 10 kilowatts	45
From 10 kilowatts to and including 25 kilowatts	70
From 25 kilowatts to and including 50 kilowatts	100

(4) Each station covered by the above ruling shall cease transmitting immediately upon intercepting distress signals or distress traffic and shall remain silent until the distress traffic has been completed, or it is determined that the operation of the station will not interfere with the distress traffic.

(5) No station shall resume operation until the need for distress traffic no longer exists, or it is determined that said station will not interfere with distress traffic as it is then being routed and said station shall again discontinue if the routing of distress traffic is so changed that said station will interfere. The status of distress traffic may be ascertained from time to time by oral or wire line communication with Government and commercial stations.

(6) No two or more broadcasting stations shall maintain a joint or common watch upon frequencies used for distress calls, without first having submitted their plans to and having obtained the express authorization of the commission so to do.

(7) No broadcasting station shall utilize the watch maintained upon the frequencies used for distress calls by a commercial marine station, without first having obtained the express authorization of the commission so to do.

(8) The commission may hereafter require stations not included herein to keep an effective continuous watch.

(9) The commission may hereafter designate stations included herein to be excluded from these regulations.

General Order No. 67

It is ordered:

June 10, 1929.

SUBPŒNAS

(*a*) *By whom issued.*—Subpœnas requiring the attendance of witnesses from any place in the United States at any designated place of hearing, or designated place for taking the deposition of such witness, may be issued by any member of the commission, the secretary of the commission, or by any examiner appointed by the commission.

(*b*) *When issued.*—No subpœna will be issued at the instance of any party to a proceeding before the commission or before an examiner except upon written application therefor timely made.

Any member of the commission or examiner may issue subpœnas on his own motion when necessary.

(*c*) *Application for.*—The application for subpœnas shall state the name and address of each witness required, the time and place at which and the person before whom he is to appear.

(*d*) *Subpœnas duces tecum.*—If evidence other than oral testimony is required, such as documents or written data, the application shall set forth the specific matter to be produced and sufficient facts to indicate that the production of such matters is reasonably necessary to establish the cause of action or defense of the applicant. All applications for subpœnas duces tecum shall be verified by the applicant or his attorney. Any member of the commission or examiner may refuse to issue such subpœnas duces tecum if of the opinion that the production of such documentary or written evidence is unnecessary. The secretary of the commission may issue subpœnas duces tecum only when authorized to do so by a member of the commission or an examiner. Any member of the commission, or any examiner, may issue subpœnas duces tecum on his own motion if he shall deem necessary.

(*e*) *Service.*—The commission will not serve subpœnas, but will leave service to be procured by the party making the application. Service of subpœnas may be made by any citizen of the United States over the age of 21 years and competent to be a witness, and not a party to or in any way interested in the proceeding.

(*f*) *Proof of service.*—Proof of service may be made by affidavit.

General Order No. 68

June 10, 1929.

It is ordered that all construction permits and licenses for relay broadcasting shall be issued on the following conditions:

(1) No station engaged in relay broadcasting shall grant authority to any radio station within the United States to rebroadcast its programs without first obtaining written consent of the commission.

(2) Stations engaged in relay broadcasting shall report at least once each quarter, to wit: March 31, June 30, September 30, December 31 (said reports to be filed within 15 days after the close of such quarter), (*a*) the stations located abroad which are regularly receiving and rebroadcasting the program originated by the licensee, (*b*) the times during which reception abroad is of sufficient intensity and quality to render rebroadcasting practicable, (*c*) the frequencies utilized abroad for reception of said programs, (*d*) the nature and extent of tests conducted abroad where relay broadcasting is carried on only for experimental purposes and not for rebroadcasting.

(3) The conditions in General Order No. 64 relating to experimental service.

General Order No. 69

June 20, 1929.

It is ordered (1) that all existing licenses to broadcast, which by their terms expire at 3 a. m., Eastern standard time, July 31, 1929, are extended from such time until 3 a. m., Eastern standard time, on October 31, 1929, provided (*a*) that this order shall apply only to stations which shall have filed applications for such renewal with the commission, in full and proper form, on or before July 31, 1929, and (*b*) that where any change of status or condition of any station has taken place during the present license period which might be considered by the commission in determining whether the further operation thereof is in the public interest, convenience, and necessity, which change shall come to the attention of the commission after the extension of license herein provided for, the right to set the same aside is specifically reserved, and (*c*) that by special order or minute entry the commission may make this order inapplicable to any specifically named station.

(2) That all existing licenses for stations other than broadcasting stations, as well as construction permits of all classes, which expire at any time from June 15, 1929, to September 10, 1929, both inclusive, are hereby extended until 3 a. m., Eastern standard time, October 1, 1929.

General Order No. 70

September 13, 1929.

It is ordered that General Order No. 51 be amended and enlarged to include he following language:

"At all ship stations using damped waves, the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto."

General Order No. 71

September 18, 1929.

The commission hereby further postpones the effective date of General Order No. 43, limiting duplicated operation on cleared channels to stations more than 300 miles apart, 90 days, to December 31, 1929.

General Order No. 72

September 26, 1929.

It is ordered pending the adoption by the commission of a policy with regard to stations in the Territory of Alaska, all existing licenses and/or special authorizations covering the operation of coastal and point-to-point transmitting stations located in said territory, which, by their terms, expire September 30, 1929, are hereby extended for a period of 31 days, to expire October 31, 1929.

Provided however, That this order shall not be deemed or construed as a finding or decision by the commission or as any evidence whatsoever that the continued use or operation of any such station after October 31, 1929, serves or will serve public interest, convenience, or necessity, or that public interest, convenience, or necessity would be served by the granting of any pending application for license or renewal of license, and the holder of any license or special authorization subject to this order who continues to use or operate any station during the period covered by this order shall be deemed to have consented to such condition.

General Order No. 73

October 10, 1929.

It is ordered that all existing licenses and/or special authorizations covering the operation of coastal and point-to-point transmitting stations located in the Territory of Alaska, heretofore extended by the commission's General Order No. 72, are hereby extended to and will expire December 31, 1929.

Provided, however, That this order shall not be deemed or construed as a finding or decision by the commission or as any evidence whatsoever that the continued use or operation of any such station after December 31, 1929, serves or will serve public interest, convenience, or necessity, or that public interest, convenience, or necessity would be served by the granting of any pending application for license or renewal of license, and the holder of any license or special authorization subject to this order who continues to use or operate any station during the period covered by this order shall be deemed to have consented to such condition.

General Order No. 74

October 11, 1929.

General Order No. 55 is hereby amended to read as follows:

The commission, in order to carry out the provisions of the radio act of 1927, having determined that public interest, convenience, or necessity requires the allocation of certain frequencies, within the band of frequencies between 1,500 and 6,000 kilocycles, to those services and classes of stations hereinafter enumerated, hereby enters the following order.

It is ordered:

Paragraph I.—That of those channels between 1,500 and 6,000 kilocycles, the following are hereby allocated to those services and classes of stations enumerated herein, for assignment to individual stations in conformity with this order. Each channel is specified by its center frequency.

(*a*) *Mobile services.*—1. Ship stations and/or coastal stations: 1,504,[8] 1,508,[8] 1,512,[8] 1,516, 1,520, 1,524, 1,528, 1,532, 1,536, 1,540, 1,548, 1,552, 1,556, 1,560, 1,568, 1,572, 1,576, 1,580, 1,588, 1,592, 1,660, 1,672, 1,684, 1,708, 2,320, 2,332, 2,350, 2,380, 2,428, 2,446, 2,518, 2,524, 2,530, 2,536, 2,542, 2,554, 2,560, 2,566, 2,578, 2,584, 2,590, 2,596, 2,668, 2,692, 2,728, 2,740, 3,112, 3,118, 3,124, 3,130, 3,420, 3,428, 3,436. 5,525, calling only.

2. Ship stations: 5,555, 5,615.

3. Coastal stations: 4,116, 4,148, 4,172, 4,188, 4,196, 4,755, 4,775, 5,675.

4. Mobile press stations: 5,645, east of Mississippi River; 5,585, west of Mississippi River.

5. Reserved for temporary mobile assignments only: 1,544, 1,564, 1,584, 2,368, 2,392, 2,476.

6. Portable stations: 1,600, 1,652, 1,664, 1,680, 1,704.

7. Emergency police: 1,712, 2,416, 2,452.

8. Emergency fire (marine): 1,596.

9. Reserved for special mobile services other than portable: 2,410, 2,422, 2,440, 2,458, 2,470.

10. Aircraft and/or aeronautical stations: 1,608, 1,612, 1,616, 1,620, 1,624, 1.628, 1,632, 1,636, 1,640, 1,644, 1,648, 1,656, 1,668, 1,676, 1,688. 2,302, 2,326, 2,344, 2,362, 2,374, 2,482, 2.506, 2,608, 2,614, 2,620, 2,626, 2,632, 2,638, 2,644, 2,650, 2,662, 2,680, 2,698, 2,722, 2,734, 3,070, 3,076, 3,082, 3,088, 3,100, 3,136, 3,142, 3,148, 3,452, 3,460, 3,468, 3,484, 3,492, 4,108, 4,124, 4,140, 4,164, 4,180, 4,765, 4,785, 5,510, 5,540, 5,570, 5,600, 5,630, 5,660, 5,690.

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[8] To be reserved as interference guard band for broadcasting stations at all locations where the assignment to other services may result in interference with broadcasting stations.

11. Aircraft stations: 3,106, national calling frequency for all transport and itinerant airplanes.

(*b*) *Fixed services.*—1. Point-to-point (shared between United States and Canada): 3.268, 3,274, 3,280, 3,286, 3,298, 3,304, 3,310, 3,316, 3,324, 3,332.

2. Point-to-point (United States exclusive): 4,268, 4,276, 4,284, 4,396, 4,405, 4,415, 4,535, 4,545, 4,555, 4,565, 4,575, 4, 585, 4,595, 4,605, 4,615, 4,625, 4,635, 4,645, 4,655, 4,665, 4,675, 4,685, 4,695, 4,705, 4,715, 4,725, 4,735, 4,745, 4,925, 4,935, 4,945, 4,955, 4,965, 4,975, 4,985, 4,995, 5,005, 5,015, 5,025, 5,035, 5,045, 5,055, 5,065, 5,075, 5,085, 5,095, 5,105, 5,115, 5,125, 5,135, 5,145, 5,155, 5,165, 5,175, 5,185, 5,195, 5,205, 5,215, 5,225, 5,235, 5,245, 5,255, 5,265, 5,275, 5,285, 5,295, 5,305, 5,315, 5,325, 5,335, 5,345, 5,355, 5,855, 5,870, 5,885, 5,900, 5,975, 5,990.

3. General communication channels (other nations priority), provided that such use will not cause interference to services in other North American countries: 2,206, 2,212, 2,218, 2,224, 2,230, 2,236, 2,242, 2,248, 2,254, 2,260, 2,266, 2,272, 2,278, 2,284, 2,290, 2,296, 3,010, 3,016, 3,022, 3,028, 3,034, 3,040, 3,046, 3,052, 3,058, 3,196, 3,202, 3,208, 3,214, 3,220, 3,226, 4,004, 4,212, 4,220, 4,228, 4,324, 4,332, 4,340, 4,348, 4,356, 4,455, 4,465, 4,475, 4,485, 4,495, 4,505, 4,515, 4,805, 4,815, 4,825, 4,835, 4,845, 4,855, 4,865, 4,875, 4,885, 4,895, 4,905, 4,915, 5,375, 5,385, 5,395, 5,405, 5,415, 5,425, 5,435, 5,445, 5,455, 5,465, 5,475, 5,485, 5,495, 5,705, 5,720, 5,735, 5,750, 5,765, 5,780, 5,795, 5,810, 5,825, 5,840.

(*c*) *Special services.*—1. Amateur: The band of frequencies between 1,715 and 2,000 kilocycles, inclusive, and the band of frequencies between 3,504 and 4,000 kilocycles, inclusive.

2. Experimental visual broadcasting: The frequencies 2,000 to 2,200 kilocycles, inclusive, and 2,750 to 2,950 kilocycles, inclusive. The frequencies 2,200 to 2,299 kilocycles, inclusive, provided that such use will not interfere with radio services in other North American countries.

3. General experimental: 1,604, 2,398, 4,795 (assigned to general experimental stations by all North American nations), 3,256 (shared between Canada and United States).

4. The following frequencies are to be assigned exclusively to stations devoted to promoting the interests of agriculture: 3,250 (shared between Canada and the United States), 4,244, 5,365 (United States exclusive channels).

5. The following frequencies are reserved for assignment to stations rendering emergency services: 3,160, 3,166, 3,172, 3,178, 3,184 (shared between United States and Newfoundland), 3,238, 3,244 (shared between United States and Canada).

6. In order to preserve a uniform channeling system, the commission urges upon Government services the desirability of operating upon the nearest standard channel, under the terms of General Order No. 62, to the frequency assigned it by the President, and for this purpose, considers Government services to be operating upon the following frequencies: 1,692, 1,696, 1,700 (2,010 to 2,020, and 2,240 to 2,250 kilocycles shared with visual broadcasting), 2,308, 2,314, 2,338, 2,356, 2,386, 2,404, 2,434, 2,464, 2,488, 2,494, 2,500, 2,512, 2,548, 2,572, 2,602, 2,656, 2,674, 2,686, 2,704, 2,710, 2,716, 2,746 (2,885, 2,915, shared with visual broadcasting), 2,956, 2,962, 2,968, 2,974, 2,980, 2,986, 2,292, 2,998, 3,004, 3,034,[9] 3,034, 3,094, 3,154, 3,190, 3,232, 3,262, 3,292, 3,340, 3,348, 3,356, 3,364, 3,372, 3,380, 3,388, 3,396, 3,404, 3,412, 3,444, 3,476, 3,500 to 4,000, 4,012, 4,020, 4,028, 4,036, 4,044, 4,052, 4,060, 4,068, 4,076, 4,084, 4,092, 4,100, 4,132, 4,156, 4,204, 4,236, 4,252, 4,260, 4,292, 4,300, 4,308, 4,316, 4,364, 4,372, 4,380, 4,388, 4,425, 4,435, 4,445, 4,525, 5,915, 5,930. 5,945, 5,960.

PAR. II.—No license shall be granted to any applicant for a fixed station, coastal station, or aeronautical station, who is unable to satisfy the commission that he can maintain the assigned station frequency with an accuracy of 0.05 per cent or better at all times.

PAR. III.—Licensees of fixed, coastal, or aeronautical stations shall obtain and use for tuning, and checking the tuning of their transmitters, suitable frequency-measuring equipment which shall be accurate within 0.025 per cent on the frequencies on which the transmitter is licensed to operate. The frequency-measuring equipment made available by the Department of Commerce shall be considered as standard for comparing and calibrating frequency-measuring equipment.

PAR. IV.—Licensees must use radio transmitters, the omissions of which, by reason of actual decrement, high-speed signaling modulation, spacing waves,

[9] Shared between Canada and other nations. (See (*b*) 3, above.)

harmonics, frequency modulation, key clicks, and mush, do not cause interference detrimental to traffic and programs being carried out on other authorized channels of communications.

D. REVIEW OF APPLICATION FORMS

The commission has an extensive system of records in the process of development to accommodate the many classes of stations and the several kinds of applications with regard to each class. Since the radio act of 1927 provides for four kinds of applications to be passed upon by the commission and so to be granted or denied under the test of public interest, convenience, or necessity, it has been necessary to evolve a large number of application forms to cover each situation. The enumerated classes are: (1) Applications for construction permits; (2) applications for licenses; (3) applications for renewal of license; (4) applications for modification of license. To these may be added applications for the commission's consent to assignment of construction permits and licenses, and certain variations of the foregoing.

As occasion demands the present application forms are revised to include additional information. Application forms of the following classification are now in use:

Application for radio broadcasting station construction permit.—It is necessary to apply for a permit when authorization is requested for (1) construction of a new station, (2) building an existing station at a new location, (3) changing the maximum power of the transmitter which would require installation of new equipment, (4) installing new equipment which changes the character of the wave emissions.

Application for radio station construction permit (other than broadcasting).—This form is used in all other cases under the same circumstances above.

Application for modification of radio station construction permit.—This form is used in all cases where modification of a construction permit is requested. The application must be filed within sufficient time to allow the commission to take action before it expires; else an application for a new permit must be filed.

Application for consent to involuntary assignment of radio station construction permit.—This form must be filed in cases where the licensee-assignor lacks full legal capacity or where the transfer of ownership has taken place by operation of law.

Application for consent to voluntary assignment of radio station construction permit.—This is the proper form where the assigner having legal capacity to assign, does so subject to the consent of the commission.

Application for consent to involuntary assignment of radio station license.—This application is filed under the same conditions mentioned above for involuntary assignment of a permit. Moreover, it must be filed so as to be acted upon before the expiration date of the license.

Application for consent to voluntary assignment of radio-station license.—This form is used where the assignor, subject to the consent of the commission, desires to assign a license and has full legal capacity to do so.

Application for radio broadcasting station license.—This form is used subsequent to the granting of a permit and should be filled out in conformity with the terms of the permit. This form is not used for renewal of an existing station license.

Application for modification of radio-station license.—Where a modification of any of the terms of a radio-station license is desired, this application must be filed within sufficient time to be acted upon prior to the expiration date of the license.

Application for renewal of radio broadcasting station license.—This form is used when renewal of an existing broadcasting license is desired.

Application for renewal of radio-station license.—This form is used for the renewal of any existing radio-station license except broadcasting, mobile and amateur.

Application for aircraft radio-station license.—This application should be filed in applying for an original or renewal license to operate a radio station on board any type of aircraft but not for ground aeronautical stations.

Application for amateur radio-station license.—This form is used both for original and renewal licenses.

Application for radio-station license.—This form is used in applying for a license to operate any station other than broadcasting, mobile and amateur. It should be filed following the issuance of the construction permit and should be in conformity with the permit. This form is not used for the renewal of a station license.

Application for ship radio-station license.—This form is used for either where original or renewal license is desired.

Application for authorization to install automatic frequency control.—This form is filed whether such apparatus is to be installed at the time station is constructed or afterwards, and whether it is built in as a part of the transmitter or as an adjunct thereto.

Supplemental applications.—These contain information supplementing the original application and identifying any additional apparatus which may be installed.

Application for special authorization to engage in television and picture broadcasting.—This form is used by the licensee of a broadcasting station when he wishes to engage in television or picture broadcasting.

V. LITIGATION

During the past year there were 25 cases arising under the provisions of the radio act of 1927 in which the commission was interested. Of this number, 20 were appeals to the Court of Appeals of the District of Columbia.

These appeals are taken in the name of the complaining party as appellant and name the Federal Radio Commission appellee. Since this commission is really not a party to the appeal, but appears in an impartial capacity, an attempt has been made to have appeals docketed with the court under a title such In re application of John Doe, instead of John Doe *v.* Federal Radio Commission, but so far without success.

Under section 16 of the radio act of 1927, appeals originate when papers are filed in the Court of Appeals of the District of Columbia giving reasons for taking the appeal and stating the decision appealed from. After a certified copy of the "Notice and Reasons for Appeal" is served on the commission, it has 20 days in which to file the originals or certified copies of all papers and evidence presented to it upon the original and subsequent applications of the appellant and at the hearing upon said application. The commission also files its statement of facts and grounds for decision which is the statutory means of bringing before the court pertinent facts necessary for a review of the case. After these preliminaries are disposed of, the general counsel prepares for argument or other disposition of the case.

The first five cases arising under the radio act of 1927 were:

No. 4614. International Broadcasting *v.* Federal Radio Commission, filed June 15, 1927.

No. 4619. Peoples Pulpit Association *v.* Federal Radio Commission, filed July 12, 1927.

No. 4674. Harold E. Smith *v.* Federal Radio Commission, filed November 27, 1927.

No. 4828. International Quotations Company *v.* Federal Radio Commission, filed August 6, 1928, and

No. 4832. Bull Insular Lines *v.* Federal Radio Commission, filed August 14, 1928.

The first three of the foregoing were appeals to the Court of Appeals of the District of Columbia from denials by the commission of applications for modification of station licenses; the last two were appeals to that court from denials of the commission of applications for high-frequency assignments. The statements of the commission setting forth facts and grounds for decision upon which its action was based in the two last-mentioned cases, were printed in Appendix L (10) and (11) of the commission's report for 1928. All five cases were either dismissed or withdrawn by the appellants at various stages of the proceedings before decision by the court.

There were three cases instituted in the District Court of the United States for the Northern District of Illinois. Two of these, Clinton

R. White (station WCRW) *v.* Johnson, U. S. Attorney, et al, and Emil Denemark (Inc.) (station WEDC) *v.* Johnson, U. S. Attorney, et al, were suits to enjoin the United States and others from enforcing the penal provisions of the radio act on the ground of alleged unconstitutionality. The cases were heard together on motions for preliminary injunctions. Decision on these motions was rendered in favor of the Government in both cases. Some important holdings are noted in the decision. (29 F. (2d) 113.)

The regulation of radio communication is a valid exercise of the power of Congress under the commerce clause; the radio act is not invalid, in whole or in part, by reason of indefiniteness of the standard of public interest, convenience, or necessity, prescribed by the Congress for the guidance of the commission in issuing licenses; the act of February 23, 1927, is not invalid, in whole or in part, by reason of the requirement that an applicant for a license shall sign a waiver of any claim to the use of any particular frequency or wave length or of the ether, as against the regulatory power of the United States, because of the previous use of the same, whether by license or otherwise; the construction of plaintiffs' plant and its operation under the licenses obtained prior to the act of February 23, 1927, did not create property rights which may be asserted against the regulatory power of the United States, if that power is properly exercised; the question as to whether the commission acted correctly and with due process in its decision could not be attacked in such a manner in view of the provisions of the act for appeal from decisions of the commission to the Court of Appeals of the District of Columbia.

In the White case an appeal has been taken from the interlocutory order to the Circuit Court of Appeals of the Seventh District where the case is now pending. The court indicated in oral argument that it was inclined to certify the case to the United States Supreme Court.

The third case, United States *v.* American Bond and Mortgage Company, was a suit in the District Court of the United States, Northern District of Illinois, to enjoin threatened violation of the radio act by operation of a station without a license. Here, the commission had denied the application of this station for renewal of license. The owner of the station thereafter openly announced its intention to broadcast without a license. Suit was brought by the Attorney General of the United States to restrain this operation. The decision in this case is reported at 31 F. (2d), page 448. It holds, among other things, that regulation of radio broadcasting is a valid exercise of power under the commerce clause of the Constitution; that radio broadcasting is interstate commerce and that there is no property right in a license to broadcast as against the regulatory power of the United States.

The first station to appeal after General Order No. 32 became effective was station WTRL at Midland Park, N. J.[10] The commission denied an application for renewal of license on the ground that its operation was not in the public interest, convenience, or necessity. Station WTRL was a "local" station, using 100 watts power. In its appeal it contended that a station using 100 watts or less is not operating in interstate commerce. It is also contended that the action of the commission resulted in confiscation of property in violation of the fifth amendment, and that the commission abused its discretion and failed properly to apply the standard of public interest, convenience, or necessity. This case was argued in the Court of

[10] Extracts from the Statements of Fact and Grounds for Decision in this and other appealed cases are found at pages 31 to 43.

Appeals of the District of Columbia and a decision rendered November 4, 1929, in which the court said:

It is argued on behalf of the commission that this appeal presents a moot question because of the fact that the commission may not issue a license for a longer period than six months,[11] and that if the commission had issued the renewal license which appellant applied for, such license would long since have expired according to its own terms. It is argued that since the period for which the license might have been issued has expired, this appeal has become moot and should be dismissed. We do not agree with this contention. Such an interpretation of the act would practically nullify the right of appeal granted by Congress in such cases, for it is rarely possible for a station to secure a decision upon such an appeal within three months after the right of appeal accrues. This fact was, of course, well known to Congress when the statute was enacted. Moreover, the relief sought by an appellant for renewal is not limited to the use of a license for three months only but includes a continuing right to apply thereafter at proper times for successive renewals thereof. The statutory appeal accordingly contemplates the restoration to the appellant, if his claim be sustained, of the continuing right to make such application to the commission as he would have enjoyed had his application first been allowed. We feel justified, therefore, in entertaining the appeal. (Southern Pacific Terminal Company *v.* Interstate Commerce Commission, 219 U. S. 498.)

The appellant complains that it was not given lawful notice of the charges made against the station, nor of the time and place of the hearings to be held by the commission. This complaint is answered by the fact that appellant actually appeared by counsel at all of the hearings, and submitted evidence and otherwise participated therein.

Appellant contends that the decision of the commission is null and void for the reason as alleged that the statute requires all of the five commissioners to participate in such hearings and decisions, whereas in this case one of the commissioners failed to take any part in the proceedings. This objection is met by the fact that the absent commissioner was charged with prejudice by appellant, and thereupon retired from the hearings with appellant's express consent and approval. The remaining four commissioners were lawfully empowered to proceed with the hearings and enter a decision in the case. (See 32 Cyc. 1407, title "Quorum.") Moreover, appellant can not be heard in this court to challenge proceedings which were taken by the commission with appellant's consent. * * *

At the hearing before the commission testimony was tendered both for and against the station in the form of voluntary unverified written statements of persons not called as witnesses and also of merely verbal statements of like persons made in the presence of Government officials, all relative to the service or lack of service rendered to the public by the station. The commission ruled that such statements, whether written or oral, would not be accepted as evidence of the facts stated therein. We find no error in this ruling. On the other hand, we think that the commission has the authority, under reasonable regulations, to depart from the strict jury-trial rules of evidence which are applicable to court proceedings. (See I Wigmore on Evidence, sec. 4a.)

Appellant also contends that the commission lacked constitutional authority "to order the station off the air," and that its refusal to renew the station's license amounts to a taking of property without compensation, and without due process of law.

We can not agree with this contention. Under the commerce clause of the Constitution (art. 1, sec. 8, clause 3), Congress has power to regulate interstate commerce, and radio communication in general falls within this classification. (Whitehurst *v.* Grimes, 21 F. (2d) 787; 35 Op. Attorney General, 126; White *v.* Federal Radio Commission, 29 F. (2d) 113; United States *v.* American Bond & Mortgage Company, 31 F. (2d) 448; Davis, Law of Radio Communication, p. 29.) It may be questioned whether radio broadcasting can in any case be so restricted in practice as to be wholly intrastate in character. It is clear, however, that the broadcasting service of WTRL can not be exclusively intrastate for its location is such that its electric waves may cross State lines, and may also interfere with the reception of radio communications from other States. The present application filed by the station for a Federal broadcasting license is an implied admission of this fact.

[11] Three months.

In the radio act of 1927 (sec. 11) Congress vested the Federal Radio Commission with authority to examine the applications for station licenses, or for the renewal or modification of such licenses and to grant or refuse the same as the public interest, convenience, or necessity may require. A hearing upon notice and an appeal to this court are allowed in case of a refusal. The validity of a refusal may also finally be tried upon proper issues in other forums. The appellant, therefore, is not denied due process of law.

Moreover, under the radio act of 1927, the only property right which was acquired by appellant in the use of the ether as a medium of communication was such as was granted to it by the terms of its license and was subject to the conditions contained therein relative to power, frequency, the time for which the license was granted, and also the provisions governing the renewal thereof. It may be added that the authority of Congress to regulate radio communication as a species of interstate commerce necessarily implies the right of reasonable regulation to control in the public interest the number, the location, and activities of broadcasting stations of the country as an integral system, and such control must necessarily at times involve the right of reasonable restriction and pro tanto prohibition. (Davis, Law of Radio Communication, 71.)

Appellant also contends that the decision of the commission is contrary to the evidence, and that it is manifest from the testimony that the station WTRL, "served public interest, convenience, and necessity of Bergen County, N. J."

On this issue the burden is upon appellant, and this court should sustain the commission's findings of fact unless they are shown by the record to be manifestly against the evidence. * * * The real substantial object sought by appellant in this controversy is not to secure a renewal of the present license but a modification of its terms whereby the station will be allowed greater power and a better wave length, with a right of removal to some other location. That question, however, is not now before this court and can not be decided upon the present record. In the case actually before us we must hold that the commission was justified in its decision that a renewal of the present station's license would not serve the public interest, convenience or necessity, and its decision to that effect is affirmed with costs, including the cost of printing.

This was followed by an appeal of the General Electric Co. operating station WGY at Schenectady, N. Y. Preliminary to taking the appeal, station WGY had applied to the court of appeals for an order to stay execution of the commission's decision, and this was granted. Continuing to operate under this order, an appeal was taken from the regulation of the commission, which in effect resulted in reducing the number of hours of operation of station WGY. The court of appeals decided this case February 25, 1929, holding: (1) Granting a license with hours of operation other than those requested in the application was a denial thereof; (2) Congress has power, under the commerce clause, to provide for the reasonable regulation of the use and operation of radio stations in the United States and to establish agencies, such as the Federal Radio Commission, to give effect to that authority; (3) the commission's refusal to renew WGY's license except as modified was unreasonable and not in the public interest, convenience, or necessity; (4) another important holding in the case deals with the nature and extent of the court's jurisdiction. The commission contended that the court's jurisdiction was judicial in nature and confined to correcting arbitrary action. Although this contention was not passed upon in the opinion, it may be considered as having been overruled, since the court exercised a broad administrative review of the commission's decision; (5) the court holds incidentally that there is no property right in a license. (See 31 Fed. (2d) 630.)

The commission made application for a writ of certiorari and prohibition and/or mandamus to the Supreme Court of the United States in this case. On October 14, 1929, the writ of certiorari was granted and argument will probably be held thereon in December.

Thereafter there were 18 appeals filed in the Court of Appeals of the District of Columbia, 9 of which are now pending. The appeal of the Southwestern Sales Corporation (station KVOO) was withdrawn shortly after the commission filed its Statement of Facts and Grounds for Decision. The appeal of the Head of the Lakes Broadcasting Co. (station WEBC) was dismissed on motion of the appellant on October 7, 1929. The appeal of Norman Baker (station KTNT) was dismissed October 29, 1928, as was the appeal of Chicago Federation of Labor (station WFL, case No. 4989) on October 21, 1927.

All of these appeals present a variety of important and interesting questions. Several cases stress the fact that the application proceeds from a State which is under or over its mathematical quota of broadcasting facilities. The weight to be given to priority of one station over another still remains undetermined judicially. Other questions involve the comparative rights of a commercial station giving programs of interest to the general public and of a station representing some particular school, church, or political organization; the relevancy and materiality of a station's programs and financial standing in a controversy between several broadcasting stations; the weight to be given to letters, telegrams, petitions, and affidavits commending or condemning a station or its programs. Whether the excessive use of ordinary phonograph records, the irregularity of schedules and the use of slanderous language may be considered on application for a renewal license are also questions directly or indirectly to be decided in these appeals.

These cases may be summarized briefly as follows:

No. 4898, City of New York *v.* Federal Radio Commission (station WNYC), appeal from denial of application for modification of license. This appeal raises practically the same general questions as those in the WGY appeal. In addition, the right of a municipality to have preference over other stations because of alleged governmental functions is also in controversy. Argument for both the appellant and the commission was had on October 9, 1929, and decision of the court was rendered November 4, 1929.

In that case, the court held:

> In our opinion the interstate broadcasting of radio communications is a species of interstate commerce, and as such is subject to Federal regulation. (Whitehurst *v.* Grimes, 21 F. (2d) 787; United States *v.* American Bond & Mortgage Company, 31 F. (2d) 448; General Electric Company *v.* Federal Radio Commission, 31 F. (2d) 630; Davis, Law of Radio, 71. In the exercise of this authority Congress has imposed upon the Federal Radio Commission the duty of classifying radio stations, of assigning bands of frequency to the various classes of stations and for each individual station, and of determining the power which each station shall use and the time during which it may operate. (Section 4 (a) and (e), radio act of 1927.) It is manifest that in the performance of this duty the commission must at times limit the operation of some of the stations in the public interest. The appellant's rights, like those of other stations, are made subject to this authority by the statute, and also by the express terms of the license.
>
> Appellant contends that the commission lacks authority to prohibit the full-time operation of station WNYC because appellant is a municipal corporation and the operation of the station is a governmental function.
>
> This contention can not be sustained. It is true that appellant is a municipal corporation, but in the operation of its radio station it exercises private, not governmental, powers, and accordingly is not acting as a municipal corporation but as a corporate legal individual. Vilas *v.* Manile, 220 U. S. 345, 346; 43 C. J. 182, 183. Moreover, even if station WNYC is partly used for governmental purposes, the use is, nevertheless, subject to the regulatory control exercised over the national broadcasting system which is vested by statute in the Federal

Radio Commission. (Brennan *v.* Titusville, 153, U. S. 269; Illinois Central Railroad Company *v.* Illinois, 163 U. S. 142; Atlantic Coast Line *v.* Wharton, 207 U. S. 328; Kansas City Southern Railway Company *v.* Kaw Valley Drainage District, 233 U. S. 75.)

Appellant contends that the order appealed from is arbitrary and unreasonable, and that the rules and procedure of the commission pursuant to which the order was made are likewise arbitrary and unreasonable, and in violation of the Federal radio act. We shall not undertake herein to discuss the voluminous testimony which was heard by the commission. We content ourselves with saying that in our opinion the decision in question is sustained by the evidence and is reasonable and just. The commission found that under the revised allocation of stations it was impracticable to grant the application of station WNYC for full operating time without the complete elimination of station WMCA. The latter station serves the same public as the former, and has won the public esteem by the high character of its service. It is believed that the stations may without substantial prejudice severally continue their public service under the present arrangement.

We find furthermore that the procedure pursued by the commission in hearing appellant's application was fully authorized by the statute and are also convinced that the record sufficiently covers the issue herein, and that no additional testimony need be heard.

Appellant presents other complaints against the decision of the commission, and we have considered them. But upon consideration of the entire record we are convinced that the decision should be, and it is, affirmed with costs.

No. 4899, C. L. Carrell *v.* Federal Radio Commission was an appeal from denial of application for renewal of station licenses. In this appeal the validity of General Order No. 30, abolishing portable broadcasting stations, was questioned. Applicant appealed on the ground that the action of the commission results in confiscation of property contrary to the provisions of the fifth amendment and on further ground that the commission failed in its administrative duty to provide for portables in determining its allocation of broadcasting stations. It further alleged a failure on the part of the commission to apply properly the standard of public interest, convenience, or necessity. The court gave its decision in this case on November 4, 1929, holding, in part, as follows:

It may be stated at once that no complaint is made as to the conduct of appellant in the operation of the stations now in question. The ruling of the commission relates to all portable stations alike and this appeal challenges the authority of the commission to make and enforce its rule against the licensing of portable broadcasting stations as a class.

It is contended on behalf of the commission that the licensing of portable broadcasting stations is not in the public interest, convenience, or necessity; that the Davis amendment to the radio act of 1927 (45 Stat. 373) contemplates fixed allocation of broadcasting stations, and its mandate can not be carried out if roving transmitters are allowed to operate; that under the allocation of the stations as at present established the operation of migratory transmitters would result in harmful interference; that the difficulties of supervision of portable stations rendered it against public interest to license them; and that to permit portable broadcasting stations to rove at will over a portion of the country on any one broadcasting channel would deprive the public of the service of that channel to its full capacity.

We think that the commission acted within its authority when dealing with portable stations as a class, under the provisions of section 4 of the radio act of 1927. * * *

We think also that the objections urged against the licensing of portable stations as a class are fully sustained by the evidence. Moreover, it is within common knowledge that if portable transmitters were licensed to rove over the country at the will of the licensee, great inconvenience would result because of interference with established stations, and the difficulty of supervising the broadcasting service as a whole would be greatly increased. It is obvious that these inconveniences need not be incurred at the present state of the art since adequate service may be expected from stations having fixed allocations, and the development of broadcasting in this country has tended exclusively toward localized stations.

No. 4900, Great Lakes Broadcasting Company *v.* Federal Radio Commission (station WENR); No. 4901, Wilbur Glenn Boliva *v.* Federal Radio Commission (station WCBD); No. 4902, Agricultural Broadcasting Company *v.* Federal Radio Commission (station WLS). These three appeals are from decisions of the commission denying applications for modification of licenses, the pleading in each case setting forth that the applicant has been deprived of property rights and the violation of the fifth amendment by action of the commission; also that the commission's action is unreasonable and arbitrary. These stations all applied for time on the same frequency and the commission was for the first time faced with a proper occasion for committing to written form the broad underlying principles which, in its opinion, must control its decision on controversies arising between broadcasting stations in their competition for favorable assignments on the limited number of channels available. This the commission attempted to do in its Statement of Facts and Grounds for Decision, filed with the Court of Appeals quoted from above on pages 32 to 35. Briefs were filed and oral argument had October 8, 1929.

No. 4925, Richmond Development Corporation *v.* Federal Radio Commission (Station WRBC) was an appeal from a decision denying, on rehearing, an application for a third extension of a construction permit authorizing the Richmond Development Corporation to construct a station at Roanoke, Va. In this appeal the validity of a 2-to-2 decision was attacked. The commission contended that its tie vote was one to determine whether it would reconsider and rescind its former action, and that to reconsider and rescind would be affirmative action requiring a majority vote of the commission; that since the vote was a tie the application to rescind its former action failed. Appellant contended that the commission's tie vote was one which attempted to deny its application for a third extension of its construction permit. Another question involved in this appeal was whether the causes of delay in completing the construction of applicant's station within the time set forth in the construction permit were within the appellant's control. The court rendered a decision in this case on November 4, 1929.

The opinion holds:

> We are convinced by a review of the record that it was the duty of the commission to grant the application. The evidence, without substantial contradiction, discloses that the appellant had acted not only in good fatih but also with diligence in its efforts to construct the station within the time allowed by the permit, and that the completion thereof was prevented by causes not under its control.
>
> If appellant is denied the privilege of completing the station it will suffer a heavy loss in consequence. On the other hand, it can not be contended that the public interests have suffered any loss or prejudice by reason of the delay in the completion of the station; and if allowed to proceed with the construction appellant agrees "to make every human effort to push it through to the earliest possible completion." Furthermore, in our opinion, the record disclosed no cause or circumstance arising or first coming to the knowledge of the commission since the granting of the permit which would make the operation of the station against the public interest. It is manifest that the opposition to appellant's application is largely based upon the claim that when the construction permit was first granted there already was an efficient broadcasting station in Roanoke, and that there was no public need for another station; also that the erection of a second station in Roanoke would tend to deprive other cities in Virginia of their just and equal rights in broadcasting. This argument, however, is answered by the fact that

all these conditions were well known to the commission and must have been considered by that body when it granted the construction permit and the extensions thereof. Consequently, they do not constitute a "cause or circumstance arising or first coming to the knowledge of the licensing authority since the granting of the permit." With reference to the alleged injustice which may result to other cities from the operation of this station, if completed, it may be noted that prior to the date of appellant's permit the competing Roanoke station was not using all of its time and when the commission made an allocation on September 1, 1928, it provided that the two stations should share time. This allocation was rescinded when it came to the attention of the commission that appellant's station had not been completed within the prescribed time. But it does not appear that such allocation can not be made without injustice to other cities, if the station should hereafter be completed.

It is therefore, the decision of this court that the appellant was, on September 1, 1928, and still is, entitled to an extension of time reasonably sufficient to enable it to complete the construction of the broadcasting station in question. The decision appealed from is reversed and this cause is remanded to the Federal Radio Commission to carry the present decision into effect.

No. 4972, Chicago Federation of Labor *v.* Federal Radio Commission (station WCFL) is an appeal from the denial of an application for modification of license. Besides the questions raised in other cases this appeal raises the question whether it is in the public interest, convenience, or necessity to give a cleared channel to an organization, body, or association to broadcast social doctrines of the owners.

No. 4976, Head-of-the-Lakes Broadcasting Company *v.* Federal Radio Commission (station WEBC) was an appeal from a denial of an application for modification of station license. It was dismissed on motion of appellant.

No. 5003, Southwestern Sales Corporation *v.* Federal Radio Commission (station KVOO) was an appeal from a denial of an application for modification of station license. This appeal has been voluntarily withdrawn by the appellant.

No. 5004, Norman Baker *v.* Federal Radio Commission (station KTNT) was an appeal from a denial of an application for modification of station license. It was dismissed on motion of appellant.

Two of the remaining eight appeals are by private corporations from the commission's denial of applications for licenses to use short-wave frequencies for private point-to-point communication. These are No. 4984, By-Products Coal Company *v.* Federal Radio Commission, and No. 4985, J. P. Burton Coal Company *v.* Federal Radio Commission, and involve the question of the application of the standard of public interest, convenience, or necessity to private communications companies. A motion to dismiss these two appeals has been filed by the commission on the ground that they were not taken within the time allowed by section 16 of the radio act of 1927.

The remaining six appeals are by communication companies seeking short-wave assignments for public point to point communication. These are: No. 4987, Intercity Radiotelegraph Company *v.* Federal Radio Commission; No. 4988, Wireless Telegraph and Communication Company *v.* Federal Radio Commission; Chicago Federation of Labor *v.* Federal Radio Commission (dismissed); No. 4990, Radio Corporation of America *v.* Federal Radio Commission; No. 4991, Mackay Radio and Telegraph Company *v.* Federal Radio Commission; No. 5005, Universal Service Wireless Company *v.* Federal Radio Commission. These appeals involve such questions as the following:

Whether an established communications company has rights superior to those of a newcomer in the assignment of additional channels; to what extent the policy of establishing competition in point to point communication must be followed; whether press messages are entitled to special recognition over the ordinary commercial messages to the extent of reserving channels for the press; what effect is to be given the fact that available channels are all disposed of, and many incidental questions involving the financial resources and technical equipment of appellants.[12]

A petition for a "stay order" has been filed in these cases, appellants relying on the decisions of the court in the WGY case and, which, if issued as requested, would effectually prevent use of any of the channels pending final judgment by the court. Motions to dismiss these petitions have been filed by the commission on the theory that the court of appeals is without jurisdiction to issue such a writ.

In addition to the foregoing, two suits have been instituted in the Supreme Court of the District of Columbia. Both were injunction proceedings. The first, San Angelo Broadcasting Company *v.* I. E. Robinson, E. O. Sykes, Sam Pickard, H. A. Lafount, and O. H. Caldwell, constituting the Federal Radio Commission, Equity No. 29000, was dismissed by plaintiff without prejudice. The second was National Radio Press Association *v.* Federal Radio Commission, and the individual commissioners, Equity No. 94524. In this case Judge Bailey denied the application for an injunction and rendered the following opinion:

> The commission has reserved 20 frequencies for general press service for intercontinental use, without allotting any particular frequency to anyone. Apart from any other question I do not think that the plaintiff is a "press" association, despite its name, nor do I think that the commission is under any obligation to reopen its hearings whenever a corporation, which has just come into existence, applies to it for that purpose.
>
> The allocations to be made by the commission are for a year only; the parties have a right to appeal from any erroneous action of that body, no irreparable injury will be done to the plaintiff that would justify the court in interfering with the action of the commission.
>
> The application for a temporary injunction will be denied.

[12] Extended quotations from the commission's statements in these cases are found at pp. 31 to 43.

VI. MISCELLANEOUS

A.-INTERNATIONAL PROBLEMS

There are already many interesting questions of an international nature raised in the field of radio communication. While several treaties and conferences have dealt with this subject, none have been of very great significance until the signing of the most recent general treaty which resulted from the Washington conference of 1927.

The United States was a signatory to this treaty. No attempt was made therein to allocate channels to the various nations of the world. It was confined merely to an obligation to avoid interference and divided up the entire spectrum of frequencies into bands to be devoted to the various kinds of service.

Negotiations were next entered into with the North American governments concerning the use of frequencies in the so-called continental band (between 1,500 and 6,000 kilocycles). As a result of these negotiations a conference was held at Ottawa, Canada, beginning January 21, 1929, and an arrangement was made allocating the short-wave channels on the North American Continent. The governments thereby agreed not to assign to stations within their respective jurisdictions any general communication channels that may be allocated to other governments unless it could be accomplished without causing interference. Each government, however, retained the right to assign such channels to any radio station within its jurisdiction upon the sole condition that no interference with any service of another country will result therefrom.

At present there is only an informal "gentlemen's agreement" between the United States and Canada covering the broadcast band, discussed elsewhere in this report.

The representatives of European nations met for the consideration of their problems in the broadcast and continental high-frequency bands at Prague in April, 1929. This meeting was also attended by representatives of the United States who were present merely as observers. The result of this conference was an assignment of frequencies to European broadcasting stations known as the Prague plan which became effective on June 30, 1929.

The American delegation spoke of the encouragement given to amateurs in the United States and explained its reasons for opposing the extension of broadcasting to high frequencies where there would be encroachment on amateur radio operation. This problem, together with many others, was presented to the International Radio Consulting Committee at The Hague with the prospect of having a solution worked out for presentation to the conference.

The first meeting of the International Technical Consulting Committee on Radio Communication was held at The Hague September 18 to October 2, 1929. The official United States delegation of tech-

nical experts was headed by Maj. Gen. Charles McK. Saltzman, a member of the Federal Radio Commission. Numerous proposals were submitted to the conference for the improvement of international radio conditions and in each instance the action taken was satisfactory to the United States. The American delegation achieved signal success in its efforts to fix standards of engineering practice in the use of wave lengths having international effect. The action of the conference with respect to proposed restrictions limiting the activities of amateurs was of great interest to the United States because of the large number of amateurs in this country. It is very gratifying to report that the status of amateurs in the United States would not be changed by any recommendations of the conference. The final report of the American delegation showing the results of the conference will probably not be available before the end of this year.

The consideration and solution of the international problems of radio is of primary importance to all nations of the world. Until they are solved the internal regulations of these countries can not achieve a status of satisfactory stability. The United States having acquired an acknowledged leadership among the family of nations in matters of radio communication and being far in advance of other nations in the use of radio, must undoubtedly play a prominent part in the satisfactory settlement of these problems.

B. SUMMARY AND DISPOSITION OF APPLICATIONS RECEIVED (YEAR ENDING JULY 1, 1929)

Applications received	Total			Granted without hearing			Heard by commission			Denied after hearing or applicant's default			Granted after hearing		
	Construction permits	Licenses	Renewals [1]	Construction permits	Licenses	Renewals [1]	Construction permits	Licenses	Renewals [1]	Construction permits	Licenses	Renewals [1]	Construction permits	Licenses	Renewals [1]
FIXED SERVICE															
Broadcasting [2]	601	601	1,894	312	231	1,860	47	52	145	240	78	39	6	16	108
Point to point (domestic)	204	193	18	146	166	13	215	22	16	144	38	22	171	5	3
Point to point (international)	131	18	92	45	89	105	137	16	1	137	16	0	0	0	1
MOBILE SERVICE															
Ships		1,426	824		1,426	598		0	0		0	0		0	0
Marine relay	0	9	0	0	9	0	0	0	0	0	0	0	0	0	0
Airplanes		78	1		84	0		0	0		0	0		0	0
Aeronautical	89	54	0	44	48	0	35	3	1	36	0	0	35	3	0
Special [3]		22	0		22	0		0	0		0	0		0	1
Portable (including geophysical)	67	105	8	15	84	23	90	16	0	3	2	0	89	14	0
Coastal	36	44	10	28	65	11	6	6	2	2	8	0	4	2	2
Fire and police	7	8	3	5	14	1	1	0	0	0	0	0	1	0	0
Press	47	22	0	0	2	2	73	0	0	57	1	0	16	0	0
EXPERIMENTAL SERVICE															
General	72	86	27	44	131	17	37	1	3	36	5	1	9	0	2
Visual	32	23	3	16	15	5	4	2	1	33	1	3	1	2	1
Relay	16	3	3	9	12	3	11	5	1	13	5	2	0	1	1
Airplane		29	5		17	4		1	0		0	0		1	0
Aeronautical	6	6	0	4	4	1	0	0	0	0	0	0	0	0	0
Broadcasting	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0
Grand total	1,308	2,731	2,888	668	2,419	2,645	656	124	170	701	154	67	338	44	119
Final grand total	6,927			5,732			950			922			501		

[1] Renewals include modifications and voluntary or involuntary assignments of license.
[2] Renewal applications for broadcasting licenses are received every 90 days. All other services are licensed for 1 year.
[3] Temporary authority to operate in connection with special events of local or national interest.

C. COMPARISON OF LICENSE, RENEWALS, AND CONSTRUCTION PERMITS ISSUED FOR YEARS ENDING JULY 1 1928 AND JULY 1, 1929

Classification	1928			1929			Increase, 1929			Decrease, 1929		
	Licenses [1]	Renewals	Construction permits	Licenses [1]	Renewals	Construction permits	Licenses [1]	Renewals	Construction permits	Licenses [1]	Renewals	Construction permits
FIXED SERVICE												
Broadcasting [2]	499	2,082	220	247	1,968	318	0	0	98	252	114	0
Point to point (domestic)	118	0	72	171	16	316	53	16	244	0	0	0
Point to point (international)	59	0	38	89	106	45	40	106	7	0	0	0
MOBILE SERVICE												
Ships	577	0	----------	1,426	598	----------	849	598	----------	0	0	----------
Marine relay	0	0	0	9	0	0	9	0	0	0	0	0
Airplanes	5	0	----------	84	0	----------	79	0	----------	0	0	----------
Aeronautical	0	0	0	51	1	79	51	1	79	0	0	0
Special [3]	11	0	7	22	0	0	11	0	0	0	0	7
Portable (including geophysical)	5	0	5	98	23	104	93	23	99	0	0	0
Coastal	23	0	18	67	13	32	44	13	14	0	0	0
Fire and police	0	0	2	14	1	6	14	1	4	0	0	0
Press	1	0	17	2	2	16	1	2	0	0	0	1
EXPERIMENTAL SERVICE												
General	101	0	34	131	19	53	30	19	19	0	0	0
Visual	0	0	0	17	7	17	17	7	17	0	0	0
Relay	0	0	0	13	4	15	13	4	15	0	0	0
Airplane	3	0	----------	18	4	----------	15	4	----------	0	0	0
Aeronautical	0	0	0	4	1	4	4	1	4	0	0	0
Broadcasting	4	0	0	0	2	0	0	2	0	4	0	0
Grand total	1,406	2,082	413	2,463	2,765	1,005	1,323	797	600	256	114	8
Final grand total	3,901			6,233			2,720			378		

[1] Licenses include modifications and voluntary or involuntary assignments of license.
[2] Renewal applications for broadcasting licenses are received every 90 days. All other services are licensed for 1 year.
[3] Temporary authority to operate in connection with special events of local or national interest.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929 [13]

PUBLIC POINT TO POINT—TRANSOCEANIC

Licensee or permittee	Location	Call letters	Remarks
American Telephone & Telegraph Co.	Ocean Township (Whale Pond Road, N. J.)	WLO	Construction permit.
Do	Deal, Lawrence Township, N. J.	WMI	Licensed.
Do	Ocean Township (Whale Pond Road, N. J.).	WNC	Construction permit.
Mackay Radio & Telegraph Co	Near Palo Alto, Calif. (Santa Clara County).	KNW	Licensed.
American Telephone & Telegraph Co.	Lawrenceville, N. J	WND	Do.
Do	Rocky Point, N. Y	WNL	Do.
Robert Dollar Co	Guam	KDC	Construction permit.
Do	Musselrock, Calif	KGQ	Do.
Do	Seattle, Wash	KGR	Do.
Do	Honolulu, Island of Oahu, Hawaii.	KGS	Do.
Do	Los Angeles, Calif	KGX	Do.
Do	New York City, N. Y	WGA	Do.
Mackay Radio & Telegraph Co	Near Palo Alto, Calif. (Santa Clara County).	KNK	Licensed.
Do	Near Honolulu, Oahu Island, Hawaii.	KNN	Do.
Do	Guam	KTA	Construction permit.
Do	Midway, Midway Island	KTF	Do.
Do	Sayville, N. Y	WML	Licensed.
Press Wireless (Inc.)	Thirty-first and Diamond Streets, San Francisco. Calif.	KOQ	Construction permit.
Do	Little Neck, Long Island, N. Y.	WJN	Do.
Do	San Francisco, Calif	KOP	Do.
Do	Los Angeles, Calif	KOS	Do.
Do	do	KPG	Do.
Do	Chicago, Ill	WJA	Do.
Do	do	WJC	Do.
Do	Near Milwaukee, Wis	WJF	Do.
Do	Philadelphia. Pa	WJG	Do.
Do	Upper Newton Falls, Newton, Mass.	WJK	Do.
Do	Washington, D. C	WJM	Do.
Do	Little Neck, Long Island, N. Y.	WJO	Do.
Do	do	WJP	Do.
Do	do	WJQ	Do.
Do	do	WJS	Do.
Do	do	WJU	Do.
R. C. A. Communications (Inc.)	Point Reyes, Calif	KDU	Licensed.
Do	Bolinas, Calif	KEB	Do.
Do	do	KEE	Do.
Do	do	KEI	Do.
Do	do	KEJ	Do.
Do	do	KEL	Do.
Do	do	KEM	Do.
Do	do	KEN	Do.
Do	Hahuku, Hawaii	KEQ	Do.
Do	Bolinas, Calif	KER	Do.
Do	do	KES	Do.
Do	do	KET	Do.
Do	do	KEZ	Do.
Do	Territory of Hawaii, Kahuku	KGI	Do.
Do	do	KIE	Do.
Do	Kahuku, Hawaii	KIO	Do.
Do	do	KKH	Do.
Do	Bolinas, Calif	KKL	Do.
Do	Kahuku, Hawaii	KKP	Do.
Do	Bolinas, Calif	KKQ	Do.
Do	do	KKR	Do.
Do	do	KKW	Do.
Do	do	KKZ	Do.
Do	do	KLL	Do.
Do	do	KMM	Do.
Do	do	KQG	Do.
Do	Kahuku, Hawaii	KQH	Construction permit.
Do	Bolinas, Calif	KQJ	Licensed.
Do	do	KQR	Do.
Do	do	KQZ	Do.
Do	Kahuku, Hawaii	KRO	Do.
Do	Bolinas, Calif	KSS	Do.
Do	do	KUN	Do.
Do	do	KWE	Do.

[13] This list is not an index to stations now in operation, but is a record of all authorizations in the fields indicated which have been issued, during the reporting period, by the commission.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

PUBLIC POINT TO POINT—TRANSOCEANIC—Continued

Licensee or permittee	Location	Call letters	Remarks
R. C. A. Communications (Inc.)	Rocky Point, N. Y.	WAJ	Licensed.
Do	New Brunswick, N. J.	WAZ	Do.
Do	Rocky Point, N. Y.	WBU	Do.
Do	Tuckerton, N. J.	WCI	Do.
Do	Rocky Point, N. Y.	WDS	Do.
Do	do	WEA	Do.
Do	do	WEB	Do.
Do	do	WEC	Do.
Do	do	WED	Do.
Do	do	WEE	Do.
Do	do	WEF	Do.
Do	do	WEG	Do.
Do	do	WEJ	Do.
Do	do	WEL	Do.
Do	do	WEM	Do.
Do	do	WEN	Do.
Do	do	WEO	Do.
Do	do	WER	Do.
Do	do	WES	Do.
Do	do	WET	Do.
Do	do	WEV	Do.
Do	do	WEX	Do.
Do	do	WEZ	Do.
Do	do	WFX	Do.
Do	Tuckerton, N. J.	WGG	Do.
Do	San Juan, P. R.	WGT	Do.
Do	do	WGU	Do.
Do	do	WGX	Construction permit.
Do	do	WGZ	Licensed.
Do	Rocky Point, N. Y.	WHR	Do.
Do	New Brunswick, N. J.	WII	Do.
Do	Rocky Point, N. Y.	WIK	Do.
Do	do	WIR	Do.
Do	do	WIY	Do.
Do	New Brunswick, N. J.	WIZ	Do.
Do	San Juan, P. R.	WJT	Do.
Do	Rocky Point, N. Y.	WKC	Do.
Do	do	WKD	Do.
Do	do	WKJ	Do.
Do	do	WKL	Do.
Do	do	WKM	Do.
Do	do	WKO	Do.
Do	do	WKP	Do.
Do	do	WKQ	Do.
Do	do	WKU	Do.
Do	do	WKW	Do.
Do	do	WLL	Do.
Do	do	WPE	Do.
Do	do	WQA	Do.
Do	do	WQB	Do.
Do	do	WQC	Do.
Do	do	WQD	Do.
Do	do	WQE	Do.
Do	do	WQF	Do.
Do	do	WQG	Do.
Do	do	WQH	Do.
Do	do	WQI	Do.
Do	do	WQJ	Do.
Do	do	WQK	Do.
Do	do	WQL	Do.
Do	do	WQN	Do.
Do	do	WQO	Do.
Do	do	WQP	Do.
Do	do	WQQ	Do.
Do	do	WQR	Do.
Do	do	WQS	Do.
Do	do	WQT	Do.
Do	do	WQU	Do.
Do	do	WQV	Do.
Do	do	WQW	Do.
Do	do	WQX	Do.
Do	do	WQY	Do.
Do	San Juan, P. R.	WQZ	Construction permit.
Do	Marion, Mass.	WRQ	Licensed.
Do	New Brunswick, N. J.	WRT	Do.
Do	Marion, Mass.	WSO	Do
Do	Rocky Point, N. Y.	WSS	Do.
Do	do	WTT	Do.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

PUBLIC POINT TO POINT—TRANSOCEANIC—Continued

Licensee or permittee	Location	Call letters	Remarks
Radio Corporation of America	Coram Hill, N. Y	WQL	Licensed.[1]
Southern Radio Corporation	Linden, N. J	WMU	Do.
Tropical Radio Telegraph Co	Hialeah, Fla	WAX	Do.
Do	Boston, Mass	WBF	Do.
Do	Mobile, Ala	WNN	Do.
Do	New Orleans, La	WNU	Do.
U. S. Liberia Radio Corporation	Akron, Ohio	WTF	Do.

PUBLIC POINT TO POINT—DOMESTIC

Alaska Pacific Salmon Corporation	Drier Bay, Alaska	KTT	Licensed.
Do	Evans Bay, Alaska	KUR	Do.
Alaska-Portland Packers Association	Daly, Alaska	KDJ	Do.
Do	Warren, Alaska	KHU	Do.
Alitak Fish Co	Zachar Bay, Alaska	KFX	Do.
Do	Lazy Bay, Alaska	KPS	Do.
Alpena Marine Radio Service	Alpena, Mich	WGI	Do.
Annette Island Packing Co	Annette Island, Alaska	KFA	Do.
Joseph T. Bauer	Chichagof, Alaska	KWW	Do.
Baranoff Packing Co	Red Bluff Bay, Alaska	KSX	Do.[1]
Chichagof Mining Co	Chichagof, Alaska	KRX	Do.[1]
Chilkat Oil Co	Katalla, Alaska	KSC	Do.
City of Seattle, harbor department	Seattle, Wash	KPE	Do.[1]
Columbia Rivers Packers Association.	Lake Bay, Alaska	KZC	Do.
Far North Fisheries (Inc.)	Hydaburg, Alaska	KGIP	Do.
Florida Radio Telegraph Co	Poinciana, Fla	WFV	Do.[1]
Do	Miami, Fla	WRB	Do.[1]
Karl Hansen	Port Alexander, Alaska	KPR	Do.
Intercity Radio Telegraph Co	Buffalo, N. Y	WAM	Do.
Do	Columbus, Ohio	WCL	Do.
Do	Detroit, Mich	WDI	Do.
Do	Chicago, Ill	WFL	Do.
Do	Duluth, Minn	WME	Do.
Do	Cleveland, Ohio	WTK	Do.
Do	do	WTL	Do.
Katmai Packing Co. (Inc.)	Uzinki, Alaska	KZU	Do.
Kennecott Copper Corporation	Latouche, Alaska	KIM	Do.
Killam, T. H	Port Graham, Alaska	KFQ	Do.[1]
Killisnoo Fisheries (Inc.)	Killisnoo, Alaska	KQU	Do.
Kodiak Island Fishing & Packing Co. (Inc.).	Uganik Bay, Alaska	KLP	Do.
Libby, McNeill & Libby	Libbyville, Alaska	KMT	Do.
Lipke, Adam W	Seldovia, Alaska	KEA	Do.
Mackinac Radio Service	Mackinac Island, Mich	WHQ	Do.
Michigan Limestone & Chemical Co.	Rogers City, Mich	WLC	Do.
Mackay Radio & Telegraph Co	Hillsboro, Oreg	KGH	Do.
Do	Palo Alto, Calif	KWT	Do.
Do	Clearwater, Calif	KNR	Do.
Do	Sayville, N. Y	WKI	Do.
Mutual Telephone Co	Wailuku, Island of Maui	KHL	Do.
Do	Lihue, Hawaii	KHM	Do.
Do	Lanai, Hawaii	KHN	Construction permit.
Do	Kaunakakai, island of Molokai.	KHO	Licensed.
Do	Hilo, Hawaii	KLN	Do.
Do	Wahiawa, Hawaii	KHK	Do.[1]
Do	Honolulu, Hawaii	KOG	Do.
Nakat Packing Co	Union Bay, Alaska	KON	Do.
Do	Waterfall, Alaska	KZN	Do.
Do	Hidden Inlet Cannery, Alaska	KQL	Do.
Do	Nakeen Cannery, Alaska	KJI	Do.
New England Fish Co	Chatham Cannery, Alaska	KGIN	Do.
Do	Steamboat Bay, Alaska	KUU	Do.
Norfolk-Cape Charles Radio Telegraph Co.	Cape Charles, Va	WEP	Do.[1]
Pacific American Fisheries	Excursion Inlet, Alaska	KGIS	Do.
Do	King Cove, Alaska	KJK	Do.
Do	Point Moller, Alaska	KWR	Do.
Do	Ikatan, Alaska	KXW	Do.
Pere Marquette Railway Co	Ludington, Mich	WLD	Do.
Peril Straits Packing Co	Todd, Alaska	KFP	Do.
Port Walter Herring & Packing Co	Big Port Walter, Alaska	KPV	Do.
Porto Rico Telephone Co	Ponce, P. R	WJF	Do.[1]

[1] Term has expired and station not now operating.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

PUBLIC POINT TO POINT—DOMESTIC—Continued

Licensee or permittee	Location	Call letters	Remarks
C. Reiss Coal Co	Sheboygan, Wis	WSK	Licensed.
R. C. A. Communications (Inc.)	Rocky Point, N. Y	WQM	Do.[1]
R. P. Slayton	Pinecrest, Fla	WRP	Do.[1]
South Porto Rico Sugar Co	Ensenada. P. R	WPR	Do.
Tropical Radio Telegraph Co	Burrwood, La	WBW	Do.[1]
Do	Fort Morgan, Ala	WIO	Do.
Union Fish Co	Pirate Cove, Alaska	KOX	Do.[1]
Universal Wireless Communications Co. (Inc.).	Akron, N. Y	WNDF	Construction permit.
Do	Albany, N. Y		Do.
Do	Amarillo, Tex		Do.
Do	Athol, Mass		Do.
Do	Atlanta, Ga		Do.
Do	Atlantic City, N. J		Do.
Do	Augusta, Ga		Do.
Do	Austin, Tex		Do.
Do	Augusta, Me		Do.
Do	Bakersfield, Calif		Do.
Do	Baltimore, Md		Do.
Do	Billings, Mont		Do.
Do	Birmingham, Ala		Do.
Do	Boise, Idaho		Do.
Do	Brunswick, Ohio	WNDC	Do.
Do	do	WNDB	Do.
Do	Burlington, Va		Do.
Do	Butte, Mont		Do.
Do	Carson City, Nev		Do.
Do	Cedar Rapids, Iowa		Do.
Do	Charleston. W. Va		Do.
Do	Charleston, S. C		Do.
Do	Chattanooga Tenn		Do.
Do	Cheyenne, Wyo		Do.
Do	Columbus, Ohio	WNDM	Do.
Do	Concord, N. H		Do.
Do	Dallas, Tex		Do.
Do	Dayton, Ohio	WNDI	Do.
Do	Denver, Colo		Do.
Do	Duluth, Minn		Do.
Do	Elko, Nev		Do.
Do	Fargo, N. Dak		Do.
Do	Fresno, Calif		Do.
Do	Galveston, Tex		Do.
Do	Grand Forks, N. Dak		Do.
Do	Harrisburg, Pa		Do.
Do	Hartford, Conn		Do.
Do	Helena, Mont		Do.
Do	Houston, Tex		Do.
Do	Indianapolis, Ind		Do.
Do	Jackson, Miss		Do.
Do	Jacksonville, Fla		Do.
Do	Jefferson City, Mo		Do.
Do	Kansas City, Mo		Do.
Do	La Crosse, Wis		Do.
Do	Lincoln, Nebr		Do.
Do	Little Rock, Ark		Do.
Do	Los Angeles, Calif		Do.
Do	Louisville, Ky		Do.
Do	Madison, Wis		Do.
Do	Medford, Oreg		Do.
Do	Memphis, Tenn		Do.
Do	Miami, Fla		Do.
Do	Milford, Ohio	WNDD	Do.
Do	Milwaukee, Wis	WNDL	Do.
Do	Minneapolis, Minn		Do.
Do	Mobile, Ala		Do.
Do	Moline, Ill		Do.
Do	Montpelier, Vt		Do.
Do	Muskegon, Mich		Do.
Do	Nashville, Tenn		Do.
Do	New Brunswick, N. J		Do.
Do	New Haven, Conn		Do.
Do	New Orleans, La		Do.
Do	Norfolk, Va		Do.
Do	North Platte, Nebr		Do.
Do	Oklahoma City, Okla		Do.

[1] Term has expired and station not now operating.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

PUBLIC POINT TO POINT—DOMESTIC—Continued

Licensee or permittee	Location	Call letters	Remarks
Universal Wireless Communications Co. (Inc.)	Omaha, Nebr		Construction permit.
Do	Palm Beach, Fla		Do.
Do	Peoria, Ill	WNDJ	Do.
Do	Philadelphia, Pa		Do.
Do	Phoenix, Ariz		Do.
Do	Pierre, S. Dak		Do.
Do	Pittsburgh, Pa		Do.
Do	Pocatello, Idaho		Do.
Do	Ponca City, Okla		Do.
Do	Portland, Me		Do.
Do	Portland, Oreg		Do.
Do	Rock Springs, Wyo		Do.
Do	Sacramento, Calif		Do.
Do	Salt Lake City, Utah		Do.
Do	San Angelo, Tex		Do.
Do	San Antonio, Tex		Do.
Do	San Francisco, Calif		Do.
Do	Santa Fe, N. Mex		Do.
Do	Sault Ste. Marie, Mich		Do.
Do	Savannah, Ga		Do.
Do	Schenectady, N. Y		Do.
Do	Seattle, Wash		Do.
Do	Shreveport, La		Do.
Do	South Lyon, Mich	WNDE	Do.
Do	Spartanburg, S. C		Do.
Do	Spokane, Wash		Do.
Do	Springfield, Ill	WNDK	Do.
Do	Springfield, Mass		Do.
Do	Springfield, Ohio		Do.
Do	St. Louis, Mo		Do.
Do	Trenton, N. J		Do.
Do	Tampa, Fla		Do.
Do	Taunton, Mass	WNDH	Do.
Do	do	WNDG	Do.
Do	Tucson, Ariz		Do.
Do	Utica, N. Y		Do.
Do	Waco, Tex		Do.
Do	Walla Walla, Wash		Do.
Do	Washington, D. C		Do.
Do	Wichita, Kans		Do.
Do	Wilmington, Del		Do.
Do	Winston-Salem, N. C		Do.
Do	Youngstown, Ohio		Do.
Do	Scobeyville, N. J	WKDA	Licensed.
Do	Plainfield, Ill	WKDE	Do.
The Warehouse Co	Port Hobron, Alaska	KGL	Do.
The Wireless Telegraph & Communication Co.	Northbrook, Ill	WHW	Do.[1]

POINT TO POINT—PRIVATE

Aleutian Livestock Co	Nelsmoor, Alaska	KGIY	Construction permit.[2]
Do	Unalaska, Alaska	KGIV	Do.
Do	Umnak, Alaska	KGIU	Do.
Alaska Consolidated Canneries (Inc.)	Chomly, Alaska	KDP	Licensed.
Do	Pybus Bay, Alaska	KFC	Do.
Do	Quadra, Alaska	KHD	Do.
Do	Tenakee, Alaska	KOU	Do.
Do	Yes Bay, Alaska	KRU	Do.
Alaska Packers Association	Moored vessel in Koggiung River, Alaska.	KDR	Do.
Do	Alameda, Calif	KFU	Do.[1]
Do	Uyak, Alaska	KHA	Do.
Do	Kvichak, Alaska	KHB	Do.
Do	Chignik, Alaska	KHC	Do.
Do	Snag Point, Alaska	KHF	Do.
Do	Clarks Point, Alaska	KHG	Do.
Do	Naknek, Alaska	KHT	Do.
Do	Loring, Alaska	KRI	Do.
Do	Naknek, Alaska	KTZ	Do.[1]
Do	Koggiung River, Alaska	KUB	Do.
Do	Bacheroff, Alaska	KUD	Do.
Do	Pilot Point, Alaska	KUL	Do.

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

POINT TO POINT—PRIVATE—Continued

Licensee or permittee	Location	Call letters	Remarks
Alaska Packers Association	Koggiung River, Alaska (Kvichak).	KVQ	Licensed.
Do	Karluk, Alaska	KYK	Do.
Do	Alitak, Alaska	KYL	Do.
Alaska Pacific Salmon Corporation	Port Althrop, Alaska	KLW	Do.
Do	Cape Chacon, Alaska	KFN	Do.
Do	Rose Inlet, Alaska	KJC	Do.
Alaska Salmon Co	Nushagak, Alaska	KZV	Do.
Ann Arbor Railroad Co	Manistique, Mich	WMX	Do.
Do	Manitowoc, Wis	WMW	Do.
Do	Frankfort, Mich	WFK	Do.
Do	Menominee, Mich	WDM	Do.
Bethleham Shipbuilding Corporation	Quincy, Mass	WPC	Do.
Baranof Packing Co	Red Bluff Bay, Alaska	KXS	Do.[1]
J. P. Burton Coal Co	Cleveland, Ohio	WLI	Do.[1]
By-Products Coal Co	Bypro, Ky	WLG	Do.[1]
Bristol Bay Packing Co	Kvichak, Alaska	KYM	Do.
Buchan and Heinen Packing Co	Point Armstrong, Alaska	KHH	Do.
Byrd Antartic Expedition	Portable	WFA	Do.[1]
Do	do	WFD	Do.[1]
Do	do	KFK	Do.[1]
Do	do	WFE	Do.[1]
Carter Publications (Inc.)	Fort Worth, Tex	KMB	Do.[1]
Caw Packing Co	Rasberry Island, Alaska	KMQ	Do.[1]
City of Los Angeles, Calif	Independence, Calif	KQS	Do.[1]
City of New York, Department of Plant and Structure.	New York City	WKDX	Construction permit.[2]
City of Seattle Light Department	Cedar Falls, Wash	KFR	Do.
City of Seattle, Harbor Department	Seattle, Wash	KPE	Do.[1]
City of Seattle Light Department	do	KVW	Do.
City of Seattle Lighting Department.	Rockport, Wash	WJE	Do.
Columbia River Packers Association (Inc.).	Nushagak, Alaska	KLJ	Do.
Do	Chignik, Alaska	KNP	Do.
Commonwealth Edison Co	Chicago, Ill	WOF	Do.
W. M. Cook	Siginaka Island, Alaska	KXD	Do.[1]
Crosley Radio Corporation	Harrison, Ohio	WDJ	Do.[1]
Dallas News and Dallas Journal	Dallas, Tex	KFB	Do.[1]
Department of Water and Power	Los Angeles, Calif	KQT	Do.[1]
The Detroit Edison Co	Detroit, Mich	WBM	Construction permit.[2]
Do	Marysville, Mich	WPV	Do.[2]
Do	Ypsilanti, Mich	WRH	Do.[2]
Everett Packing Co	Herendeen Bay, Alaska	KHE	Licensed.
First Troop Philadelphia City Cavalry.	Philadelphia, Pa	WDH	Do.[1]
Florida Power & Light Co	Bradenton, Fla	WNE	Do.
Do	Lakeland, Fla	WNF	Do.
Do	West Palm Beach, Fla	WNG	Do.
Do	Miami, Fla	WNH	Do.
Do	Lake City, Fla	WNM	Do.
Do	Palatka, Fla	WNP	Do.
Do	Fort Lauderdale, Fla	WNQ	Do.
Do	Punta Gorda, Fla	WNS	Do.
Do	Sanford, Fla	WNT	Do.
Do	St. Augustine, Fla	WNV	Do.
Do	Daytona Beach, Fla	WNX	Do.
Do	Fort Pierce, Fla	WNZ	Do.
Florida Radio Telegraph Co	Miami, Fla	WRB	Do.[1]
Do	Poinciana, Fla	WFV	Do.[1]
Ford Motor Co	Dearborn, Mich	WAV	Do.
Do	do	WBO	Do.[1]
Do	L'Anse, Mich	WCT	Do.[1]
Federal-State Marketing Service	San Diego, Calif	KGJA	Construction permit.[2]
Do	Indio, Calif	KGJB	Do.[2]
Do	Lodi, Calif	KGJC	Do.[2]
Do	Santa Rosa, Calif	KGJD	Do.[2]
Do	Santa Maria, Calif	KGJE	Do.[2]
Do	Modesto, Calif	KGJG	Do.[2]
Do	Marysville, Calif	KGJH	Do.[2]
Do	Fresno, Calif	KGJI	Do.[2]
Do	Salinas, Calif	KRB	Licensed.
Do	Sebastopol, Calif	KRD	Do.
Do	San Francisco, Calif	KRG	Do.
Do	San Jose, Calif	KRH	Do.
Do	Sacramento, Calif	KRJ	Do.

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

POINT TO POINT—PRIVATE—Continued

Licensee or permittee	Location	Call letters	Remarks
Federal-State Marketing Service	Los Angeles, Calif	KRM	Licensed.
Do	Brawley, El Centro, Calif	KRN	Do.
P. E. Harris & Co	False Pass, Alaska	KJL	Do.
Do	Hawk Inlet, Alaska	KPD	Do.
Headquarters Troop One-hundred and Fourth Cavalry, Pennsylvania National Guard.	Harrisburg, Pa	WKB	Do.[1]
Hawaiian Pineapple Co. (Ltd.)	Kaumapalapu, Hawaii	KRQ	Do.[1]
Do	Honolulu, Hawaii	KYB	Do.[1]
Hemrich Packing Co. (Inc.)	Kukah Bay, Alaska	KJP	Do.[1]
Huron Transportation Co	Alpena, Mich	WNO	Do.
Independent Wireless Telegraphing Co.	Zachar Bay, Alaska	KFX	Do.
Indiana Electric Corporation	Indianapolis, Ind	WMDH	Construction permit.
Do	Terre Haute, Ind	WMDM	Do.
Inland Waterways Corporation	Minneapolis, Minn	KQP	Licensed.
Do	Memphis, Tenn	WPI	Do.
International News Service (Inc.)	New York City	WJD	Do.[1]
Inland Waterways Corporation	Birmingport, Ala	WPM	Do.[1]
Lincoln L. Jackson	Seattle, Wash	KPA	Do.[1]
Kreeten Co	Johnswood, Mich	WMF	Do.
W. W. Kathan	Cheboygan, Mich	WPJ	Do.
Libby, McNeil & Libby	Yakutat, Alaska	KKA	Do.
Do	Egegik, Alaska	KMF	Do.
Do	Ekuk, Alaska	KMG	Do.
Do	Lockanok, Alaska	KML	Do.
Do	Nushagak, Alaska	KNO	Do.
Do	Tally Scow, Alaska	KTQ	Do.
Do	Taku Harbor, Alaska	KVG	Do.
Do	Koggiung, Alaska	KVV	Do.
Do	Kenai, Alaska	KYZ	Do.
G. E. Maddox	Mary Island, Alaska	KJJ	Do.
Marland Pipe Line Co	Panhandle, Tex	KEH	Do.
Do	Ponca City, Okla	KFE	Do.
C. A. McCue	Boca De Quadra, Alaska	KZS	Do.
Michigan Limestone & Chemical Co.	Rogers City, Mich	WLC	Do.
Minaret Mines Co	Sierras, Calif	KGKI	Construction permit.[2]
Do	Anaheim, Calif	KGKJ	Do.
Nakat Packing Corporation	Heceta Island, Alaska	KGG	Linseed.[1]
New England Fish Co	Steamboat Bay, Alaska	KUU	Do.[1]
New York Alaska Gold Dredging Co.	Bear Creek, Alaska	KUY	Do.
Northwestern Electric Co	Underwood, Wash	KFL	Do.
Do	Portland, Oreg	KLB	Do.
Northwestern Fisheries Co	Dundas, Alaska	KEY	Do.
Do	Uyak, Alaska	KHV	Do.
Do	Chignik, Alaska	KJB	Do.
Do	Kenai, Alaska	KLD	Do.
Do	Kasaan, Alaska	KMC	Do.
Do	Nushagak, Alaska	KNJ	Do.
Do	Naknek, Alaska	KOM	Do.
Do	Quadra, Alaska	KOR	Do.
Do	Hunters Bay, Alaska	KQI	Do.
Do	Shakan, Alaska	KVN	Do.
Northern States Power Co	Minneapolis, Minn	WLP	Do.
Do	St. Croix Falls, Wis	WPL	Do.
Pacific American Fisheries	Pillar Bay, Alaska	KYV	Do.
Penna Power & Light Co	Frackville, Pa	WBI	Do.
Do	Hazleton, Pa	WCJ	Do.
Do	Allentown, Pa	WHC	Do.
Do	Williamsport, Pa	WPH	Do.
Pennsylvania Railroad	Altoona, Pa	WHL	Do.
Penna Power & Light Co	Willsonville, Pa	WLF	Do.[1]
Pere Marquette Railway Co	Ludington, Mich	WLD	Do.
The Philadelphia Electric Co	Philadelphia, Pa	WJV	Do.
Phillips Petroleum Co	Bartlesville, Okla	KJM	Do.
Do	Borger, Tex	KJS	Do.
Do	Breckenridge, Tex	KSU	Do.
Port Walter Herring & Packing Co	Saginaw Bay, Alaska	KFJ	Do.
Potomac Edison Co	Williamsport, Md	WHF	Do.
Do	Cumberland, Md	WKZ	Do.
Potomac Electric Power Co	Washington, D. C	WJH	Do.
Do	Benning, Washington, D. C	WJX	Do.
Public Service Electric & Gas Co	Jersey City, N. J	WHU	Do.
Do	Newark, N. J	WHV	Do.
Pan American Airways (Inc.)	San Juan, P. R	WMDU	Construction permit.
Russell Reed	Portable	KGV	Licensed.[1]

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

POINT TO POINT—PRIVATE—Continued

Licensee or permittee	Location	Call letters	Remarks
Radio Victor Corporation of America.	Madison Square Garden, New York City.	WODD	Licensed.[1]
Radio Salmon Canning Co	Naknek, Alaska	KMK	Do.
Do	Ugashik, Alaska	KMU	Do.
Do	S. S. Hyades (moored), Alaska	KPB	Do.
Do	M. S. Mount Baker (moored), Alaska.	KYD	Do.
Radiomarine Corporation of America.	Aberdeen, Wash	KZE	Do.[1]
San Juan Fishing & Packing Co	Uganik, Alaska	KVF	Do.
Sebastian Stuart Fish Co	Tyee, Alaska	KSR	Do.
Skelly Oil Co	Skelly Camp, Tex	KIH	Do.
Do	Eldorado, Kans	WAH	Do.
Do	Tulsa, Okla	WEH	Do.
R. P. Slayton	Pinecrest, Fla	WRP	Do.[1]
Snug Harbor Packing Co	Snug Harbor, Alaska	KVC	Do.
Starr-Collinson Packing Co	Prince of Wales Island, Alaska	KGIT	Do.
State of California, Division of Forestry.	Portable	KGKN	Construction permit.
Do	do	KGKP	Do.
Sunny Point Packing Co	Kake, Alaska	KGP	Licensed.
Do	Funter, Alaska	KXK	Do.
Superior Packing Co	Tenakee, Alaska	KFD	Do.
Susquehanna Power Co	Darlington, Md	WSY	Do.
Tropical Radio Telegraph Co	Fort Morgan, Ala	WIO	Do.
Texas Pipe Line Co	McCamey, Tex	KSZ	Do.
Do	Kingsmill, Tex	KYI	Do.
Do	Wichita Falls, Tex	KYU	Do.
United States Alaska Packing Co	Point Herbert, Alaska	KOV	Do.
U. S. Shipping Board Merchant Fleet Corporation.	Mobile, Ala	WPK	Do.[1]
The Warehouse Co	Point Hobron, Alaska	KGL	Do.
Do	Akutan, Alaska	KMW	Do.
West Penn Power Co	Charleroi, Pa	WBV	Do.
Do	Cheat Haven, W. Va	WHH	Construction permit.[2]
Do	Butler, Pa	WHJ	Do.[2]
Do	Connellsville, Pa	WOB	Licensed.
Do	Springdale, Pa	WOY	Do.
Wyandotte Transportation Co	Wyandotte, Mich	WCV	Do.[1]
Whitworth Fisheries (Inc.)	Point Warde, Alaska	KLH	Do.[1]
Westinghouse Electric & Manufacturing Co.	East Pittsburgh, Pa	WKA	Do.[1]
Do	Springfield, Mass	WBZ	Do.[1]
Do	Newark, N. J	WAQ	Do.[1]

MOBILE SERVICE—COASTAL

American Tug Boat Co	Everett, Wash	KFT	Licensed.
Ann Arbor Railroad Co	Manistique, Mich	WMX	Do.
Do	Manitowoc, Wis	WMW	Do.
Do	Frankfort, Mich	WFK	Do.
Do	Menominee, Mich	WDM	Do.
Annette Island Packing Co	Annette Island, Alaska	KFA	Do.
American Telephone & Telegraph Co.	Near Deal, N. J	WOO	Do.
Bureau of Insular Telegraph	Munoz Rivera, Vieques, P. R.	WGW	Do.
Do	Ceiba, P. R	WKK	Do.
Chilkat Oil Co	Katalla, Alaska	KSC	Do.
City of Seattle, harbor department	Seattle, Wash	KPE	Do.
Commercial Pacific Cable Co	Midway Island, Pacific Ocean.	KYN	Do.[1]
Coos Bay Wireless Telegraph Co	North Bend, Oreg	KGN	Do.
Robert Dollar Co	Guam	KDC	Construction permit.
Do	Portland, Oreg	KKB	Do.
Do	Seattle, Wash	KSA	Do.
Do	Los Angeles, Calif	KSM	Do.
Do	San Francisco, Calif	KTK	Do.
Do	Honolulu, Island of Oahu, Hawaii.	KYG	Do.
Do	Hunts Point, New York City, N. Y.	WPN	Do.
Elwood Exploration Co	Santa Barbara, Calif	KGJY	Do.
Carol G. Fisher Co	Miami Beach, Fla	WFU	Licensed.[2]
Ford Motor Co	Fordson, Mich	WMD	Do.
Gulf Radio Service	Tampa, Fla	WPD	Do.

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D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE—COASTAL—Continued

Licensee or permittee	Location	Call letters	Remarks
Karl Hansen	Port Alexander, Alaska	KPR	Licensed.[1]
The Harbor Tug & Barge Co	Alameda, Calif	KLR	Do.
Do	San Francisco, Calif	KGKH	Construction permit.[2]
Humble Oil & Refining Co	Baytown, Tex	KJV	Licensed.
Howard P. Hardesty	Highland Park, Mich	WBC	Do.[1]
Inland Waterways Corporation, Mississippi Warrior Service.	Birmingport, Ala	WPM	Do.
Do	Mobile, Ala	WPP	Do.
Illinois Radio Corporation of America	South Chicago, Ill	WGO	Do.
The Intercity Radio Telegraph Co	Buffalo, N. Y	WAM	Do.
Do	Ishpeming, Mich	WAN	Do.
Do	Detroit, Mich	WDI	Do.
Do	Chicago, Ill	WFL	Do.
Do	do	WFL	Do.
Do	Duluth, Minn	WME	Do.
Do	Cleveland, Ohio	WTK	Do.
Kennecott Copper Corporation	Latouche, Alaska	KIM	Do.
Libby, McNeill & Libby	Libbyville, Alaska	KMT	Do.
Adam W. Lipke	Seldovia, Territory of Alaska	KEA	Do.
Mackinac Radio Service	Mackinac Island, Mich	WHQ	Do.
Magnolia Petroleum Co	Beaumont, Tex	WOD	Do.
Marine Products (Inc.)	Reedville, Va	WRX	Do.[1]
Merchants Exchange (Inc.)	Portland, Oreg	KPK	Do.
Mackay Radio & Telegraph Co	Hillsboro, Oreg	KEK	Do.
Do	Near Palo Alto, Calif	KFS	Do.
Do	Clearwater, Calif	KOK	Do.
Do	Near Bar Harbor, Me	WAG	Construction permit.
Mackay Radio & Telegraph Co	North West Palm Beach, Fla	WMR	Do.
Do	New York City, N. Y	WSF	Licensed.
Do	Sayville, N. Y	WSL	Do.
Michigan Limestone & Chemical Co	Rogers City, Mich	WLC	Do.
Mutual Telephone Co	Wahiawa, Territory of Hawaii	KHK	Do.
Pacific American Fisheries	King Cove, Alaska	KJK	Do.
Do	Port Moller, Alaska	KWR	Do.
Do	Ikatan, Alaska	KXW	Do.
Pacific Coast Cement Co	Dall Island, Alaska	KSJ	Do.[1]
Pere Marquette Railway Co	Ludington, Mich	WLD	Do.
Radio Corporation of America, Ohio Co.	Buffalo, N. Y	WBL	Do.
Do	West Dover, Ohio	WCY	Do.
Do	Duluth, Minn	WRL	Do.
Radiomarine Corporation of America	Bolinas, Calif	KPH	Do.
Do	Torrance, Calif	KSE	Do.
Do	Marion, Mass	WCC	Do.
Do	Galveston, Tex	WGV	Do.
Do	Baltimore, Md	WMH	Do.
Do	Brooklyn, N. Y	WNY	Do.
Do	Palm Beach, Fla	WOE	Do.
Do	Port Arthur, Tex	WPA	Do.
Do	New London, Conn	WSA	Do.
Do	Tuckerton, N. J	WSC	Do.
Do	East Moriches, Long Island, N. Y.	WSH	Do.
The C. Reiss Coal Co	Sheboygan, Wis	WSK	Do.
San Francisco Bar Pilots Association	San Francisco, Calif	KGJJ	Construction permit.
South Porto Rico Sugar Co	Ensenada, P. R	WPR	Licensed.
Tidewater Wireless Telegraph Co	Philadelphia, Pa	WNW	Do.
Tropical Radio Telegraph Co	Hialeah, Fla	WAX	Do.
Do	Boston, Mass	WBF	Do.
Do	Fort Morgan, Ala	WIO	Do.
Do	Mobile, Ala	WNN	Do.
Do	New Orleans, La	WNU	Do.
Twin Harbor Stevedoring & Tug Co	Hoquiam, Wash	KJQ	Do.[1]
United States Shipping Board Emergency Fleet Corporation.	Fort Eustis Pier, Va	WPF	Do.
The Warehouse Co	Port Hobron, Territory of Alaska.	KGL	Do.
Do	Akutan, Territory of Alaska	KMW	Do.

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[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE-MARINE RELAY

Licensee or permittee	Location	Call letters	Remarks
Illinois Radio Corporation of America.	Chicago, Ill	WGO	Licensed.
Intercity Radio Telegraph Co	Buffalo, N. Y	WAM	Do.
Do	Ishpeming, Mich	WAN	Do.
Do	Detroit, Mich	WDI	Do.
Do	Duluth, Minn	WME	Do.
Do	Cleveland, Ohio	WTK	Do.
R. C. A. Communications (Inc.)	Rocky Point, N. Y	WQM	Do.
Radio Corporation of America, Ohio Co.	Buffalo, N. Y	WBL	Do.
Do	Duluth, Minn	WRL	Do.
Radiomarine Corporation of America	Port Arthur, Tex	WPA	Do.
Tropical Radio Telegraph Co	Mobile, Ala	WNN	Do.
Do	New Orleans, La	WNU	Do.

MOBILE SERVICE-PRESS

New York Times Co	New York City	WHD	Licensed.
Examiner Printing Co	San Francisco, Calif	KUP	Do.

MOBILE SERVICE—AERONAUTICAL

Boeing Air Transport (Inc.)	Portland, Oreg	KEG	Construction permit.[2]
Do	Burbank, Calif	KEU	Do.[2]
Do	Sacramento, Calif	KFM	Licensed.
Do	Oakland, Calif	KFO	Do.
Do	Medford, Oreg	KGE	Do.
Do	do	KGE	Construction permit.
Do	Fresno, Calif	KGT	Licensed.
Do	Tacoma, Wash	KGKW	Construction permit.
Do	Fresno, Calif	KGT	Do.
Do	Reno, Nev	KJE	Do.[2]
Do	Elko, Nev	KKO	Do.[2]
Do	Omaha, Nebr	KMP	Do.[2]
Do	North Platte, Nebr	KMR	Do.[2]
Do	Cheyenne, Wyo	KOE	Do.[2]
Do	Rock Springs, Wyo	KQC	Do.[2]
Do	Salt Lake City, Utah	KQD	Do.[2]
Do	Des Moines, Iowa	KQM	Do.[2]
Do	Iowa City, Iowa	KQQ	Do.[2]
Do	Bakersfield, Calif	KQX	Licensed.
Do	Cedar Rapids, Iowa	KRA	Construction permit.[2]
Do	Lincoln, Nebr	KRF	Do.[2]
Do	Redding, Calif	KTU	Do.[2]
Do	Portland, Oreg	KVO	Do.[2]
Do	Seattle, Wash	KZJ	Do.[2]
Do	Chicago, Ill	WBQ	Do.[2]
Egyptian Transportation System (Inc.)	Marion, Ill	WEU	Do.
Ford Motor Co	Dearborn, Mich	WFO	Licensed.
Do	Lansing, Ill	WCQ	Do.
Maddux Air Lines (Inc.)	Phoenix, Ariz	KGJR	Construction permit.[2]
Do	San Diego, Calif	KGJS	Do.[2]
Do	San Bruno, Calif	KGJT	Do.[2]
Do	El Paso, Tex	KGJU	Do.[2]
Do	Los Angeles, Calif	KGJV	Do.[2]
Monterey Peninsula Airport	Monterey County, Calif	KGKV	Do.[2]
New York Air Terminals (Inc.)	Jackson Heights, N. Y	WODJ	Do.[2]
Pacific Air Transport	Los Angeles, Calif	KFU	Licensed.
Pan American Airways (Inc.)	Brownsville, Tex	KGJW	Do.
Do	Miami, Fla	WKDL	Construction permit.[2]
Santa Maria Air Lines (Inc.)	Santa Maria, Calif	KGKD	Do.[2]
Transcontinental Air Transport (Inc.)	Albuquerque, N. Mex	KSI	Licensed.
Do	Gallup, N. Mex	KSP	Construction permit.[2]
Do	Clovia, N. Mex	KST	Licensed.
Do	Winslow, Ariz	KSV	Do.
Do	Kingman, Ariz	KSX	Do.
Do	Waynoka, Okla	KSY	Do.
Do	Columbus, Ohio	WHG	Do.
Do	Indianapolis, Ind	WHM	Do.

[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE—AERONAUTICAL—Continued

Licensee or permittee	Location	Call letters	Remarks
Universal Aviation Corporation	Garden City, Kans	KGKQ	Construction permit.
Western Air Express (Inc.)	Oakland, Calif	KGSB	Licensed.
Do	Albuquerque, N. Mex	KGSD	Do.
Do	Amarillo, Tex	KGSE	Do.
Do	Dodge City, Kans	KGSH	Do.
Do	Phoenix, Ariz	KGSI	Do.
Do	Seligman, Ariz	KGSL	Construction permit.[2]
Do	El Paso, Tex	KGSM	Licensed.
Do	Denver, Colo	KGSP	Do.
Do	Pueblo, Colo	KGSR	Do.
Do	San Diego, Calif	KGSX	Do.
Do	Holbrook, Ariz	KGTA	Do.
Do	Wichita, Kans	KGTD	Do.
Do	Kansas City, Mo	KGTG	Do.
Do	Salt Lake City, Utah	KGTH	Do.
Do	Los Angeles, Calif	KGTI	Do.
Do	Las Vegas, Nev	KGTJ	Do.
Do	Kingman, Ariz	KGTL	Do.
Do	Avalon, Calif	KGTM	Do.
Do	Williams, Ariz	KGSA	Construction permit.[2]
Do	Oklahoma City, Okla	KGSC	Do.[2]
Do	Tucson, Ariz	KGSF	Do.[2]
Do	Flagstaff, Ariz	KGSG	Do.[2]
Do	Austin, Tex	KGSJ	Do.[2]
Do	Dallas, Tex	KGSK	Do.[2]
Do	Fort Worth, Tex	KGSN	Do.[2]
Do	Houston, Tex	KGSO	Do.[2]
Do	Marca, Tex	KGSQ	Do.[2]
Do	San Antonio, Tex	KGSS	Do.[2]
Do	St. Louis, Mo	KGST	Do.[2]
Do	Sweetwater, Tex	KGSU	Do.[2]
Do	Wichita Falls, Tex	KGSV	Do.[2]
Do	Muskogee, Okla	KGSW	Do.[2]
Do	Barstow, Calif	KGSY	Do.[2]
Do	Ashfork, Ariz	KGSZ	Do.[2]
Do	Gallup, N. Mex	KGTB	Do.[2]
Do	Clovis, N. Mex	KGTC	Do.[2]
Do	Needles, Calif	KGTE	Do.[2]
Do	Winslow, Ariz	KGTF	Do.[2]
Do	S. F. Municipal Airport, Calif	KGTK	Do.[2]
Do	Chicago, Ill	WMDA	Do.[2]

MOBILE SERVICE—AIRPLANE

American International Airways (Inc.).	Airplane	KHEA	Licensed.[1]
Boeing Air Transport (Inc.)	do	KHAF	Do.[1]
Do	do	KHBA	Do.[1]
Do	do	KHBB	Do.[1]
Do	do	KHBC	Do.[1]
Do	do	KHBD	Do.
Do	do	KHBE	Do.
Do	do	KHBF	Do.
Do	do	KHBG	Do.
Do	do	KHBH	Do.
Do	do	KHBI	Do.
Do	do	KHBJ	Do.
Do	do	KHBK	Do.
Do	do	KHBL	Do.
Do	do	KHBM	Do.
Do	do	KHBN	Do.
Do	do	KHBO	Do.
Do	do	KHBP	Do.
Do	do	KHBQ	Do.
Do	do	KHBR	Do.[1]
Do	do	KHBS	Do.[1]
Do	do	KHBT	Do.[1]
Do	do	KHBU	Do.[1]
Do	do	KHBV	Do.[1]
Commander Richard E. Byrd	do	WFB	Do.[1]
Do	do	WFC	Do.[1]
Do	do	WFF	Do.[1]

[1] Term has expired and station not now operating.
[2] Term has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE—AIRPLANE—Continued

Licensee or permittee	Location	Call letters	Remarks
R. N. Cheminant	Airplane	W10XN	Licensed.
Chicago Daily News (Inc.)	do	KHEH	Do.
Curtiss Aeroplane Export Corporation.	do	KHEN	Do.
Curtis Flying Service (Inc.)	do	KHEB	Do.
Do	do	KHGA	Do.
Do	do	KHGB	Do.
B. Ellson	do	KDY	Do.[1]
Do	do	KDZ	Do.[1]
R. H. Jackson, jr	do	KHEP	Do.
H. G. McCarroll	do	KHAS	Do.[1]
New York, Rio & Buenos Aires Line (Inc.).	do	KHED	Do.
Irving Niles	do	KIK	Do.
Joseph M. Patterson	do	KHAL	Do.
Pan American Airways (Inc.)	do	KHAM	Do.
Do	do	KHFG	Do.
Do	do	KHAA	Do.
Do	do	KHAB	Do.
Do	do	KHAC	Do.
Do	do	KHAD	Do.
Do	do	KHAE	Do.
Do	do	KHAH	Do.
Do	do	KHAK	Do.
Do	do	KHAO	Do.
Do	do	KHAP	Do.
Do	do	KHAQ	Do.
Do	do	KHAR	Do.
Do	do	KHAS	Do.
Do	do	KHAT	Do.
Do	do	KHAU	Do.
Do	do	KHAV	Do.
Do	do	KHAW	Do.
Do	do	KHAX	Do.
Do	do	KHFA	Do.
Do	do	KHFB	Do.
Do	do	KHFC	Do.
Do	do	KHFD	Do.
Do	do	KHFE	Do.
Do	do	KHFF	Do.
Do	do	KHFH	Do.
Do	do	KHFI	Do.
Do	do	KHFJ	Do.
Do	do	KHFK	Do.
Do	do	KHFL	Do.
Do	do	KHFN	Do.
Radio Engineer Laboratories	do	KHAK	Do.[1]
Radiomarine Corporation of America	do	KHAY	Do.
Do	do	KHEC	Do.
Do	do	KHEI	Do.
Do	do	KHRC	Do.
Cesare Sabelli	do	KHAT	Do.[1]
Slate Aircraft Corporation	do	KHEF	Do.
Standard Oil Co. of California	do	KHAZ	Do.
The Tribune Co	do	KHEJ	Do.[1]
Transcontinental Air Transport (Inc.).	do	KHDA	Do.
Do	do	KHDB	Do.
Do	do	KHDC	Do.
Do	do	KHDD	Do.
Do	do	KHDE	Do.
Do	do	KHDF	Do.
Do	do	KHDG	Do.
Do	do	KHDH	Do.
Do	do	KHDI	Do.
Do	do	KHDJ	Do.
Do	do	KHDK	Do.
Do	do	KHDL	Do.
Do	do	KHDM	Do.
Do	do	KHDN	Do.
Do	do	KHDO	Do.
Do	do	KHDP	Do.
Do	do	KHDQ	Do.
Do	do	KHDR	Do.
Do	do	KHDS	Do.
Do	do	KHDT	Do.

[1] Term has expired and station not now operating.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE—AIRPLANE—Continued

Licensee or permittee	Location	Call letters	Remarks
Universal Aviation Corporation	Airplane	KHEM	Licensed.
James Walter Warner	do	KHEE	Do.
Western Air Express (Inc.)	do	KHAG	Do.
Do	do	KHAI	Do.
Do	do	KHAJ	Do.
Do	do	KHCA	Do.
Do	do	KHCB	Do.
Do	do	KHCC	Do.
Do	do	KHCD	Do.
Do	do	KHCE	Do.
Do	do	KHCF	Do.
Do	do	KHCG	Do.
Do	do	KHCH	Do.
Do	do	KHCI	Do.
Do	do	KHCJ	Do.
Do	do	KHCK	Do.

MOBILE SERVICE—GEOPHYSICAL

F. S. Chapman	Portable	KDD	Construction permit.[2]
Do	do	KDE	Do.[2]
Do	do	KDL	Do.[2]
Do	do	WGC	Do.[2]
Geophysical Exploration Co	do	KJN	Licensed.
Do	do	KJO	Do.
Do	do	KJT	Do.
Do	do	KJW	Do.
Do	do	KJY	Do.
Geophysical Research Corporation	do	KDH	Do.
Do	do	KDV	Do.
Do	do	KDX	Do.
Do	do	KGJL	Do.
Do	do	KGJM	Do.
Do	do	KGJN	Do.
Do	do	KGJO	Do.
Do	do	KGJP	Do.
Do	do	KGJQ	Do.
Do	do	KGKR	Construction permit.
Do	do	KGKS	Do.
Do	do	KGKT	Do.
Do	do	KGKU	Do.
Do	do	KHP	Licensed.
Do	do	KHS	Do.
Do	do	KHW	Do.
Do	do	KHZ	Do.
Do	do	KIB	Do.
Do	do	KIC	Do.
Do	do	KIJ	Do.
Do	do	KKD	Do.
Do	do	KKF	Do.
Do	do	KKU	Do.
Do	do	KKV	Do.
Do	do	KKX	Do.
Do	do	KKY	Do.
Do	do	KNL	Do.
Do	do	KNM	Do.
Do	do	KNQ	Do.
Do	do	KNS	Do.
Do	do	KNT	Do.
Do	do	KNU	Do.
Do	do	KNY	Do.
Do	do	KNZ	Do.
Do	do	KOD	Do.
Do	do	KOF	Do.
Do	do	KOI	Do.
Do	do	KOT	Do.
Do	do	KSB	Do.
Do	do	WFG	Do.
Do	do	WFH	Do.
Do	do	WFJ	Do.
Do	do	WFM	Do.
Do	do	WFN	Do.
Do	Portable	WFP	Do.
Do	do	WFQ	Do.

[2] Time has expired within which to complete construction

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE—GEOPHYSICAL—Continued

Licensee or permittee	Location	Call letters	Remarks
Geophysical Research Corporation	Portable	WFR	Licensed.
Do	do	WFS	Do.
Do	do	WFY	Do.
Do	do	WFZ	Do.
Do	do	WGB	Do.
Humble Oil & Refining Co	do	KFF	Do.
Do	do	KFG	Do.
Do	do	KFY	Do.
Do	do	KGZ	Do.
Do	do	KJA	Do.
Do	do	KJD	Do.
Do	do	KLA	Do.
Do	do	KLE	Do.
Do	do	KLG	Do.
Do	do	KLI	Do.
Do	do	KLT	Do.
Do	do	KLY	Do.
Do	do	KMD	Do.
Do	do	KMI	Do.
Do	do	KMS	Do.
Do	do	KMX	Do.
Do	do	KMY	Do.
Do	do	KMZ	Do.
Interstate Geophysical Exploration Co.	do	KOZ	Do.
Do	do	KPF	Do.
Do	do	KPL	Do.
Do	do	KPT	Do.
Do	do	KPU	Do.
Do	do	KRR	Do.
Do	do	KRS	Do.
Do	do	KRT	Do.
Do	do	KRV	Do.
Do	do	KRW	Do.
Do	do	KRZ	Do.
Do	do	WCS	Do.
Marland Refining Co	do	KJZ	Do.
Do	Ponca City, Okla	KSF	Do.
Do	Portable	WCU	Do.
McCollum Exploration Co	do	KGKE	Construction permit.
Sun Oil Co	do	WCM	Do.[1]
Do	do	WCN	Do.[1]
Do	do	WCO	Do.[1]
Do	do	WCP	Do.[1]
Do	do	WCR	Do.[1]
The Texas Co	do	KJG	Licensed.
Do	do	KNB	Do.
Do	do	KNC	Do.
Do	do	KND	Do.
Do	do	KNE	Do.
Do	do	KNF	Do.
Do	do	WBB	Do.
Do	do	WBD	Do.
Do	do	WBE	Do.
Do	do	WBG	Do.
Do	do	WBH	Do.
Do	do	WBK	Do.
Do	do	WBN	Do.
Do	do	WBS	Do.
Do	do	WBX	Do.
Do	do	WCA	Do.
Do	do	WCB	Do.
Do	do	WCD	Do.
Do	do	WCH	Do.
Wireless Service Corporation	do	KGJZ	Construction permit.[1]

MOBILE SERVICE—POLICE AND FIRE

Berkeley Police Department	Berkeley, Calif	KSW	Construction permit.[1]
Board of fire commissioners, Baltimore, Md.	Baltimore, Md	WEQ	Licensed.
Boston Fire Department	Boston, Mass	WEY	Do.
Bureau of police (department of public safety, city of Philadelphia).	Philadelphia, Pa	WPDP	Construction permit.
City of Beaumont, Tex	Beaumont, Tex	KGKM	Do.

[1] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

MOBILE SERVICE—POLICE AND FIRE—Continued

Licensee or permittee	Location	Call letters	Remarks
City of Buffalo, N. Y., department of police.	Buffalo, N. Y.	WMJ	Construction permit.[2]
City of Chicago, police department	Chicago, Ill.	WPDB	Do.
Do	do	WPDC	Do.
Do	do	WPDD	Do.
City of Cincinnati	Cincinnati, Ohio	WKDU	Do.
City of Cleveland	Cleveland, Ohio	WRBH	Do.
City of Dallas, police and fire signal department.		KVP	Licensed.
City of Indianapolis, police department.	Indianapolis, Ind.	WMDZ	Construction permit.
City of Miami, police department	Miami, Fla.	WNDA	Do.
City of New York, police department	New York, N. Y.	WPY	Licensed.
City of Seattle, fire department	Seattle, Wash.	KYF	Do.
Commonwealth of Massachusetts, department of public safety, division of State police.	Framingham, Mass.	WMP	Do.
Highland Park Police	Highland Park, Mich.	WMO	Do.
Detroit Fire Department	Detroit, Mich.	WKDT	Construction permit.[2]
Detroit Police Department	Belle Isle, Mich.	WCK	Licensed.
Pasadena Police Department	Pasadena, Calif.	KGJX	Construction permit.
Pennsylvania State Police	Harrisburg, Pa.	WBA	Licensed.
Pennsylvania State Police, Commonwealth of Pennsylvania.	Butler, Pa.	WBR	Do.
Do	Wyoming, Pa.	WDX	Do.
Do	Greensburg, Pa.	WJL	Do.
Do	West Reading, Pa.	WMB	Do.
Police department, city of Tulare	Tulare, Calif.	WPDA	Construction permit.
Seattle Police Department and Seattle Fire Department.	Seattle, Wash.	KGPA	Do.

MOBILE—SPECIALS

L. Bamberger & Co	New York, N. Y.	W2XAQ	Licensed.[1]
Chicago Police Department	Chicago, Ill.	W9XAJ	Do.[1]
Crosley Radio Corporation	Airplane	W8XAA	Do.[1]
H. P. Drey	Columbus, Ohio	WCAH	Do.[1]
Examiner Printing Co	Aboard press yacht Ambassador.	W6XZ	Do.[1]
Gimbel Bros. (Inc.)	Airplane	W2XBZ	Do.[1]
National Battery Broadcasting Co	do		Do.[1]
National Broadcasting Co. (Inc.)	do	W2XBF	Do.[1]
WYAY (Inc.)	do	W8XH	Do.[1]

GENERAL EXPERIMENTAL

Anderson, Clayton & Co	Houston, Tex.	W5XJ	Construction permit.[2]
Earle C. Anthony (Inc.)	Portable	W6XY	Licensed.[1]
American Telephone & Telegraph Co.	do	W1XR	Do.
Do	Rocky Point, N. Y.	W2XA	Do.
Do	Washington, D. C.	W3XT	Do.
Baltimore Radio Show (Inc.)	Baltimore, Md.	W3XE	Do.
Merrill D. Beam	Narberth, Pa.	W3XB	Construction permit.
Bell Telephone Laboratories (Inc.)	Portable	W2XAA	Licensed.
Gerald M. Best	Piedmont, Calif.	W6XAO	Do.
Joseph G. Branch	Chicago, Ill.	W9XAD	Construction permit.[2]
C. F. Burgess Laboratories	Madison, Wis.	W9XH	Licensed.
Bell Telephone Laboratories (Inc.)	Portable	W2XAV	Do.
Do	New York City, N. Y.	W2XB	Do.
Do	Ocean Township, N. J.	W2XG	Do.
Do	Deal, N. J.	W2XJ	Do.
Do	Cliffwood, N. J.	W2XF	Do.
Do	Whippany, N. J.	W3XN	Do.
Do	Portable	W6XQ	Do.
Do	Airplane	W7XAA	Do.
R. N. Cheminant	Los Angeles, Calif.	W6XBC	Construction permit.[2]
Allen D. Cardwell Manufacturing Corporation.	Brooklyn, N. Y.	W2XCE	Licensed.
Ceco Manufacturing Co. (Inc.)	Providence, R. I.	W1XAC	Do.[1]
Frank B. Chambers	Philadelphia, Pa.	W3XC	Do.
Corwin C. Chapman	Palo Alto, Calif.	W6XAY	Do.

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

GENERAL EXPERIMENTAL—Continued

Licensee or permittee	Location	Call letters	Remarks
The Chicago Daily News (Inc.)	Addison, Ill	W9XAP	Construction permit.
Clark University	Worcester, Mass	W1XZ	Licensed.
Cleveland Vacuum Tube Works	Cleveland, Ohio	W8XD	Do.
Colonial Air Transport (Inc.)	Boston, Mass	W1XE	Construction permit.[2]
Do	Hartford, Conn	W1XF	Do.[2]
Colorado School of Mines	Portable	W9XE	Do.[2]
Continental Broadcasting Corporation.	Alexandria, Va	W3XD	Do.[2]
Do	Fredericksburg, Va	W3XF	Do.[2]
Do	do	W3XG	Do.[2]
Do	Richmond, Va	W3XH	Do.[2]
Howard C. Crossett	Wianno, Mass	W1XA	Licensed.
De Forest Radio Co	Passaic, N. J	W2XCD	Do.
Fred Louis Dewey	Los Angeles, Calif	W6XL	Do.[1]
Laurence E. Dutton	Miami Beach, Fla	W4XQ	Do.
Do	Culver, Ind	W9XB	Do.
The Robert Dollar Co	Portable	K6XAK	Construction permit.[2]
The Electro-Spray Corporation	North Wenatchee, Wash	W7XAS	Licensed.[1]
Do	North Cashmere, Wash	W7XAT	Do.[1]
Elgin National Watch Co	Elgin, Ill	W9XAM	Do.
Dr. Willis Eugene Everette	San Rafael, Calif	W6XAC	Do.[1]
Dean Farran	Portable	W6XAP	Do.
Federal Telegraph Co	Newark, N. J	W2XCG	Construction permit.
Do	Halfmoon Bay, Pacific Ocean	W6XAQ	Licensed.
Do	Palo Alto, Calif	W6XV	Do.
Reginald A. Fessenden	Chestnut Hill, Mass	W1XS	Do.
Robert Anton Fleiss	Portable	W2XAY	Construction permit.[2]
Edmund Thomas Flewelling	Dayton, Ohio	W8XAG	Licensed.
Fox Film Corporation	Beverly Hills, Calif	W6XAH	Construction permit.[2]
Galt Technical Junior College for Aeronautics.	Galt, Calif	W6XBX	Do.
General Electric Co	Portable	W6XAX	Licensed.[1]
General Radio Co	Cambridge, Mass	W1XO	Do.
David Grimes	Grasmere, N. Y	W2XCB	Construction permit.[2]
Do	New York City, N. Y	W2XCC	Do.[2]
Daniel Guggenheim Fund for the Promotion of Aeronautics.	Garden City, N. Y	W2XBG	Do.
General Electric Co	South Schenectady, N. Y	W2XAC	Licensed.
Do	do	W2XAH	Do.
Do	do	W2XAK	Do.
Do	do	W2XAW	Do.
Do	do	W2XAZ	Do.
Do	do	W2XH	Do.
Do	Schenectady, N. Y	W2XI	Licensed.[1]
Do	South Schenectady, N. Y	W2XK	Do.
Do	do	W2XO	Do.
Do	Oakland, Calif	W6XN	Do.
John Hays Hammond, jr	Gloucester, Mass	W1XI	Do.
Francis Edward Handy	Hartford, Conn	W1XL	Do.
Lorenze A. Hansen and Carlton H. Kohler.	Robbinsdale, Minn	W9XAE	Do.[1]
Harvard University-Cruft Laboratory.	Cambridge, Mass	W1XJ	Do.
Ralph M. Heintz	Portable	W6XBB	Do.[1]
Herbert Hoover, jr., and Frederick E. Terman.	do	W6XH	Do.
Gleason W. Kenrick	Philadelphia, Pa	W3XS	Do.
Lemert Engineering Corporation	Catalina Terminal, Calif	W6XAE	Construction permit.
Mackay Radio & Telegraph Co	Sayville, N. Y	W2XBL	Licensed.[1]
Do	do	W2XCM	Do.[1]
Massachusetts Institute of Technology.	Cambridge, Mass	W1XM	Do.
D. B. McGown	Portable	W6XD	Construction permit.[2]
Michigan College of Mining and Technology.	Houghton, Mich	W9XAW	Do.
Montana State College	Bozeman, Mont	W7XB	Licensed.
Morkum-Kleinschmidt Corporation	Chicago, Ill	W9XO	Do.
Mackay Radio & Telegraph Co	Palo Alto, Calif	W6XAU	Do.[1]
Do	Portable	W6XBK	Do.
Mutual Telephone Co	Honolulu, Hawaii	W6XP	Do.
Nightingale Radios (Inc.)	Portable	W6XR	Do.[1]
Louis Gerard Pacent	Winfield, Long Island, N. Y	W2XP	Do.
Pacific Coast Crystal Laboratory	San Diego, Calif	W6XJ	Construction permit.[2]
The Pennsylvania State College, department of electric engineering.	State College, Pa	W8XE	Licensed.
Petroleum Telephone Co	Oil City, Pa	W8XBD	Do.[1]

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

GENERAL EXPERIMENTAL—Continued

Licensee or permittee	Location	Call letters	Remarks
Pilot Electric Manufacturing Co. (Inc.).	Yorktown Heights, N. Y	W2XCF	Construction permit.[2]
Albert B. Pitts	Rantoul, Ill	W9XK	Licensed.
Radio Air Service Corporation	Cleveland, Ohio	W8XF	Do.
Radio Engineering Laboratories	Long Island City, N. Y	W2XV	Do.
Radio Pictures (Inc.)	New York City, N. Y	W2XR	Do.
The Radiore Co	Portable	W6XAB	Do.
John L. Reinartz	South Manchester, Conn	W1XAM	Do.
J. Harris Rogers	Hyattsville, Md	W3XR	Do.
Round Hills Radio Corporation	Portable	W1XAN	Do.
Do	Dartmouth, Mass	W1XV	Do.
R. C. A. Communications (Inc.)	Marion, Mass	W1XC	Do.
Do	New Brunswick, N. J	W2XAM	Do.
Do	Rocky Point, N. Y	W2XAS	Do.
Do	do	W2XBI	Do.
Do	Portable	W2XCQ	Do.
Do	Tuckerton, N. J	W2XD	Do.
Do	Rocky Point, N. Y	W2XS	Do.
Do	do	W2XT	Do.
Do	Bound Brook, N. J	W3XL	Do.
Do	Bolinas, Calif	W6XI	Do.
Do	Kahuku, Hawaii	W6XO	Do.
Do	Honolulu, Island of Oahu, Hawaii.	K6XS	Do.
Do	Lahaina, Island of Maui	K6XX	Do.
Do	Chicago, Ill	W9XAK	Do.
Radio Corporation of America	Yonkers, N. Y	W2XAB	Do.
Do	do	W2XAJ	Do.
Do	Brooklyn, N. Y	W2XBB	Do.
Do	New York City, N. Y	W2XCI	Do.
Do	Bronx, N. Y	W2XN	Do.
Do	New York City, N. Y	W2XW	Do.
Radiomarine Corporation of America.	Seattle, Wash	W7XE	Do.
Southern Pacific Co	Oakland, Calif	W6XZ	Construction permit.[2]
Southern Radio Corporation	Linden, N. J	W2XCY	Do.
George W. Sterling	Baltimore, Md	W3XI	Licensed.
Rev. Lannie W. Stewart	Carterville, Mo	W9XV	Do.
Stromberg-Carlson Telephone Manufacturing Co.	Rochester, N. Y	W8XAC	Do.
The Travelers Broadcasting Service Corporation.	Hartford, Conn	W1XG	Do.
Trustees of Tufts College	Medford, Mass	W1XAW	Do.
Tropical Radio Telegraph Co	Boston, Mass	W1XT	Do.
Do	Hialeah, Fla	W4XG	Do.
Do	New Orleans, La	W5XH	Do.
University of California	Berkeley, Calif	W6XM	Do.
University of Minnesota	Minneapolis, Minn	W9XI	Do.
Department of Electrical Engineering, University of North Dakota.	Grand Forks, N. Dak	W9XJ	Do.
Universal Wireless Commercial Co. (Inc.).	New York City, N. Y	W2XCT	Construction permit.[2]
Do	Portable	W3XU	Licensed.
Do	Salt Lake City, Utah	W6XA	Construction permit.[2]
Do	San Francisco, Calif	W6XZ	Do.[2]
Do	Buffalo, N. Y	W8XH	Do.[2]
Do	Chicago, Ill	W9XM	Do.[2]
Do	Portable	W10XA	Licensed.
Do	do	W10XB	Do.
Do	do	W10XC	Do.
Do	do	W10XD	Do.
Do	do	W10XE	Do.
G. H. Vincent	Utica, Mich	W8XB	Do.
Walter Charles Von Brandt	Jersey City, N. J	W2XBY	Construction permit.
Edward F. Walter	Los Angeles, Calif	W6XAV	Do.[2]
Ward Leonard Electric Co	Mount Vernon, N. Y	W2XBF	Do.
Warner Bros. Pictures (Inc.)	Portable	W6XBR	Licensed.[1]
Washburn Crosby Co	Anoka, Minn	W9XL	Do.
John E. Waters	Portable	W6XE	Do.[1]
Charles L. Watson and Ralph C. Gray.	San Francisco, Calif	W6XT	Construction permit.[2]
John M. Wells (for American Optical Co.)	Southbridge, Mass	W1XAX	Licensed.[1]
Wesleyan University	Middletown, Conn	W1XN	Do.
Western State College of Colorado	Gunnison, Colo	W9XD	Do.

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

GENERAL EXPERIMENTAL—Continued

Licensee or permittee	Location	Call letters	Remarks
Westinghouse Electric & Manufacturing Co.	Newark, N. J	W2XAI	Licensed.
Do	East Pittsburgh, Pa	W8XI	Do.
Do	do	W8XP	Do.
Do	do	W8XS	Do.
Do	Chicago, Ill	W9XY	Do.
West Virginia University	Portable	W8XAW	Construction permit.
Wired Radio (Inc.)	Newark, N. J	W2XCU	Do.

EXPERIMENTAL—VISUAL BROADCASTING

Aero Products (Inc.)	Chicago, Ill	W9XAG	Construction permit.[1]
Chicago Federation of Labor	do	W9XAA	Licensed.[1]
Freed-Eisemann Radio Corporation	Allwood, N. J	W2XCP	Construction permit.
General Industries Co	Somerville, Mass	W1XB	Do.
Great Lakes Broadcasting Co	Downers Grove, Ill	W9XR	Licensed.[2]
General Electric Co	Schenectady, N. Y	W2XCW	Do.[1]
Jenkins Television Corporation	Jersey City, N. J	W2XCR	Do.
Do	Washington, D. C	W3XK	Do.
Do	Airplane	W10XU	Do.
Wilbur Jerman	Portland, Oreg	W7XAO	Do.
The Lexington Air Stations	Lexington, Mass	W1XAY	Do.
William Justice Lee	Winter Park, Fla	W4XE	Do.[1]
Ben S. McGlashan	Los Angeles, Calif	W6XAM	Construction permit.[2]
Nelson Bros. Bond & Mortgage Co.	Chicago. Ill	W9XAO	Licensed.
Pilot Electric Manufacturing Co. (Inc.).	Brooklyn, N. Y	W2XCL	Do.
RCA Communications (Inc.)	Bound Brook, N. J	W3XL	Do.
Radio Corporation of America	Portable	W2XBS	Do.
Do	do	W2XBV	Do.
Do	Near New York City, N. Y	W2XCO	Construction permit.
Do	Portable	W3XAK	Licensed.
Radio Pictures (Inc.)	New York City, N. Y	W2XR	Do.
Shortwave and Television Laboratory (Inc.).	Boston, Mass	W1XAV	Construction permit.
Harold E. Smith	Near Beacon, N. Y	W2XBU	Licensed.
University of Iowa	Iowa City, Iowa	W9XAZ	Do.[1]
W. A. A. M. (Inc.), Isiah R. Nelson, president.	Newark, N. J	W2XBA	Do.
Westinghouse Electric & Manufacturing Co.	Springfield, Mass	W1XAE	Do.[1]
Do	East Pittsburgh, Pa	W8XAV	Do.[1]
W. R. E. C. (Inc.)	Whitehaven, Tenn	W4XA	Do.[1]

EXPERIMENTAL—RELAY BROADCASTING

Atlantic Broadcasting Corporation	Crossbay Boulevard, Long Island, near Jamaica, N. Y.	W2XE	Licensed.
Aviation Radio Station (Inc.)	Coytesville, N. Y	W2XAL	Do.
L. Bamberger & Co	Kearny, N. J	W2XCX	Construction permit.[2]
Baruchrome Corporation	Portable	W2XBR	Licensed.
The Chicago Daily News (Inc.)	Addison, Ill	W9XAQ	Construction permit.
Chicago Federation of Labor	Chicago, Ill	W9XAA	Do.
The Crosley Radio Corporation	Harrison, Ohio	W8XAL	Licensed.[1]
Great Lakes Radio Broadcasting Co.	North Downers Grove, Ill	W9XF	Do.
General Electric Co	South Schenectady, N. Y	W2XAD	Do.
Do	do	W2XAF	Do.
Mona Motor Oil Co	Council Bluffs, Iowa	W9XU	Do.[1]
Pacific-Western Broadcasting Federation.	North Westminster, Calif	W6XAL	Construction permit.
RCA Communications (Inc.)	Bound Brook, N. J	W3XAL	Licensed.
Universal Broadcasting Co	North Bustleton, Pa	W3XAU	Construction permit.
Westinghouse Electric & Manufacturing Co.	East Springfield, Mass	W1XAZ	Do.
Do	East Pittsburgh, Pa	W8XK	Licensed.[1]

[1] Term has expired and station not now operating.
[2] Time has expired within which to complete construction.

D. List of licenses and permits (exclusive of broadcasting, ship or amateur) arranged by services, that have been authorized from July 1, 1928, to November 1, 1929—Continued

EXPERIMENTAL—AIRPLANE

Licensee or permittee	Location	Call letters	Remarks
Aircraft Radio Corporation	Airplane	W10XI	Licensed.
American Aeronautical Corporation	do	W10XG	Do.
Bell Telephone Laboratories (Inc.)	do	W2XBX	Do.[1]
Do	do	W7XAA	Do.
The Chicago Daily News (Inc.)	do	W10XF	Do.
Colonial Air Transport (Inc.)	do	W10XQ	Do.
Do	do	W10XS	Do.
Lieut. James H. Doolittle	do	W10XH	Do.[1]
Ford Motor Co	do	W8XA	Do.
C. Francis Jenkins	do	W10XZ	Do.
Morton B. Kahn	do	W2XCA	Do.
National Air Transport (Inc.)	do	W10XJ	Do.
Packard Motor Car Co	do	W8XC	Do.
Pilot Electric Manufacturing Co. (Inc.).	do	W2XBQ	Do.
Radio Corporation of America	do	W4XN	Do.[1]
Do	do	W2XBZ	Do.[1]
Radio Engineering Laboratories	do	W10XO	Do.
Do	do	W10XP	Do.
Roosevelt Field (Inc.)	On a parachute	W10XT	Do.
Do	Airplane	W10XV	Do.
Radio Corporation of America	do	W4XM	Do.[1]
Do	do	W4XP	Do.[1]
Do	do	W10XW	Do.
Radiomarine Corporation of America	do	W10XL	Do.
Sky Lines (Inc.)	do	W2XAQ	Do.
William Deaderick Van Dyke	do	W10XR	Do.

EXPERIMENTAL—AERONAUTICAL

Aircraft Radio Corporation	Boonton, N. J	W3XW	Licensed.
American Aeronautical Corporation	Port Washington, N. Y	W2XCS	Do.
Boeing Air Transport (Inc.)	Portable	W10XM	Construction permit.
Do	do	W10XX	Do.
Do	do	W10XY	Do.
The Chicago Daily News (Inc.)	Addison Township, Ill	W9XAL	Do.
General Electric Co	Schenectady, N. Y	W2XCH	Licensed.
Roosevelt Field (Inc.)	Mineola, N. Y	W2XCV	Construction permit.
Radio Corporation of America, Ohio Co.	West Dover, Ohio	W8XJ	Do.

EXPERIMENTAL—BROADCASTING

General Electric Co	South Schenectady, N. Y	W2XAG	Licensed.
Do	Portable	W6XG	Do.
Do	Denver, Colo	W9XA	Do.
Oregonian Publishing Co	Portable	W7XA	Do.
Fisher's Blend Station (Inc.)	do	W7XAR	Do.

[1] Term has expired and station not now operating.

List of radio station construction permits that have been authorized by the commission for domestic communication but not yet issued

Permittee	Location	Permittee	Location
R. C. A. Communications (Inc.).	New York, N. Y.	Western Radio Telegraph Co.	Tulsa, Okla.
Do	Chicago, Ill.	Do	Eldorado, Kans.
Do	San Francisco, Calif.	Do	Skellytown, Tex.
Do	New Orleans, La.	Do	Bartlesville, Okla.
Do	Seattle, Wash.	Do	Borger, Tex.
Do	Los Angeles, Calif.	Do	Breckenridge, Tex.
Do	Denver, Colo.	Do	Kingsmill, Tex.
Do	Cincinnati, Ohio.	Do	Burkburnett, Tex.
Do	Detroit, Mich.	Do	McCamey, Tex.
Do	Kansas City, Mo.	Do	Ponca City, Okla.
Do	Cleveland, Ohio.	Do	Jal, N. Mex.
Do	St. Louis, Mo.	Do	Crane, Tex.
		Do	Wink, Tex.
		Press Wireless (Inc.)	Indefinite.[1]

[1] The number of cities to be served by the domestic press communications service is not yet ascertained 20 frequencies (2 per cent channe ls) have been reserved for this service.

E. OUTSTANDING BROADCAST STATION AUTHORIZATIONS

The following list shows the outstanding licenses in the broadcast band as of November 9, 1929:

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WAAF	Chicago, Ill	Drovers Journal Publishing Co		500	920	D.
WAAM	Newark, N. J	W. A. A. M. (Inc.)	WGCP, WODA	1 kw	1,250	
				2 kw		LS.
WAAT	Jersey City, N. J	Bremer Broadcasting Corporation		300	1,070	(1).
WAAW	Omaha, Nebr	Omaha Grain Exchange		500	660	D.
WABC, WBOQ	West of Cross Bay Boulevard, Queens County, N. Y. C. P. to move and increase power to 50 kilowatts, LP. S.=New York City.	Atlantic Broadcasting Corporation.		5 kw	860	
WABI	Bangor, Me	First Universalist Church of Bangor		100	1,200	
WABO, WHEC. (See WHEC-WABO.)						
WABZ	New Orleans, La	Coliseum Place Baptist Church	WJBW	100	1,200	
WADC	Akron, Ohio. C. P. to move to Talmadge, Ohio.	Allen T. Simmons		1 kw	1,320	
WAGM	Royal Oak, Mich	Robert L. Miller (½ time)		50	1,310	
WAIU	Columbus, Ohio	American Insurance Union		500	640	LT.
WAPI	Birmingham, Ala	Alabama Polytechnic Institute, University of Alabama, and Alabama College.	KVOO	5 kw	1,140	
WASH	Grand Rapids Township, Mich.	WASH Broadcasting Corporation	WOOD	500	1,270	
WBAA	West Lafayette, Ind	Purdue University	WCMA, WKBF	500	1,400	C. P. only.
WBAK	Harrisburg, Pa	Pennsylvania State Police, Commonwealth of Pennsylvania.	WHP, WCAH	500	1,430	
WBAL	Glen Morris, Md S.=Baltimore, Md.	Consolidated Gas, Electric Light & Power Co. of Baltimore.	WTIC	10 kw	1,060	
WBAP	Forth Worth, Tex	Carter Publications (Inc.)	WFAA	50 kw	800	LP.
WBAX	Wilkes-Barre, Pa. C. P. issued to move to Bear Creek Township.	John H. Stenger, jr	WJBU	100	1,210	

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.
LT.=Limited time. See General Order No. 48.
LP.=Limited power. See General Order No. 42.
C. P.=Construction permit authorized.
S.=Where main studio location differs from transmitter same is shown below transmitter location.

[1] Day till 6 p. m., but not after sunset at Cleveland, Ohio.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WBBC	Brooklyn, N. Y	Brooklyn Broadcasting Corporation	WSGH, WSDA, WCGU, WLTH	500	1,400	
WBBL	Richmond, Va	Grace Covenant Presbyterian Church		100	1,370	
WBBM, WJBT	Glenview, Ill	Atlass Co. (Inc.)	KFAB	25 kw	770	
	S.=Chicago, Ill.					
WBBR	Rossville, N. Y	Peoples Pulpit Association	WHAZ, WHAP, WEVD	1 kw	1,300	
WBBY	Charleston, S. C	Washington Light Infantry		75	1,200	
WBBZ	Ponca City, Okla	C. L. Carrell		100	1,200	
WBCM	Hampton Township, Mich	James E. Davidson		500	1,410	
	S.=Bay City, Mich.					
WBIS, WNAC. (See WNAC, WBIS.)						
WBMS	Fort Lee, N. J	WBMS Broadcasting Corporation	WNJ, WKBO, WIBS	250	1,450	
WBNY	New York, N. Y	Baruchrome Corporation	WCDA, WKBQ, WMSG	250	1,350	
WBOQ, WABC. (See WABC, WBOQ.)						
WBOW	Terre Haute, Ind	Banks of Wabash (Inc.)		100	1,310	
WBRC	Birmingham, Ala	Birmingham Broadcasting Co. (Inc.)		500	930	
				1 kw		LS.
WBRE	Wilkes-Barre, Pa	Louis G. Baltimore		100	1,310	
WBRL	Tilton, N. H	Booth Radio Laboratories (Inc.)		500	1,430	
WBSO	Wellesley Hills, Mass. C. P. issued to move to Needham, Mass., and increase power to 500 watts.	Babson's Statistical Organization (Inc.)		250	920	D.
WBT	Charlotte, N. C	Station WBT (Inc.)		5 kw	1,080	
WBZ	East Springfield, Mass	Westinghouse Electric & Manufacturing Co	WBZA	15 kw	990	
	S.=Springfield, Mass.					
WBZA	Boston, Mass	do	WBZ	500	990	
WCAC	Storrs, Conn	Connecticut Agricultural College (½ time)		250	600	
WCAD	Canton, N. Y	St. Lawrence University		500	1,220	D.
WCAE	Pittsburgh, Pa	Kaufman & Baer Co. (Inc.)		500	1,220	
WCAH	Columbus, Ohio	Commercial Radio Service Co	WHP, WBAK	500	1,430	
WCAJ	Lincoln, Nebr	Nebraska Wesleyan University	WOW	500	590	
WCAL	Northfield, Minn	St. Olaf College	KFMX, WRHM, WLB	1 kw	1,250	
WCAM	Camden, N. J	City of Camden	WOAX, WCAP	500	1,280	
WCAO	Baltimore, Md	Monumental Radio (Inc.)		250	600	
WCAP	Asbury Park, N. J	Radio Industries Broadcast Co	WCAM, WOAX	500	1,280	
WCAT	Rapid City, S. Dak	South Dakota State School of Mines		100	1,200	
WCAU	Byberry, Pa	Universal Broadcasting Co		10 kw	1,170	
	S.=Philadelphia, Pa.					
WCAX	Burlington, Vt	University of Vermont	WNBX	100	1,200	
WCAZ	Carthage, Ill	Carthage College		50	1,070	D.
WCBA	Allentown, Pa	B. Bryan Musselman	WSAN	250	1,440	
WCBD	Zion, Ill	Wilbur Glenn Voliva	WMBI	5 kw	1,080	LT.

WCBM	Baltimore, Md. C. P. issued to increase power to 250 watts; LS.	Baltimore Broadcasting Corporation		100	1,370	
WCBS	Springfield, Ill	Charles H. Messter and Harold L. Dewing	WTAX	100	1,210	
WCCO	Anoka, Minn S.=Minneapolis, Minn.	Northwestern Broadcasting (Inc.)		7½ kw	810	
WCDA	Cliffside Park, N. J S.=New York City, N. Y.	Italian Educational Broadcasting Co. (Inc.)	WBNY, WKBQ, WMSG	250	1,350	
WCFL	Chicago, Ill	Chicago Federation of Labor		1½ kw	970	LT.
WCGU	Coney Island, N. Y	U. S. Broadcasting Corporation	WSGH, WSDA, WLTH, WBBCO.	500	1,400	
WCKY	Crescent Springs, Ky S.=Covington, Ky.	L. B. Wilson (Inc.)	WSOA, WJAZ, WORD	5 kw	1,480	
WCLO	Kenosha, Wis	C. E. Whitmore		100	1,200	
WCLS	Joliet, Ill	WCLS (Inc.)	WEHS, WKBB, WKBI, WHFC.	100	1,310	
WCMA	Culver, Ind	Culver Military Academy	WBAA, WKBF	500	1,400	
WCOA	Pensacola, Fla	City of Pensacola, Fla		500	1,120	
WCOC	Meridian, Miss	H. B. Holmes, sr., and H. B. Holmes, jr., doing business as Crystal Oil Co.		500	880	
WCOD (formerly WPRC)	Harrisburg, Pa	Norman R. Hoffman	WKJC	1 kw		LS.
WCOH	Greenville, N. Y S.=Yonkers, N. Y.	Westchester Broadcasting Corporation	WJBI, WGBB, WINR	100	1,200	
WCRW	Chicago, Ill	Clinton R. White	WSBC, WEDC	100	1,210	
WCSH	Portland, Me	Congress Square Hotel Co		100	1,210	
WCSO	Springfield, Ohio	Wittenberg College	WFJC	500	940	
WDAE	Tampa, Fla	Tampa Publishing Co	WDBO	500	1,450	
WDAF	Kansas City, Mo	Kansas City Star Co	WOQ	1 kw	620	
WDAG	Amarillo, Tex	National Radio & Broadcasting Corporation	KGRS	1 kw	610	
WDAH	El Paso, Tex	Trinity Methodist Church	KTSM	250	1,410	
WDAY	West Fargo, N. Dak	WDAY (Inc.)	WEBC	100	1,310	
WDBJ	Roanoke, Va	Richardson-Wayland Electrical Corporation		1 kw	1,280	
WDBO	Orlando, Fla	Rollins College (Inc.)	WDAE	250	930	
WDEL	Wilmington, Del	WDEL (Inc.)		500		LS.
WDGY	Minneapolis, Minn	Dr. Geo. W. Young	WHDI	1 kw	620	
WDOD	Chattanooga, Tenn	Chattanooga Radio Co. (Inc.)		250	1,120	
WDRC	New Haven, Conn	Doolittle Radio Corporation		350		LS.
WDSU	New Orleans, La	Joseph H. Uhalt		1 kw	1,180	LT.
WDWF, WLSI	Cranston, R. I S.=Providence, R. I.	Dutee W. Flint and The Lincoln Studios (Inc.)	WPAW	1 kw	1,280	
WDZ	Tuscola, Ill	James L. Bush		2½ kw		LS.
WEAF	Bellmore, N. Y S.=New York, N. Y.	National Broadcasting Co. (Inc.)		500	1,330	
WEAI	Ithaca, N. Y	Cornell University		1 kw	1,250	
WEAN	Providence, R. I	The Shepard Co		100	1,210	
				100	1,070	D.
				50 kw	660	LP.
				500	1,270	D.
				250	780	
				500		LS.

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.

LT.=Limited time. See General Order No. 48.
LP.=Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WEAO	Columbus, Ohio	Ohio State University	WKBN	750	570	
WEAR	Cleveland, Ohio	WTAM and WEAR (Inc.)	WTBM	1 kw	1,070	
WEBC	Superior, Wis. S.=Duluth, Minn.	Head of the Lakes Broadcasting Co	WDAY	1 kw	1,280	
WEBE	Cambridge, Ohio	Roy W. Waller		100	1,210	
WEBQ	Harrisburg, Ill	First Trust & Savings Bank of Harrisburg	KFVS	100	1,210	
WEBR	Buffalo, N. Y	Howell Broadcasting Co. (Inc.)		100	1,310	
WEBW	Beloit, Wis	Beloit College		200		LS.
WEDC	Chicago, Ill	Emil Denemark (Inc.)	WCRW, WSBC	350	600	D.
WEDH	Erie, Pa	Erie Dispatch Herald Broadcasting Corporation		100	1,210	
WEEI	Weymouth, Mass. S.=Boston, Mass.	Edison Electric Illuminating Co. of Boston		30	1,420	
WEHC	Emory, Va	Emory and Henry College		1 kw	590	
WEHS	Evanston, Ill	Victor C. Carlson	WCLS, WKBB, WKBI, WHFC	100	1,370	
WELK	Philadelphia, Pa	Howard R. Miller		100	1,310	
WEMC	Berrien Springs, Mich	Emmanuel Missionary College		100	1,370	
WENR, WBCN	Chicago, Ill	Great Lakes Broadcasting Co	WLS	1 kw	590	D.
WEVD	Forest Hills, N. Y. S.=New York City.	Debs Memorial Radio Fund (Inc.)	WBBR, WHAP, WHAZ	50 kw	870	LP.
WEW	St. Louis, Mo	St. Louis University		500	1,300	
WFAA	Dallas, Tex. C. P. issued to increase power to 50 kilowatts; LP.	The Dallas News & Dallas Journal (A. H. Belo Corporation).	WBAP	1 kw 10 kw	760 800	D.
WFAN	Philadelphia, Pa	Keystone Broadcasting Co	WIP	500	610	
WFBC	Knoxville, Tenn	First Baptist Church		50	1,200	
WFBG	Altoona, Pa	Wm. F. Gable Co	WJAC	100	1,310	
WFBJ	Collegeville, Minn	St. John's University		100	1,370	
WFBL	Syracuse, N. Y	The Onondaga Co	WMAK	750	900	
WFBM	Indianapolis, Ind	Indianapolis Power & Light Co	WSBT	1 kw	1,230	
WFBR	Baltimore, Md	Baltimore Radio Show (Inc.)		250	1,270	
WFDF	Flint, Mich	Frank D. Fallain		100	1,310	
WFI	Philadelphia, Pa	Strawbridge & Clothier	WLIT	500	560	
WFIW	Hopkinsville, Ky	The Acme Mills (Inc.)		1 kw	940	
WFJC	Akron, Ohio	W. F. Jones Broadcasting (Inc.)	WCSO	500	1,450	
WFKD	Wissinoming, Pa. S.=Philadelphia, Pa.	Foulkrod Radio Engineering Co	WNAT, WABY	50	1,310	
WFLA, WSUN	Clearwater, Fla	Clearwater Chamber of Commerce and St. Petersburg Chamber of Commerce.		1 kw 2½ kw	900	LS.
WGAL	Lancaster, Pa	Lancaster Electric Supply & Construction Co	WRAW	15	1,310	
WGBB	Freeport, N. Y	Harry H. Carman	WJBI, WINR, WCOH	100	1,210	

WGBC	Memphis, Tenn	First Baptist Church	WNBR	500	1,430	
WGBF	Evansville, Ind	Evansville on the Air (Inc.)	WOS, KFRU	500	630	
WGBI	Scranton, Pa	Scranton Broadcasters (Inc.)	WQAN	250	880	
WGBS	Astoria, Long Island, N. Y. S.=New York City.	General Broadcasting System (Inc.)		500	1,180	LT.
WGCM	Gulfport, Miss	Great Southern Land Co. (Inc.)		100	1,210	
WGCP	Newark, N. J	May Radio Broadcast Corporation	WODA, WAAM	250	1,250	
WGES	Chicago, Ill	Oak Leaves Broadcasting Station (Inc.)	WJKS	500	1,360	
WGH	Newport News, Va	Virginia Broadcasting Co. (Inc.)		100	1,310	
WGHP	Fraser, Mich S.=Detroit, Mich.	American Broadcasting Corporation of Ohio. C. P. issued to move and increase power to 1 kilowatt.		750	1,240	
WGL	Fort Wayne, Ind	Fred C. Zieg (Allen Wayne Co.)		100	1,370	
WGMS, WLB. (See WLB, WGMS.)						
WGN, WLIB	Elgin, Ill S.=Chicago, Ill.	The Tribune Co		25 kw	720	
WGR	Amherst, N. Y S.=Buffalo, N. Y.	Radio Station WGR (Inc.)		1 kw	550	
WGST	Atlanta, Ga	Georgia School of Technology	WMAZ	250	890	
WGY	South Schenectady, N. Y	General Electric Co		50 kw	790	
WHA	Madison, Wis	University of Wisconsin		750	940	D.
WHAD	Milwaukee, Wis	Marquette University	WISN	250	1,120	
WHAM	Victor Township, N. Y S.=Rochester, N. Y.	Stromberg-Carlson Telephone Manufacturing Co.		5 kw	1,150	
WHAP	Carlstadt, N. J S.=New York City.	Defenders of Truth Society (Inc.)	WBBR, WEVD, WHAZ	1 kw	1,300	
WHAS	Jeffersontown, Ky S.=Louisville, Ky.	The Courier-Journal Co. and The Louisville Times Co.		10 kw	820	
WHAZ	Troy, N. Y	Rensselaer Polytechnic Institute	WBBR, WAHP, WEVD	500	1,300	
WHB	Kansas City, Mo	Sweeney Automobile School Co	KMBC	500	950	
WHBC	Canton, Ohio	St. John's Catholic Church (Sundays)	WNBO	10	1,200	
WHBD	Mount Orab, Ohio	F. P. Moler		100	1,370	
WHBF	Rock Island, Ill	Beardsley Specialty Co		100	1,210	
WHBL	Sheboygan, Wis	Press Publishing Co. and C. L. Carrell	KFLV	500	1,410	
WHBQ	Memphis, Tenn	Broadcasting Station WHBQ (Inc.)		100	1,370	
WHBU	Anderson, Ind	Citizens Bank		100	1,210	
WHBY	West De Pere, Wis S.=Green Bay, Wis.	St. Norbert College (Sunday 10 to 11 a. m. and 5 to 6 p. m. Daily 12 noon to 1 p. m. and 6 to 8 p. m.)		100	1,200	LT.
WHDF	Calumet, Mich	Upper Michigan Broadcasting Co		100	1,370	
WHDH	Gloucester, Mass	Matheson Radio Co. (Inc.)		1 kw	830	D.
WHDI	Minneapolis, Minn	William Hood Dunwoody Industrial Institute	WDGY	500	1,180	LT.
WHEC, WABO	Rochester, N. Y	Hickson Elec. Co. (Inc.)	WOKO	500	1,440	
WHFC	Cicero, Ill	Triangle Broadcasters	WCLS, WKBB, WKBI, WEHS	100	1,310	
WHIS	Bluefield, W. Va	Daily Telegraph Printing Co		100	1,420	

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.
LT.=Limited time. See General Order No. 48.
LP.=Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WHK	Cleveland, Ohio. C. P. to move to Independence, Ohio.	Radio Air Service Corporation		1 kw	1,390	
WHN	New York, N. Y	Marcus Loew Booking Agency	WRNY, WQAO-WPAP	250	1,010	
WHO	Des Moines, Iowa	Bankers Life Co	WOC	5 kw	1,000	
WHP	Lemoyne, Pa. S.=Harrisburg, Pa.	Pennsylvania Broadcasting Co. (W. S. McCachren, president).	WBAK, WCAH	500	1,430	
WIAS	Ottumwa, Iowa	Morris W. & James P. Poling, doing business as Poling Electric Co.		100	1,420	
WIBA	Madison, Wis	The Capital Times Co		100	1,210	
WIBG	Elkins Park, Pa	St. Pauls Protestant Episcopal Church		50	930	D.
WIBM	Jackson, Mich	C. L. Carrell	WJBK	100	1,370	
WIBO	Desplaines, Ill S.=Chicago, Ill.	Nelson Bros. Bond & Mortgage Co	WPCC, WNAX	1 kw	570	
WIBR	Steubenville, Ohio	George W. Robinson	WQBZ	1½ kw		LS.
WIBS	Jersey City, N. J	New Jersey Broadcasting Corporation	WBMS, WNJ, WKBO	50	1,420	
WIBU	Poynette, Wis	Wm. C. Forrest		250	1,450	
WIBW	Near Topeka, Kans	Topeka Broadcasting Association (Inc.)	KFH	100	1,310	
WIBX	Utica, N. Y	WIBX (Inc.)		1 kw	1,300	
WICC	Easton, Conn S.=Bridgeport, Conn.	Bridgeport Broadcasting Station (Inc.)		2½ kw		LS.
WIL	St. Louis, Mo	Missouri Broadcasting Corporation	KFWF, WMAY	100	1,200	
WILL	Urbana, Ill	University of Illinois	KFNF, KUSD	250		LS.
WILM	Wilmington, Del	Delaware Broadcasting Co. (Inc.)		250	890	
WIOD, WMBF	Miami Beach, Fla	Webb Jay & Jesse H. Jay, doing business as Isle of Dreams Broadcasting Co.		500		LS.
WIP	Philadelphia, Pa	Gimbel Bros. (Inc.)	WFAN	100	1,420	
WISN	Milwaukee, Wis	Evening Wisconsin Co	WHAD	1 kw	560	
WJAC (formerly WHBP)	Johnstown, Pa	Johnstown Automobile Co	WFBG	500	610	
WJAD	Waco, Tex	Frank P. Jackson	KSAT	250	1,120	
WJAG	Norfolk, Nebr	Norfolk Daily News		100	1,310	
WJAK	Marion, Ind	Marion Broadcast Co	WLBC	1 kw	1,240	
WJAR	Providence, R. I	The Outlet Co		1 kw	1,060	LT.
WJAS	North Fayette Township, Pa. S.=Pittsburgh, Pa.	Pittsburgh Radio Supply House		50	1,310	
WJAX	Jacksonville, Fla	City of Jacksonville		250	890	
WJAY	Cleveland, Ohio	Cleveland Radio Broadcasting Corporation		400		LS
WJAZ	Mount Prospect, Ill S.=Chicago, Ill.	Zenith Radio Corporation	WSOA, WORD, WCKY	1 kw	1,290	
				1 kw	1,260	
				500	620	D.
				5 kw	1,480	

WJBC	La Salle, Ill	Hummer Furniture Co	WJBL	100	1,200	
WJBI	Red Bank, N. J	Robert S. Johnson	WGBR, WINR, WCOH	100	1,210	
WJBK	Ypsilanti, Mich	James F. Hopkins	WIBM	50	1,370	
WJBL	Decatur, Ill	Wm. Gushard Dry Goods Co	WJBC	100	1,200	
WJBO	New Orleans, La	Valdemar Jensen		100	1,370	
WJBT, WBBM. (See WBBM, WJBT.)						
WJBU	Lewisburg, Pa	Bucknell University	WBAX	100	1,210	
WJBW	New Orleans, La	C. Carlson	WABZ	30	1,200	
WJBY	Gadsden, Ala	Chas. J. Black		50	1,210	
				500 kw	1,270	
WJDX	Jackson, Miss	Lamar Life Insurance Co. (C. P. only)		1 kw		LS.
WJJD	Mooseheart, Ill	Supreme Lodge of the World, Loyal Order of Moose.		20 kw	1,130	LT.
WJKS	Gary, Ind	Johnson-Kennedy Radio Corporation	WGES	500	1,360	
				1¼ kw		LS.
WJR	Sylvan Lake Village, Mich. S.=Detroit, Mich.	WJR The Goodwill Station (Inc.)		5 kw	750	
WJSV	Mount Vernon Hills, Va	Independent Publishing Co		10 kw	1,460	
WJW (formerly WLBV)	Mansfield, Ohio	John F. Weimer, owner Mansfield Broadcasting Association.		100	1,210	
WJZ	Bound Brook, N. J S.=New York City, N. Y.	Radio Corporation of America		30 kw	760	LP.
WKAQ	San Juan, P. R	Radio Corporation of Porto Rico		500	890	
WKAR	E. Lansing, Mich	Michigan State College		1 kw	1,040	D.
WKAV	Laconia, N. H	Laconia Radio Club		100	1,310	
WKBB	Joliet, Ill	J. Sanders and Ben Sanders, doing business as Sanders Bros.	WEHS, WCLS, WKBI, WHFC	100	1,310	
WKBC	Birmingham, Ala	R. B. Broyles, doing business as R. B. Broyles Furniture Co.		100	1,310	
WKBF	Indianapolis, Ind	Indianapolis Broadcasting (Inc.)	WBAA, WCMA	500	1,400	
WKBH	La Crosse, Wis	Jos. Callaway, doing business as Callaway Music Co.	KSO	1 kw	1,380	
WKBI	Chicago, Ill	Fred L. Schoenwolf	WCLS, WKBB, WHFC, WEHS	50	1,310	
WKBN	Youngstown, Ohio	Warren P. Williamson, jr	WEAO	500	570	
WKBO	Jersey City, N. J	Camith Corporation	WBMS, WNJ, WIBS	250	1,450	
WKBP	Battle Creek, Mich	Enquirer-News Co		50	1,420	
WKBQ	New York, N. Y	Standard Cahill Co. (Inc.)	WBNY, WMSG, WCDA	250	1,350	
WKBS	Galesburg, Ill	Permil N. Nelson		100	1,310	
WKBV	Connersville, Ind	Wm. O. Knox, doing business as Knox Battery & Electric Co.		100	1,500	
				150		LS.
WKBW	Amherst, N. Y S.=Buffalo, N. Y.	Churchill Evangelistic Association (Inc.)		5 kw	1,470	
WKBZ	Ludington, Mich	K. L. Ashbacker		50	1,500	
WKEN	Grand Island, N. Y S.=Buffalo, N. Y.	Radio Station WKEN (Inc.)		1 kw	1,040	LT.
WKJC	Lancaster, Pa	Kirk Johnson & Co	WCOD	100	1,200	
WKRC	Cincinnati, Ohio	J. S. Boyd		500	550	

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.
LT.=Limited time. See General Order No. 48.
LP.=Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WKY	Oklahoma City, Okla	WKY Radiophone Co		1 kw	900	
WLAC	Nashville, Tenn	Life & Casualty Insurance Co. of Tennessee	WTNT	5 kw	1,490	
WLAP	Louisville, Ky	American Broadcasting Corporation of Kentucky.		30	1,200	
WLB, WGMS	Minneapolis, Minn. (Call WGMS used by WCCO when broadcasting over WLB.)	University of Minnesota	WCAL, KFMX, WRHM	500	1,250	
WLBC	Muncie, Ind	Donald A. Burton	WJAK	50	1,310	
WLBF	Kansas City, Kans	Everett L. Dillard		100	1,420	
WLBG	Ettrick, Va S.=Petersburg, Va.	Robert Allen Gamble		250		LS.
WLBL	Stevens Point, Wis	Wisconsin Department of Markets		2 kw	900	D.
WLBW	Oil City, Pa	Radio-Wire Program Corporation of America		500	1,260	
WLBX	Long Island City, N. Y	John N. Brahy	WCLB, WWRL, WMBQ	100	1,500	
WLBZ	Bangor, Me	Maine Broadcasting Co. (Inc.)		500	620	
WLCI	Ithaca, N. Y	Lutheran Association of Ithaca, N. Y		50	1,210	
WLEX	Lexington, Mass	Carl S. Wheeler, doing business as the Lexington Air Stations.	WMAF	500	1,360	
WLEY	do	do	WSSH	100 250	1,420	LS.
WLIB, WGN. (See WGN, WLIB.)						
WLIT	Philadelphia, Pa	Lit Bros	WFI	500	560	
WLOE	Chelsea, Mass S.=Boston, Mass.	Boston Broadcasting Co	WMES	100 250	1,500	LS.
WLS	Crete, Ill S.=Chicago, Ill.	Agricultural Broadcasting Co C. P. issued to increase power to 50 kilowatts; LP.	WENR, WBCN	5 kw	870	
WLSI, WDWF. (See WDWF, WLSI.)						
WLTH	Brooklyn, N. Y	Voice of Brooklyn (Inc.)	WCGU, WSGH, WSDA, WBBC	500	1,400	
WLW	Mason, Ohio S.=Cincinnati.	Crosley Radio Corporation		50 kw	700	LP.
WLWL	Kearny, N. J S.=New York City.	Missionary Society of St. Paul the Apostle	WPG	5 kw	1,100	
WMAC	Cazenovia, N. Y	Clive B. Meredith	WSYR	250	570	
WMAK	Martinsville, N. Y S.=Buffalo, N. Y.	WMAK Broadcasting System (Inc.)	WFBL	750	900	
WMAL	Washington, D. C	M. A. Leese		250 500	630	LS.
WMAN	Columbus, Ohio	W. E. Heskett		50	1,210	

WMAQ	Addison, Ill. S.=Chicago, Ill.	Chicago Daily News (Inc.)		5 kw	670	
WMAY	St. Louis, Mo.	Kingshighway Presbyterian Church	KFWF, WIL	100	1,200	
				250		LS.
WMAZ	Macon, Ga.	Macon Junior Chamber of Commerce	WGST	250	890	
				500		LS.
WMBA	Newport, R. I.	Leroy Joseph Beebe		100	1,500	
WMBC	Detroit, Mich. C. P. issued to increase power to 250; LS.	Michigan Broadcasting Co. (Inc.)		100	1,420	
WMBD	Peoria Heights, Ill.	E. M. Kahler (owner Peoria Heights Radio Laboratory)	WTAD	500	1,440	
				1 kw		LS.
WMBF, WIOD. (See WIOD, WMBF.)						
WMBG	Richmond, Va.	Havens & Martin (Inc.)		100	1,210	
WMBH	Joplin, Mo.	Edwin Dudley Aber		100	1,420	
				250		LS.
WMBI	Addison, Ill. S.=Chicago.	The Moody Bible Institute Radio Station	WCBD	5 kw	1,080	LT.
WMBO	Auburn, N. Y.	Radio Service Laboratories		100	1,370	
WMBQ	Brooklyn, N. Y.	Paul J. Gollhofer	WCLB, WWRL, WLBX	100	1,500	
WMBR	Tampa, Fla.	F. J. Reynolds		100	1,210	
WMC	Memphis, Tenn. (C. P. issued to move to Bartlett, Tenn.)	Memphis Commercial Appeal (Inc.)		500	780	
				1 kw		LS.
WMCA	Hoboken, N. J. S.=New York City, N. Y.	Knickerbocker Broadcasting Co. (Inc.)	WNYC	500	570	
WMES	Boston, Mass.	Massachusetts Education Society	WLOE	50	1,500	
WMMN	Fairmont W. Va.	Holt-Rowe Novelty Co.		250	890	
				500		LS.
WMPC	Lapeer, Mich.	First Methodist Protestant Church of Lapeer		100	1,500	
WMRJ	Jamaica, N. Y.	Peter J. Prinz	WPOE, WHPP	10	1,420	
WMSG	New York, N. Y.	Madison Square Garden Broadcast Corporation	WBNY, WCDA, WKBQ	250	1,350	
WMT	Waterloo, Iowa.	Waterloo Broadcasting Co.		250	600	
WNAC, WBIS	Quincy, Mass. S.=Boston, Mass.	Shepard Norwell Co. (Trade name The Shepard Stores.)		1 kw	1,230	
WNAD	Norman, Okla.	University of Oklahoma	KGGF	500	1,010	
WNAT	Philadelphia, Pa.	Albert A. Walker	WFKD, WABY	100	1,310	
WNAX	Yankton, S. Dak.	Gurney Seed & Nursery Co.	WIBO, WPCC	1 kw	570	
WNBF	Binghamton, N. Y.	Howitt-Wood Radio Co. (Inc.)		50	1,500	
WNBH	New Bedford, Mass.	Irving Vermilya, doing business as New Bedford Broadcasting Co.		100	1,310	
WNBJ	Knoxville, Tenn.	Lonsdale Baptist Church		50	1,310	
WNBO	Washington, Pa.	John Brownlee Spriggs	WHBC Sundays	100	1,200	
WNBR	Memphis, Tenn.	John Ulrich	WGBC	500	1,430	
WNBW	Carbondale, Pa.	G. F. Schiessler & M. E. Stephens, doing business as Home Cut Glass & China Co.		10	1,200	
WNBX	Springfield, Vt.	First Congregational Church Corporation	WCAX	10	1,200	
WNBZ	Saranac Lake, N. Y.	Earl J. Smith & William Mace, doing business as Smith & Mace.		50	1,290	D.

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.

LT.=Limited time. See General Order No. 48.
LP.=Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WNJ	Newark, N. J.	Radio Investment Co.	WBMS, WIBS, WKBO	250	1,450	
WNOX	Knoxville, Tenn. (C. P. issued to increase power to 2 kilowatts; LS.)	Sterchi Bros.		1 kw	560	
WNRC	Greensboro, N. C.	Wayne M. Nelson		250	1,440	
WNYC	New York, N. Y.	City of New York, department of plant and structures.	WMCA	500	570	
WOAI	San Antonio, Tex. (C. P. issued to increase power to 50 kilowatts, LP.)	Southern Equipment Co.		5 kw	1,190	
WOAN	Lawrenceburg, Tenn.	James D. Vaughan	WREC	500	600	
WOAX	Trenton, N. J.	Franklyn J. Wolff	WCAM, WCAP	500	1,280	
WOBT	Union City, Tenn.	A. F. Tittsworth, trading as Tittsworth Radio & Music Shop.		100, 250	1,310	LS.
WOBU	Near Charleston	Charleston Radio Broadcasting Co.	WSAZ	250	580	
WOC	Davenport, Iowa	Palmer School of Chiropractic	WHO	5 kw	1,000	
WOCL	Jamestown, N. Y.	A. E. Newton		25	1,210	
WODA	Paterson, N. J.	Richard E. O'Dea	WGCP, WAAM	1 kw	1,250	
WODX	Springhill, Ala. S.=Mobile, Ala.	Scott Helt, trustee, Mobile Broadcasting Corporation. (C. P. only.)	WSFA	500	1,410	
WOI	Ames, Iowa	Iowa State College of Agricultural and Mechanical Arts.	KFEQ	5 kw	560	D.
WOKO	Mount Beacon, N. Y. S.=Poughkeepsie, N. Y.	H. E. Smith & R. M. Curtis, doing business as Hudson Valley Broadcasting Co.	WHEC, WABO	500	1,440	
WOL	Washington, D. C.	American Broadcasting Co.		100	1,310	
WOMT	Manitowoc, Wis.	Francis M. Kadow		100	1,210	
WOOD	Furnwood, Mich. S.=Grand Rapids, Mich.	Walter B. Stiles (Inc.)	WASH	500	1,270	
WOPI	Bristol, Tenn.	Wilson Radiophone Service Co.		100	1,500	
WOQ	Kansas City, Mo.	Unity School of Christianity	WDAF	1 kw	610	
WOR	Kearny, N. J. S.=Newark, N. J.	L. Bamberger & Co.		5 kw	710	
WORC (formerly WKBE).	Auburn, Mass. S.=Worcester, Mass.	Alfred Frank Kleindienst	WEPS	100	1,200	
WORD	Batavia, Ill. S.=Chicago, Ill.	People's Pulpit Association	WJAZ, WSOA, WCKY	5 kw	1,480	
WOS	Jefferson City, Mo.	Missouri State Marketing Bureau	WGBF, KFRU	500 1 kw	630	 LS.
WOV	Secaucus, N. J. S.=New York City.	International Broadcasting Corporation		1 kw	1,130	D. to 6 p. m.
WOW	Omaha, Nebr.	Woodmen of the World Life Insurance Association.	WCAJ	1 kw	590	
WOWO	Fort Wayne, Ind.	Main Auto Supply Co.	WWVA	10 kw	1,160	

WPAP, WQAO. (See WQAO, WPAP.)						
WPAW	Pawtucket, R. I.	Shartenberg & Robinson Co.	WDWF, WLSI	100	1,210	
WPCC	Chicago, Ill.	North Shore Congregational Church	WIBO, WNAX	500	570	
WPCH	Hoboken, N. J. S.=New York City.	Eastern Broadcasters (Inc.)		500	810	D.
WPEN (formerly WPSW).	Philadelphia, Pa.	Wm. Penn Broadcasting Co.		100	1,500	
				250		LS.
WPG	Atlantic City, N. J.	Municipality of Atlantic City	WLWL	5 kw	1,100	
WPOE	Patchogue, N. Y.	Nassau Broadcasting Corporation	WHPP, WMRJ	30	1,420	
				100		LS.
WPOR, WTAR. (See WTAR, WPOR.)						
WPSC	State College, Pa.	Pennsylvania State College		500	1,230	D.
WPTF	Raleigh, N. C.	Durham Life Insurance Co.		1 kw	680	LT.
WQAM	Miami, Fla.	Miami Broadcasting Co.		1 kw	1,240	
WQAN	Scranton, Pa.	E. J. Lynett, proprietor, The Scranton Times	WGBI	250	880	
WQAQ, WPAP	Cliffside, N. J. S.=New York City, N. Y.	Calvary Baptist Church	WHN, WRNY	250	1,010	
WQBC	Utica, Miss.	Utica Chamber of Commerce (Inc.)		300	1,360	
WQBZ	Weirton, W. Va.	J. H. Thompson	WIBR	60	1,420	
WRAF	La Porte, Ind.	The Radio Club (Inc.)	WWAE	100	1,200	
WRAK	Erie, Pa.	Clarence R. Cummins		50	1,370	
WRAW	Reading, Pa.	Horace D. Good, trading as Avenue Radio & Electric Shop.	WGAI	100	1,310	
WRAX	Philadelphia, Pa.	Berachah Church (Inc.)		250	1,020	D.
WRBI	Tifton, Ga.	Chas. A. & Milton U. Kent, doing business as Kent's Furniture & Music Store.	Half time	20	1,310	
WRBJ	Hattiesburg, Miss.	Woodruff Furniture Co. (Inc.)		10	1,500	
WRBL	Columbus, Ga.	David Parmer		50	1,200	
WRBQ	Greenville, Miss.	J. Pat. Scully		100	1,210	
WRBT	Wilmington, N. C.	Wilmington Radio Association		100	1,370	
WRBU	Gastonia, N. C.	A. J. Kirby Music Co. (A. J. Kirby, owner)		100	1,210	
WRC	Washington, D. C.	Radio Corporation of America		500	950	
WREC	Whitehaven, Tenn. S.=Memphis, Tenn.	WREC (Inc.)	WOAN	500	600	
				1 kw		LS.
WREN	Lawrence, Kans.	Jenny Wren Co.	KFKU	1 kw	1,220	
WRHM	Fridley, Minn. S.=Minneapolis, Minn.	Rosedale Hospital Co. (Inc.)	WCAL, KFMX, WLB	1 kw	1,250	
WRJN	Racine, Wis.	Racine Broadcasting Corporation		100	1,370	
WRK	Hamilton, Ohio	S. W. Doron & John C. Slade, doing business as Hamilton Radio Service.		100	1,310	
WRNY	Coytesville, N. J. S.=New York City, N. Y.	Aviation Radio Station (Inc.)	WQAO, WPAP, WHN	250	1,010	
WRR	Dallas, Tex.	City of Dallas, Tex.		500	1,280	
WRUF	Gainesville, Fla.	University of Florida		5 kw	1,470	
WRVA	Mechanicsville, Va. S.=Richmond, Va.	Larus & Bro. Co. (Inc.)		5 kw	1,110	
WSAI	Mason, Ohio S.=Cincinnati, Ohio	Crosley Radio Corporation, lessee		500	1,330	

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.

LT.=Limited time. See General Order No. 48.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
WSAJ	Grove City, Pa	Grove City College		100	1,310	
WSAN	Allentown, Pa	Allentown Call Pub. Co. (Inc.)	WCBA	250	1,440	
WSAR	Fall River, Mass	Doughty & Welsh Electric Co. (Inc.)		250	1,450	
WSAZ	Huntington, W. Va	WSAZ (Inc.)	WOBU	250	580	
WSB	Atlanta, Ga. (C. P. issued to increase power to 5 kilowatts.)	Atlanta Journal Co		1 kw	740	
WSBC	Chicago, Ill	World Battery Co. (Inc.)	WEDC, WCRW	100	1,210	
WSBT	South Bend, Ind	South Bend Tribune	WFBM	500	1,230	
WSDA, WSGH. (See WSGH, WSDA.)						
WSFA	Montgomery, Ala	Howard E. Pill and S. G. Persons, doing business as Montgomery Broadcasting Co. (C. P. only).	WODX	500	1,410	
WSGH, WSDA	Brooklyn, N. Y	Abraham Hass and Salvatore D. Angelo, doing business as Amateur Radio Specialty Co.	WCGU, WLTH, WBBC	500	1,400	
WSIX	Springfield, Tenn	Jack M. and Lewis R. Draughton, doing business as 638 Tire & Vulcanizing Co.		100	1,210	
WSJS (formerly WJDZ)	Winston-Salem, N. C	Winston-Salem Journal Co. (C. P. only)		100	1,310	
WSM	Nashville, Tenn	National Life & Accident Insurance Co		5 kw	650	
WSMB	New Orleans, La	Saenger Theatres (Inc.) & Maison Blanche Co		500	1,320	
WSMK	Dayton, Ohio	Stanley M. Krohn, jr	KQV	200	1,380	
WSOA	Deerfield, Ill S.=Chicago, Ill.	Radiophone Broadcasting Corporation	WJAZ, WORD, WCKY	5 kw	1,480	
WSPD	Toledo, Ohio	Toledo Broadcasting Co		500	1,340	
				1 kw		LS.
WSSH	Boston, Mass	Tremont Temple Baptist Church	WLEY	100	1,420	
				250		LS.
WSUI	Iowa City, Iowa	State University of Iowa	KSAC	500	580	
WSUN, WFLA. (See WFLA, WSUN.)						
WSVS	Buffalo, N. Y	Seneca Vocational High School (Elmer S. Pierce, principal).		50	1,370	
WSYR	Syracuse, N. Y	Clive B. Meredith	WMAC	250	570	
WTAD	Quincy, Ill	Illinois Stock Medicine Broadcasting Corporation.	WMBD	500	1,440	
WTAG	Worcester, Mass	Worcester Telegram Publishing Co. (Inc.)		250	580	
WTAM	Brecksville Village, Ohio S.=Cleveland, Ohio.	WTAM & WEAR (Inc.)	WEAR	50 kw	1,070	LP.
WTAQ	Township of Washington, Wisconsin. S.=Eau Claire, Wis.	Gillette Rubber Co	KSCJ	1 kw	1,330	
WTAR, WPOR	Norfolk, Va	WTAR Radio Corporation	½ time	500	780	

WTAW	College Station, Tex	Agricultural & Mechanical College of Texas	KUT	500	1,120	
WTAX	Streator, Ill	Williams Hardware Co	WCBS	50	1,210	
WTBO	Cumberland, Md	Associated Broadcasting Corporation		50	1,420	
WTFI	Toccoa, Ga	Toccoa Falls Institute		250	1,450	
WTIC	Avon, Conn S.=Hartford, Conn.	Travelers Broadcasting Service	WBAL	50 kw	1,060	LP.
WTMJ	Brookfield, Wis S.=Milwaukee, Wis.	The Journal Co. (Milwaukee Journal)		1 kw 2½ kw	620 ------	LS.
WTNT (formerly WBAW).	Nashville, Tenn	Tennessee Publishing Co	WLAC	5 kw	1,490	
WTOC	Savannah, Ga	Chamber of Commerce of Savannah		500	1,260	
WWAE	Hammond, Ind	Hammond-Calumet Broadcasting Corporation	WRAF	100	1,200	
WWJ	Detroit, Mich	The Evening News Association (Inc.)		1 kw	920	
WWL	New Orleans, La	Loyola University (KWKH)		5 kw	850	
WWNC	Asheville, N. C	Citizen's Broadcasting Co. (Inc.)		1 kw	570	
WWRL	Woodside, N. Y	Long Island Broadcasting Corporation	WMBQ, WLBX, WCLB	100	1,500	
WWVA	Wheeling, W. Va	West Virginia Broadcasting Corporation	WOWO	5 kw	1,160	
KCRC	Enid, Okla	Champlin Refining Co	KGFG	100 250	1,370 ------	LS.
KDB	Santa Barbara, Calif	Santa Barbara Broadcasting Co		100	1,500	
KDFN	Casper, Wyo	Donald Lewis Hathaway (C. P. only)		100	1,210	
KDKA	Wilkins Township, Pa. (C. P. issued to move near Saxonburg, Pa.) S.=Pittsburgh, Pa.	Westinghouse Electric & Manufacturing Co		50 kw	980	LP.
KDLR	Devils Lake, N. Dak	Bert Wick & Harold Serumgard (Radio Electric Co.).		100	1,210	
KDYL	Salt Lake City, Utah	Intermountain Broadcasting Corporation		1 kw	1,290	
KECA (formerly KPLA)	Los Angeles, Calif	Pacific Radio Development Co		1 kw	1,000	LT.
KEJK	Beverly Hills, Calif	R. S. Macmillan		500	1,170	LT.
KELW	Burbank, Calif	Earl L. White	KTM	500	780	
KEX	Portland, Oreg	Western Broadcasting Co	KOB	5 kw	1,180	
KFAB	Lincoln, Nebr	Nebraska Buick Automobile Co	WBBM, WJBT	5 kw	770	
KFBB	Great Falls, Mont	Buttrey Broadcast (Inc.)	KGIR	500	1,360	
KFBK	Sacramento, Calif	James McClatchy Co		100	1,310	
KFBL	Everett, Wash	Otto Leese & Robert Leese, doing business as Leese Bros.	KVL	50	1,370	
KFDM	Beaumont, Tex. (C. P. issued to increase power to 1 kilowatt, LS.)	Magnolia Petroleum Co		500	560	
KFDY	Brookings, S. Dak	South Dakota State College	KFYR	500 1 kw	550 ------	LS.
KFEL	Denver, Colo	Eugene P. O'Fallon (Inc.)	KFXF	250	940	
KFEQ	St. Joseph, Mo	Scroggin & Co. Bank	WOI	2½ kw	560	D.
KFGQ	Boone, Iowa	Boone Biblical College	KWCR, KFJY	100	1,310	
KFH	Wichita, Kans. (C. P. issued for 1 kilowatt.)	Radio Station KFH Co	WIBW	500	1,300	
KFHA	Gunnison, Colo	Western State College of Colorado		50	1,200	
KFI	Los Angeles, Calif	Earl C. Anthony (Inc.)		5 kw	640	
KFIF	Portland, Oreg	Benson Polytechnic School	KXL	100	1,420	

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.
LT.=Limited time. See General Order No. 48.
LP.=Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
KFIO	Spokane, Wash	Spokane Broadcasting Corporation		100	1,230	D.
KFIZ	Fond du Lac, Wis	The Reporter Printing Co		100	1,420	
KFJB	Marshalltown, Iowa	Marshall Electric Co. (Inc.)		100	1,200	
KFJF	Oklahoma City, Okla	National Radio Manufacturing Co		5 kw	1,470	
KFJI	Astoria, Oreg	KFJI Broadcasters (Inc.)		100	1,370	
KFJM	Grand Forks, N. Dak	University of North Dakota		100	1,370	
KFJR	Portland, Oreg	Ashley C. Dixon, trading as Ashley C. Dixon & Son.	KTBR	500	1,300	
KFJY	Fort Dodge, Iowa	C. S. Tunwall	KFGQ, KWCR	100	1,310	
KFJZ	Fort Worth, Tex	H. C. Meacham		100	1,370	
KFKA	Greeley, Colo	Colorado State Teachers College	KPOF	500	880	
				1 kw		LS.
KFKB	Milford, Kans	John R. Brinkley		5 kw	1,050	LT.
KFKU	Lawrence, Kans	University of Kansas	WREN	1 kw	1,220	
KFKX-KYW. (See KYW, KFKX.)						
KFLV	Rockford, Ill	A. T. Frykman	WHBL	500	1,410	
KFLX	Galveston, Tex	George Roy Clough		100	1,370	
KFMX	Northfield, Minn	Carleton College	WCAL, WRHM, WLB	1 kw	1,250	
KFNF	Shenandoah, Iowa	Henry Field Seed Co	WILL, KUSD	500	890	
				1 kw		LS.
KFOR	Lincoln, Nebr	Howard A. Shuman		100	1,210	
				250		LS.
KFOX	Long Beach, Calif	Nicholas & Warriner (Inc.)		1 kw	1,250	
KFPL	Dublin, Tex. (C. P. issued to increase power to 100 watts.)	C. C. Baxter		15	1,310	
KFPM	Greenville, Tex	Dave Ablowich, trading as the New Furniture Co.		15	1,310	
KFPW	Siloam Springs, Ark	Rev. Lannie W. Stewart		50	1,340	D.
KFPY	Spokane, Wash	Symons Broadcasting Co	KMO	500	1,340	
KFQA, KMOX. (See KMOX, KFQA.)						
KFQD	Anchorage, Alaska	Anchorage Radio Club		100	1,230	
KFQU	Holy City, Calif	W. E. Riker	KGGC	100	1,420	
KFQW	Seattle, Wash	KFQW (Inc.)		100	1,420	
KFQZ	Hollywood, Calif S=Los Angeles, Calif.	Taft Radio & Broadcasting Co. (Inc.)		250	860	LT.
KFRC	San Francisco, Calif	Don Lee (Inc.)		1 kw	610	
KFRU	Columbia, Mo	Stephens College	WOS, WGBF	500	630	
KFSD	San Diego, Calif	Airfan Radio Corporation		500	600	
				1 kw		LS.
KFSG	Los Angeles, Calif	Echo Park Evangelical Association	KMIC	500	1,120	
KFUL	Galveston, Tex	Will H. Ford	KTSA	500	1,290	

KFUM	Colorado Springs, Colo	W. D. Corley		1 kw	1,270	
KFUO	Clayton, Mo	Evangelical Lutheran Synod of Missouri, Ohio, and other States, Rev. R. Kretzschmar, chairman, board of control of Concordia, Seminary.	KSD	500	550	
				1 kw		LS.
KFUP	Denver, Colo	Fitzsimons General Hospital, U. S. Army	KFXJ	100	1,310	
KFVD	Culver City, Calif	Los Angeles Broadcasting Co		250	710	LT.
KFVS	Cape Girardeau, Mo	Oscar C. Hirsch, trading as Hirsch Battery & Radio Co.	WEBQ	100	1,210	
KFWB	Hollywood, Calif	Warner Bros. Broadcasting Corporation	KPSN	1 kw	950	
KFWF	St. Louis, Mo	St. Louis Truth Center (Inc.)	WMAY, WIL	100	1,200	
KFWI	San Francisco, Calif	Radio Entertainments (Inc.)	KFWM	500	930	
KFWM	Richmond, Calif	Oakland Educational Society	KFWI	500	930	
				1 kw		LS.
KFXD	Jerome, Idaho	Frank E. Hurt, trading as Service Radio Co		50	1,420	
KFXF	Denver, Colo	Pikes Peak Broadcasting Co. (Inc.)	KFEL	250	940	
KFXJ	Edgewater, Colo	R. G. Howell	KFUP	50	1,310	
KFXM (formerly KFWC)	San Bernadino, Calif	J. C. & E. W. Lee (Lee Bros. Broadcasting Co.)	KPPC	100	1,200	
KFXR	Oklahoma City, Okla	Exchange Avenue Baptist Church		100	1,310	
KFXY	Flagstaff, Ariz	Mary M. Costigan		100	1,420	
KFYO	Abilene, Tex	T. E. Kirksey, trading as Kirksey Bros		100	1,420	
				250		LS.
KFYR	Bismarck, N. Dak	Hoskins-Meyer	KFDY	500	550	
KGA	Spokane, Wash	Ralph A. Horr, receiver for Northwest Radio Service Co.		5 kw	1,470	
KGAR	Tucson, Ariz	Tucson Motor Service Co		100	1,370	
KGB	San Diego, Calif	Pickwick Broadcasting Corporation		250	1,360	
KGBU	Ketchikan, Alaska	Alaska Radio & Service Co. (Inc.)		500	900	
KGBX	St. Joseph, Mo	Foster-Hall Tire Co	KWKC	100	1,370	
KGBZ	York, Nebr	Dr. George R. Miller	KMA	500	930	
				1 kw		LS.
KGCA	Decorah, Iowa	Chas. W. Greenley	KWLC	50	1,270	D.
KGCI	San Antonio, Tex	Sam Liberto, trading as Liberto Radio Sales Co.	KGRC	100	1,370	
KGCR	Watertown, S. Dak	Cutler's Radio Broadcasting Service (Inc.)		100	1,210	
KGCU	Mandan, N. Dak	Mandan Radio Association		100	1,200	
KGCX	Wolf Point, Mont	First State Bank of Vida	½ time	100	1,310	
				250		LS.
KGDA	Dell Rapids, S. Dak	J. R. Nelson, trading as Home Auto Co		50	1,370	
KGDE	Fergus Falls, Minn	Chas. L. Jaren (Jaren Drug Co.)		50	1,200	
KGDM	Stockton, Calif	E. F. Peffer		50	1,100	D.
KGDY	Oldham, S. Dak	J. Albert Loesch and Geo. W. Wright		15	1,200	
KGEF	Los Angeles, Calif	Trinity Methodist Church South	KTBI	1 kw	1,300	
KGEK	Yuma, Colo	Elmer G. Beehler, trading as Beehler Electrical Equipment Co.	KGEW	50	1,200	
KGER	Long Beach, Calif	C. Merwin Dobyns		100	1,370	
KGEW	Fort Morgan, Colo	City of Fort Morgan	KGEK	100	1,200	
KGEZ	Kalispell, Mont	Kalispell Chamber of Commerce		100	1,310	
KGFF	Alva, Okla	D. R. Wallace, owner KGFF Broadcasting Co		100	1,420	
KGFG	Oklahoma City, Okla	Faith Tabernacle Association (Inc.)	KCRC	100	1,370	
KGFI	Corpus Christi, Tex	Eagle Broadcasting Co. (Inc.)		100	1,500	
KGFJ	Los Angeles, Calif	Ben S. McGlashan		100	1,420	

D.=Daytime. See General Order No. 41.
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LT.=Limited time. See General Order No. 48.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
KGFK	Hallock, Minn	R. W. Lautzenheiser and O. R. Mitchell, doing business as Lautzenheiser & Mitchell.		50	1,200	
KGFL	Raton, N. Mex	Lamont A. Hubbard and T. F. Murphy, doing business as Hubbard & Murphy.		50	1,370	
KGFW	Ravenna, Nebr. (C. P. to increase power to 100 watts.)	Otto F. Sothman and Roy H. McConnell		50	1,310	
KGFX	Pierre, S. Dak	Dana McNeil		200	580	D.
KGGC	San Francisco, Calif	The Golden Gate Broadcasting Co	KFQU	50	1,420	
KGGF	Picher, Okla	D. L. Connell, M. D	WNAD	500	1,010	
KGGM	Albuquerque, N. Mex	New Mexico Broadcasting Co		250	1,230	
				500		LS.
KGHF	Pueblo, Colo. (C. P. to increase power to 500 watts; LS.).	Curtis P. Ritchie and Joe E. Finch		250	1,320	
KGHI	Little Rock, Ark	Berean Bible Class, First Baptist Church		100	1,200	
KGHL	Billings, Mont	Northwestern Auto Supply Co. (Inc.)		500	950	
KGHX	Richmond, Tex	Fort Bend County School Board		50	1,500	
KGIQ	Twin Falls, Idaho	Radio Broadcasting Corporation	KID	250	1,320	
KGIR	Butte, Mont	Symons Broadcasting Co	KFBB	250	1,360	
KGIW	Trinidad, Colo	Trinidad Creamery Co. (Inc.)		100	1,420	
KGIX	Las Vegas, Nev	J. M. Heaton. (C. P. only)		100	1,420	
KGJF	Little Rock, Ark	First Church of the Nazarene		250	890	
KGKB	Brownwood, Tex	E. M., C. T., and E. E. Wilson, doing business as Eagle Publishing Co.		100	1,500	
KGKL	San Angelo, Tex	KGKL (Inc.)		100	1,370	
KGKO	Wichita Falls, Tex	Wichita Falls Broadcasting Co		250	570	
				500		LS.
KGKX	Sandpoint, Idaho. (C. P. to increase power to 100 watts.)	C. E. Twiss and F. H. McCann		15	1,420	
KGO	Oakland, Calif	General Electric Co		7½ kw	790	
KGRC	San Antonio, Tex	Eugene J. Roth	KGCI	100	1,370	
KGRS	Amarillo, Tex	E. B. Gish (Gish Radio Service)	WDAG	1 kw	1,410	
KGU	Honolulu, Hawaii. (C. P. to increase power to 1 kilowatt.)	Marion A. Mulrony and Advertiser Publishing Co. (Ltd.).		500	940	
KGW	Portland, Oreg	Oregonian Publishing Co		1 kw	620	
KGY	Lacey, Wash	St. Martins College		10	1,200	
				50		LS.
KHJ	Los Angeles, Calif	Don Lee (Inc.)		1 kw	900	
KHQ	Spokane, Wash. (C. P. to increase power to 2 kilowatts, LS.)	Louis Wasmer (Inc.)		1 kw	590	
KICK	Red Oak, Iowa	Red Oak Radio Corporation		100	1,420	

KID	Idaho Falls, Idaho	Jack W. Duckworth	KGIQ	250	1,320	
KIDO	Boise, Idaho	Frank L. Hill and C. G. Phillips, doing business as Boise Broadcast Station.		1 kw	1,250	
KIT	Yakima, Wash	Carl E. Haymond		50	1,370	
KJBS	San Francisco, Calif	Julius Brunton & Sons Co		100	1,070	D.
KJR	Seattle, Wash	Ralph A. Horr, receiver for Northwest Radio Service Co.		5 kw	970	
KLCN	Blytheville, Ark	Charles Leo Lintzenich		50	1,290	D.
KLO	Ogden, Utah	Peery Building Co		100	1,370	
				200		LS.
KLPM	Minot, N. Dak	E. C. Reineke		100	1,420	
KLRA	Little Rock, Ark	Arkansas Broadcasting Co	KUOA	1 kw	1,390	
KLS	Oakland, Calif	E. N. and S. W. Warner, doing business as Warner Bros.		250	1,440	D.
KLX	do	The Tribune Publishing Co		500	880	
KLZ	Denver, Colo	Reynolds Radio Co. (Inc.)		1 kw	560	
KMA	Shenandoah, Iowa	May Seed & Nursery Co	KGBZ	500	930	
				1 kw		LS.
KMBC	Independence, Mo S.=Kansas City, Mo.	Midland Broadcasting Co. (Inc.)	WHB	1 kw	950	
				2½ kw		LS.
KMED	Medford, Oreg	Mrs. W. J. Virgin		50	1,310	
KMIC	Inglewood, Calif	Dalton's (Inc.)	KFSG	500	1,120	
KMJ	Fresno, Calif	James McClatchy Co		100	1,210	
KMMJ	Clay Center, Nebr	The M. M. Johnson Co		1 kw	740	LT.
KMO	Tacoma, Wash	KMO (Inc.)	KFPY	500	1,340	
KMOX, KFQA	Kirkwood, Mo S.=St. Louis, Mo.	Voice of St. Louis (Inc.). C. P. to move and increase power to 50 kilowatts, LP.		5 kw	1,090	
KMTR	Hollywood, Calif	KMTR Radio Corporation		500	570	
KNX	Los Angeles, Calif S.=Hollywood, Calif.	Western Broadcast Co. C. P. to increase power to 50 kilowatts, LP.		5 kw	1,050	
KOA	Denver, Colo	General Electric Co		12½ kw	830	
KOAC	Corvallis, Oreg	Oregon State Agricultural College		1 kw	550	
KOB	State College, N. Mex	New Mexico College of Agricultural and Mechanical Arts. C. P. to increase power to 20 kilowatts.	KEX	10 kw	1,180	
KOCW	Chickasha, Okla	Oklahoma College for Women		250	1,400	
				500		LS.
KOH	Reno, Nev	Jay Peters (Inc.)		100	1,370	
KOIL	Council Bluffs, Iowa	Mona Motor Oil Co		1 kw	1,260	
KOIN	Sylvan, Oreg S.=Portland, Oreg.	KOIN (Inc.)		1 kw	940	
KOL	Seattle, Wash	Seattle Broadcasting Co. (Inc.)	KTW	1 kw	1,270	
KOMO	do	Fisher's Blend Station (Inc.)		1 kw	920	
KOOS	Marshfield, Oreg	H. H. Hanseth		50	1,370	
KORE	Eugene, Oreg	Frank L. Hill & C. G. Phillips, doing business as Eugene Broadcast Station.		100	1,420	
KOY	Phoenix, Ariz	Nielson Radio Supply Co		500	1,390	
KPCB	Seattle, Wash. C. P. to move locally and increase power to 100 watts.	Wescoast Broadcasting Co	KPQ	50	1,210	

D.=Daytime. See General Order No. 41.
LS.=Power until local sunset.

LT.=Limited time. See General Order No. 48.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
KPJM	Prescott, Ariz	A. P. Miller and Geo. R. Klahn, doing business as Miller & Klahn.		100	1,500	
KPO	San Francisco, Calif	Hale Bros. Stores (Inc.), and the Chronicle Publishing Co.		5 kw	680	
KPOF	Denver, Colo	Pillar of Fire (Inc.)	KFKA	500	880	
KPPC	Pasadena, Calif	Pasadena Presbyterian Church	KFXM	50	1,200	
KPQ	Seattle, Wash. C. P. to move to Wenatchee, Wash.; power, 50 watts.	Wescoast Broadcasting Co	KPCB	100	1,210	
KPRC	Sugarland, Tex S.=Houston, Tex.	Houston Printing Co		1 kw 2½ kw	920 ----	LS.
KPSN	Pasadena, Calif	Pasadena Star-News Publishing Co	KFWB	1 kw	950	
KPWF	Westminster, Calif	Pacific-Western Broadcasting Federation (C. P. only).		5 to 10 kw	1,490	
KQV	Pittsburgh, Pa	Doubleday-Hill Electric Co	WSMK	500	1,380	
KQW	San Jose, Calif	First Baptist Church		500	1,010	
KRE	Berkeley, Calif	First Congregational Church of Berkeley	KZM	100	1,370	
KREP (formerly KFAD)	Phoenix, Ariz. C. P. to move locally and increase power to 1 kilowatt; LS.	KAR Broadcasting Co		500	620	
KRGV	Harlingen, Tex	Valley Radio-Electric Corporation	KWWG	500	1,260	
KRLD	Dallas, Tex	KRLD Radio Corporation	KTHS	10 kw	1,040	
KRMD	Shreveport, La	Robert M. Dean	KTSL	50	1,310	
KRSC	Seattle, Wash	Radio Sales Corporation		50	1,120	D.
KSAC	Manhattan, Kans	Kansas State Agricultural College	WSUI	500	580	
KSAT (formerly KTAT)	Birdsville, Tex S.=Fort Worth, Tex.	Texas Air Transport Broadcast Co	WJAD	1 kw 1 kw	---- 1,240	LS.
KSCJ	Sioux City, Iowa	Perkins Bros. Co. (publishes the Sioux City Journal).	WTAQ	1 kw	1,330	
KSD	St. Louis, Mo	Pulitzer Publishing Co	KFUO	500	550	
KSEI	Pocatello, Idaho	KSEI Broadcasting Association (Inc.)		250	900	
KSL	Salt Lake City, Utah	Radio Service Corporation of Utah		5 kw	1,130	
KSMR	Santa Maria, Calif	Santa Maria Valley Railroad Co		100	1,200	
KSO	Clarinda, Iowa	Berry Seed Co	WKBH	500	1,380	
KSOO	Sioux Falls, S. Dak	Sioux Falls Broadcast Association (Inc.)		2 kw	1,110	LT.
KSTP	Westcott, Minn S.=St. Paul, Minn.	National Battery Broadcasting Co		10 kw	1,460	
KTAB	Oakland, Calif	Associated Broadcasters		1 kw	560	
KTAP	San Antonio, Tex	Alamo Broadcasting Co		100	1,420	
KTBI	Los Angeles, Calif	Bible Institute of Los Angeles	KGEF	750	1,300	
KTBR	Portland, Oreg	M. E. Brown	KFJR	500	1,300	
KTBS	Shreveport, La	S. R. Elliott and A. C. Steere		1 kw	1,450	

KTHS	Hot Springs National Park, Ark.	Hot Springs Chamber of Commerce	KRLD	10 kw	1,040	
KTM	Santa Monica, Calif. (C. P. issued to move locally and increase power to 1 kilowatt; LS.) S.=Los Angeles, Calif.	Pickwick Broadcasting Corporation	KELW	500	780	
KTNT	Muscatine, Iowa	Norman Baker		5 kw	1,170	LT.
KTSA	San Antonio, Tex	Lone Star Broadcast Co. (Inc.)	KFUL	1 kw	1,290	
				2 kw		LS.
KTSL	Cedar Grove, La. S.=Shreveport, La.	Houseman Sheet Metal Works (Inc.)	KRMD	100	1,310	
KTSM	El Paso, Tex	W. S. Bledsoe and W. T. Blackwell	WDAH	100	1,310	
KTUE	Houston, Tex. (C. P. issued to increase power to 100 watts.)	William John Uhalt (Uhalt Electric)		5	1,420	
KTW	Seattle, Wash	First Presbyterian Church	KOL	1 kw	1,270	
KUJ	Longview, Wash. (C. P. issued to increase power to 100 watts, sharing with KVEP.)	Columbia Broadcasting Co. (Inc.)		10	1,500	
KUOA	Fayetteville, Ark	University of Arkansas	KLRA	1 kw	1,390	
KUSD	Vermilion, S. Dak	University of South Dakota	KFNF, WILL	500	890	
				750		LS.
KUT	Austin, Tex	M. A. English, D. W. English, and W. G. Stacy, doing business as KUT Broadcasting Co.	WTAW	500	1,120	
KVEP (formerly KWBS)	Portland, Oreg	Schaeffer Radio Co		15	1,500	
KVI	Des Moines, Wash. S.=Tacoma, Wash.	Puget Sound Broadcasting Co. (Inc.)		1 kw	760	LT.
KVL	Seattle, Wash	Arthur C. Dailey	KFBL	100	1,370	
KVOA	Tucson, Ariz	Robert M. Riculfi		500	1,260	D.
KVOO	Tulsa, Okla	Southwestern Sales Corporation	WAPI	5 kw	1,140	
KVOS	Bellingham, Wash	KVOS (Inc.)		100	1,200	
KWCR	Cedar Rapids, Iowa	Harry F. Paar	KFJY, KFGQ	100	1,310	
KWEA	Shreveport, La	William E. Antony		100	1,210	
KWG	Stockton, Calif	Portable Wireless Telegraph Co. (Inc.)		100	1,200	
KWJJ	Portland, Oreg	Wilbur Jerman		500	1,060	LT.
KWK	St. Louis, Mo	Greater St. Louis Broadcasting Corporation		1 kw	1,350	
KWKC	Kansas City, Mo	Wilson Duncan, trading as Wilson Duncan Broadcasting Co.	KGBX	100	1,370	
KWKH	Kennonwood, La	W. K. Henderson	WWL	10 kw	850	
KWLC	Decorah, Iowa	Luther College	KGCA	100	1,270	D.
KWSC	Pullman, Wash	State College of Washington	½ time	500	1,390	
KWWG	Brownsville, Tex	Chamber of Commerce, City of Brownsville	KRGV	500	1,260	
KXA	Seattle, Wash	American Radio Telephone Co		500	570	
KXL	Portland, Oreg	KXL Broadcasters (Inc.)	KFIF	100	1,420	
KXO	El Centro, Calif	E. R. Irey and F. M. Bowles		100	1,200	
KXRO	Aberdeen, Wash	KXRO (Inc.)		75	1,310	

D.=Daytime. See General Order No. 41.
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LT.=Limited time. See General Order No. 48.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilocycles	Time and power limitations
KYW, KFKX	Chicago, Ill. C. P. issued to move to Bloomingdale Township and increase power to 10 kilowatts.	Westinghouse Electric & Manufacturing Co.	KYWA	5 kw	1,020	
KYWA	Chicago, Ill.	do	KYW, KFKX	500	1,020	

Respectfully submitted.

FEDERAL RADIO COMMISSION.
CARL H. BUTMAN, *Secretary*.

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