

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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TABLE OF CONTENTS

	Page
Introduction.....	1
I. Financial statement.....	4
II. Personnel and organization.....	5
A. Organisation for administration.....	5
B. Divisions of the commission.....	6
1. The Secretary's office.....	6
a. License section.....	7
b. Press service.....	8
c. Statistical records.....	9
2. Legal division.....	9
a. Opinions of the general counsel.....	10
3. Engineering division.....	12
4. Investigation division.....	13
III. Administration and policy.....	14
A. The radio spectrum.....	14
1. Low and intermediate frequencies.....	14
a. Allocation to services.....	15
2. Broadcast band.....	15
a. Note on synchronization.....	16
b. Mechanical reproductions.....	16
3. High frequencies.....	18
a. General considerations applicable.....	18
b. High-frequency channeling system.....	19
c. The continental band.....	20
(1) Summary of channel distribution in the continental band.....	20
(2) Summary of domestic communica- tion systems authorized by the commission.....	21
(3) Visual broadcasting.....	22
d. The transoceanic band.....	22
(1) Summary of allocation.....	23
(2) Relay broadcasting.....	23
4. Special services.....	24
a. Amateurs.....	24
b. Aviation.....	25
c. Experimental.....	25
d. Maritime.....	29
B. Grounds for decisions of the commission.....	31
1. Broadcasting cases.....	31
2. General communication cases.....	37
IV. Procedure.....	44
A. Hearings.....	44
1. List of hearings.....	45
B. Practice and procedure before the commission.....	53
C. Rules and regulations (General Orders 50-74).....	55
D. Review of application forms.....	67
V. Litigation.....	69
VI. Miscellaneous.....	78
A. International problems.....	78
B. Tabulated disposition of applications.....	80
C. Tabulated comparison of licenses.....	81
D. List of authorizations (exclusive of broadcasting, ship, and amateur).....	82
E. Outstanding broadcast station authorizations.....	101

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.

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. 89

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
	<u>275, 344. 79</u>

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.....	8
		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 contact 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.

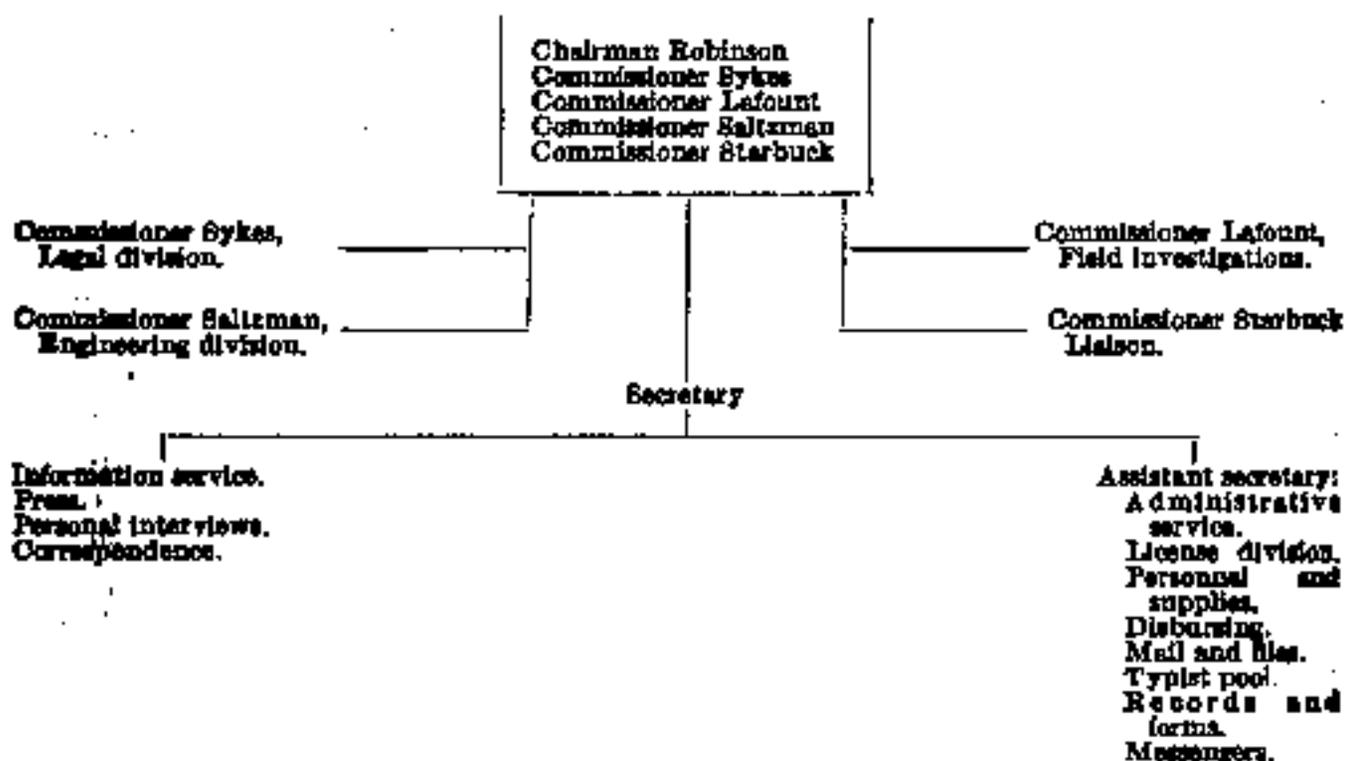
The budget and personnel committee will serve in an advisory capacity to the secretary. The budget and personnel committee will represent the commission in hearings before the Budget Bureau and Appropriations Committee, and before the Personnel Classification Board on the more important positions involving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

G. 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 personnel 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 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 commission 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.

G. 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 commission by the general counsel:

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

- 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.

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)	
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.

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.

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 500 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.

C. CONTINENTAL BAND

(1,500 to 8,000 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 8,000 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
[1,500-8,000 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.....	1
	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 broadcasting (four 100-kilocycle channels shared with other nations).....	61
	Experimental visual broadcasting (one 100-kilocycle channel—other nations priority, United States stations must not interfere).....	16
	General experimental (shared).....	4
	Agriculture.....	2
	Emergency (shared).....	7
	Government (shared with other nations).....	54
	Government (exclusive).....	24
	Amateurs.....	134
	Total special services.....	286
	Total all services.....	439

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

[10 to 500 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	126	28
21.25 to 21	do.	.25	30	1	18	11
26.3 to 30.2	do.	.30	14	1	18	3
30.55 to 37.2	do.	.35	30	3	17	16
37.70 to 49.7	do.	.50	25	4	13	18
50.45 to 60.2	do.	.75	68	14	18	44
100 to 109	Fixed and mobile	1	10	5		4
112 to 124	Mobile	1	15	4		11
125 to 149	Mobile (marine P. G.)	1	26	2	16	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	5		0
315 to 350	Air mobile (Government)	5	6	6		0
350 to 390	Mobile (Government)	15	1	1		0
390 to 390	Radio compass	20	1	1		0
392 to 400	Air mobile and marine	2	35	5		27
402 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 500	Mobile (Government)	2	18	12		0
Total			465	152	68	245

- 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 400 kilocycles contains channels as follows:

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

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 interference.

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 synchronizing 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

(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:

Licenses	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	78	0	0	0	General public service, point to point; nation-wide system.
Press.....	Indefinite. ²	20	26	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	9	0	0	4	General public service, point to point, Southwest.
Intercity Radio Telegraph Co.	6	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	.....	.....

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."

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 2,300²; 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.

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

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	10
	Coastal stations.....	66
	Mobile press.....	5
	Aircraft and/or aeronautical ²	13
	Maritime calling ²	2
	Total mobile services.....	116

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 chan- nels (0.2 per cent Ch.)
Fixed	Point-to-point	270
	Relay broadcasting ¹	34
	Total fixed services	404
Government ²		70
Amateurs		33
General experimental		4
Total special services		107
Total all services		694

¹ Actually there are 31 relay broadcasting channels which conform with the commission's channeling system prescribed in General Order No. 62.

² 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

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.	500 kilocycles: Calling, distress, CW, ICW, damped.
151 kilocycles: Working, CW, ICW, only.	5,525 kilocycles: Calling.
153 kilocycles: Working, CW, ICW, only.	5,555 kilocycles: Working.
155 kilocycles: Working, CW, ICW, only.	5,615 kilocycles: Working.
157 kilocycles: Working, CW, ICW, only.	6,590 kilocycles: Working.
159 kilocycles: Working, CW, ICW, only.	6,605 kilocycles: Working.
160 kilocycles: Working, CW, ICW, only.	6,620 kilocycles: Working.
375 kilocycles: Radio compass.	6,635 kilocycles: Working.
400 kilocycles: CW, ICW, only; working.	8,290 kilocycles: Working.
410 kilocycles: CW, ICW, damped; working.	8,330 kilocycles: Working.
425 kilocycles: CW, ICW, damped; working.	8,450 kilocycles: Working.
454 kilocycles: CW, ICW, damped; working.	11,050 kilocycles: Calling.
468 kilocycles: CW, ICW only; working.	11,110 kilocycles: Working.
	11,280 kilocycles: Working.
	18,240 kilocycles: Working.
	13,270 kilocycles: Working.
	16,580 kilocycles: Calling.
	16,680 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.	394 kilocycles: Working, CW, ICW only.
151 kilocycles: Working, CW, ICW only.	410 kilocycles: Calling, CW, ICW, damped.
153 kilocycles: Working, CW, ICW only.	425 kilocycles: Working, CW, ICW, damped.
155 kilocycles: Working, CW, ICW only.	5,525 kilocycles: Calling.
157 kilocycles: Working, CW, ICW only.	5,555 kilocycles: Working.
375 kilocycles: Radio compass.	5,615 kilocycles: Working.
	8,330 kilocycles: Working.

GENERAL PUBLIC COASTAL STATIONS

Coastal station calling frequencies

High frequency:	Low frequency:
5,525 kilocycles.	143 kilocycles.
11,050 kilocycles.	410 kilocycles (Great Lakes only).
16,575 (channel 16,580).	500 kilocycles (except Great Lakes).
22,100.	

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 12,648 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 3,138, 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-

Coastal working low frequencies

RADIOMARINE CORPORATION OF AMERICA

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

MACKAY RADIO TELEGRAPH CO.

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

TROPICAL RADIO TELEGRAPH CO.

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

OTHER COMPANIES

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

Coastal working high frequencies

RADIOMARINE CORPORATION OF AMERICA COASTAL STATIONS

4,188 kilocycles.	12,430 kilocycles.	16,780 kilocycles.
4,775 kilocycles.	12,490 kilocycles.	21,700 kilocycles.
6,440 kilocycles.	12,520 kilocycles.	21,740 kilocycles.
6,455 kilocycles.	12,550 kilocycles.	21,780 kilocycles.
6,470 kilocycles.	12,580 kilocycles.	21,820 kilocycles.
6,485 kilocycles.	12,640 kilocycles.	21,860 kilocycles.
6,500 kilocycles.	12,670 kilocycles.	21,900 kilocycles.
8,350 kilocycles.	12,780 kilocycles.	21,940 kilocycles.
8,370 kilocycles.	12,820 kilocycles.	21,980 kilocycles.
8,390 kilocycles.	13,210 kilocycles.	22,040 kilocycles.
8,480 kilocycles.	16,700 kilocycles.	22,520 kilocycles.
8,570 kilocycles.	16,740 kilocycles.	

MACKAY RADIO TELEGRAPH CO. COASTAL STATIONS

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

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	5,600, day, aircraft and aeronautical station.
	Aviation Corporation	
	Braniff Air Lines	
	Central Air Lines	
	Continental Air Lines	
	Northern Air Lines	
	Southern Air Transport	
	Texas Air Transport	
	Gulf Air Lines	
Blue	Interstate Air Lines	3,484, night, aircraft and aeronautical station.
	Clifford Ball	
	Colonial Air Transport	
Blue	Western Air Express	3,070, point to point, aeronautical.
	Standard Air Lines	
	Mid-Continent	
	West Coast Air Transport	
Green	Transcontinental Air Transport	5,690, point to point, aeronautical and aircraft and aeronautical.
	National Air Transport	
	Northwest Airways	
	Pitcairn Aviation	
Red	Maddux Air Lines	3,460, aircraft and aeronautical station.
	Boeing Air Transport	
	Pacific Air Transport	
	Stout Air Services	
	Varney Air Lines	
Pan-American	National Parks Airways	8,015, point to point, aeronautical, day only.
	Grace Airways	
Pan-American	Grace Airways	5,690, aircraft and aeronautical station, day only; also point to point aeronautical, night only.
	Airways	
		2,682, navigation.
		3,070, night, aircraft and aeronautical station.

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

- 276 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.
 5,625, 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.

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.	18,180 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.

I. BROADCASTING CASES

Licenses 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 licenses, 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 services, 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

- (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.

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 telegraph 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 corners 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. 20). 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~~ of all be continuous 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 law 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 to the other. 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

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 5,900 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 multiplier 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

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 its 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 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

the commission and all appellants. Certain limitations on and exceptions to these general rules, which have encountered but little 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.

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.

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 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., 27 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 Plantations 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 go on 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 82.

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 its 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.....	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.

* In each of 7 cases 1 application was granted and 1 denied.

REPORT OF THE FEDERAL RADIO COMMISSION

Hearings held by the commission during the period October 1, 1938, to November 1, 1939

(Symbols: B, broadcasting; C, commercial; E, experimental; F, television; G, geographical; H, hearing; I, license; J, assignment of license; K, P., construction permit; L., modification of license; M., L., renewal of license; N., assignment of license; O., P., construction permit)

Date of hearing	Call letters	Applicant and location	Nature of application	Power and frequency	Decision (granted or denied)
1938					
Oct. 16.	WJAR	The Outlet Co., Providence, R. I.	(B) C. P.	1,000 w	Granted.
Do	WEPB	Matheson Radio Co. (Inc.), Gloucester, Mass.	do	500 w	Denied.
Do	WLEH	Joe J. Lombardi, Falmouth, Long Island, N. Y.	do	200 kc., 250 w	Do.
Do		State Federation Joint Marketing Service, Sacramento, Calif.	(C) C. P.		Granted.
Do	WOY	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	KFSB	Airplan Radio Corporation, San Diego, Calif.	(B) Rem. L.	600 kc., 1 kw.; day, 500 w.; night.	Granted.
Do	WBNY	Baruchroma Corporation, New York, N. Y.	(B) Mod. L.	900 kc.	Denied.
Do	WNAC	The Shepherd Stores, Boston, Mass.	do	1,200 to 800 kc., 500 w.	Do.
Do	WBIS				
Do	WRAN	The Shepherd Co., Providence, R. I.	do	250 w., 550 kc.	Granted.
Oct. 22.	WIBS	New Jersey Broadcasting Corporation, Elizabeth, N. J.	do	1,400 kc., 200 to 500 w.	Denied.
Do	WHAD	Marquette University, Milwaukee, Wis.	do	1,150 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. 26.	KWK	Greater St. Louis Broadcasting Corporation, St. Louis, Mo.	do	1,300 kc., one-half to full time.	Granted.
Oct. 30.		The Robert Dollar Co., San Francisco, Calif.	(C) C. P.		Denied.
Nov. 16.	WKBO	Carnith Corporation, Jersey City, N. J.	(B) C. P.		Do.
Oct. 31.	WMDJ	Rev. John W. Strevell, Pittsburgh, Pa.	do	1,450 kc., 1,000 w	Granted.
Nov. 1.	KFJZ	Henry Clay Allison, Fort Worth, Tex.	(B) Mod. L.	1,570 to 1,240 kc., 400 to 1,000 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	Trueman Temple Baptist Church, Boston, Mass.	do	1,150 to 1,200 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	800 to 570 kc., 300 to 570 kc.; 500 to 1,000 w	Granted.
Do	WIHO	Nelson Reed, Bond & Mortgage Co., Chicago, Ill.	do	1,400 to 570 kc.; 1,000 to 5,000 w	Do
Do	WHT	Radiophonic Broadcasting Corporation, Chicago, Ill.	do	1,400 to 570 kc., 1,000 to 5,000 w	Denied.
Do	WMEB	Massachusetts Educational Society, Boston, Mass.	do	1,400 to 1,200 kc., 50 to 100 w	Do.
Nov. 3.	KOOB	F. H. Hanzel, Marshfield, Ore.	(B) C. P.	1,400 kc., 80 w	Granted.
Nov. 6.	WGES	Oak Leaves Broadcasting Station (Inc.), Chicago, Ill.	(B) Mod. L.	1,300 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		Do.
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., Pecos City, Okla.	do		Do.
Do		F. Cushing Moore, Spokane, Wash.	do		Do.
Do		International Geophysical Exploration Co., McLean, Va.	do		Do.
Do			do		Granted.

Date of hearing	Call letters	Applicants and location	Nature of application	Power and frequency	Decision (granted or denied)
1933					
Nov. 14	WENR WBCN	Gross Lakes Broadcasting Co., Chicago, Ill.	(B) Mod. L.	870 kc.; one-half time (6,000-50,000 w.	(Granted power. Decided operating hours. Denied.
Do	WLB	Edward L. Bell, Chicago, Ill.	do	870 kc., 5,000 w.; from five-seventh to full time.	Do.
Do	WCBD	Wilbur Glenn Voliva, Zion, Ill.	do	1,050 to 870 kc., 5,000 w.; change hours op- eration.	Do.
Nov. 15		The Sheppard News 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; 670 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; 1,350 kc., 1,000 w.	Do.
Do	WAAW	Radio Station W.A.A.M. (Inc.), Newark, N. J.	do	One-half or full time; 1,250 kc., 250 to 500 w.	Do.
Nov. 24	WQAJ	Southern Equipment Co., San Antonio, Tex.	do	Full time (divides with WRK, 1, 190 kc., 500 w.	Do.
Do	KFDM	Magnolia Petroleum Co., Beaumont, Tex.	do	580 to 1,100 kc., 500 to 1,000 w.	Denied.
Nov. 26	WFAA	Dallas News and Dallas Journal, Dallas, Tex.	do	Full time (divides with KELD), 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	Experimenters Publishing Co., New York, N. Y.	(B) Mod. L.	One-half time 1,010 kc., 250 to 500 w.	Granted 37 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.	(B) C. P.	1,500-1,000 kc., 75-250-500 w.	Do.
Do		Cow Packing Co., Seattle, Wash.	(C) C. P.	3,300 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.	(B) C. P.	1,000-5,000 w.	Denied.
Dec. 12	WKBG	C. L. Carrell, Chicago, Ill.	(B) Gen. L.; portable		Do.
Do	WHHM	do	do		Do.
Do	WIBJ	do	do		Do.
Dec. 14	KPK	Merchants Exchange, Portland, Oreg.	(C) Lic.	476 kc., 750 w.	Do.
Dec. 15		The Texas Co., Houston, Tex.	(C) C. P. (3 applica- tions.)	140	Granted.

Date	Call Letters	Applicant	Class of Station	Power	Frequency	Result
Dec. 21		Illinois Pipe Line Co., Findlay, Ohio.	(C) Gen. L. (3 applications)			Denied.
Do.		Boyd Phelps, Jamaica, N. Y.	(F) C. P.			Do.
Do.		Richmond Development Corporation, Roanoke, Va.	(B) C. F. (2 applications)			Do.
Jan. 16	KFCB	Melburn Radio Supply Co., Phoenix, Ariz.	(B) C. P. Mod. L.	5,000 kc., 1,000 w.	1,310 to 1,440 kc., from 100 w, 260 d, to 860 w.	Granted.
Jan. 22	New	R. V. Bidout Co., San Francisco, Calif.	(C) C. P.	25 w., kn. not specified.	200-2,700 kc., 5 w.	Denied.
Do.	do.	Robert M. Rhoad, Tucson, Ariz.	(B) C. P.		1,150 kc., 1,000 w.	Granted.
Feb. 14		L. Bamberg & Co., Kearney, N. J.	(E) C. P.			Do.
Feb. 12	(New WCT WBO)	Ford Motor Co., Detroit, Mich.	(C) C. F. (1 application)			Do.
Do.		Southern Radio Corporation, New York, N. Y.	(C) C. P.			Do.
Feb. 12	New	S. Ernest Philpitt & Son, Miami, Fla.	(B) C. P.			Do.
Do.	KFT	American Tug Boat Co., Everett, Wash.	(B) C. P.			Do.
Do.	WLI	The J. P. Bunting Coal Co., Cleveland, Ohio	(C) Mod. L.			Do.
Do.	WLAG	The By-Products Coal Co., Hynoo, Ky	(C) Lic.			Do.
Do.	KPE	City of Seattle, harbor department, Seattle, Wash.	do			Do.
Do.	KUPH	Frederick Robinson, Glendale, Calif.	do			Do.
Feb. 15		Chicago Federation of Labor, Chicago, Ill.	(B) C. P.			Do.
Do.	New	Inter-city Radio, Chicago, Ill.	(C) Lic.			Do.
Feb. 19	KZE	Grays Harbor Stevedores Co., Aberdeen, Wash.	(C) Assignment C. F.			Do.
Do.	New	The N. Y. Central R. Co., New York, N. Y.	(C) Lic.			Do.
Do.	WCV	Wyandotte Trans. Co., Detroit, Mich.	do			Do.
Do.		City of New York, department of plants and structures, New York, N. Y.	(C) C. F.			Do.
Feb. 20	KV00	Southern Sales Corporation, Tulsa, Okla.	(B) Mod. L.			Do.
Feb. 26	WRAK	Clarence R. Cummins, Erie, Pa.	(B) Gen. L.			Do.
Feb. 27	New	C. C. Crawford, Kansas Pk. Co., Haysville, Mo.	(B) C. P.			Do.
Do.	KOCW	Oklahoma College for Women, Chickasha, Okla.	(B) Mod. L.			Do.
Mar. 5	KFWI	Radio Entertainments (Inc.), San Francisco, Calif.	do			Do.
Mar. 5	WCLB	Arthur Faska, Long Beach, N. Y.	(B) Gen. L.			Do.
Do.	WKBO	Camith Corporation, Jersey City, N. J.	do			Do.
Do.	WIBS	New Jersey Broadcasting Corporation, Elizabeth, N. J.	do			Do.
Do.	WLBX	John N. Braby, Long Island City, N. Y.	do			Do.
Mar. 7, 8, 9		Consolidated Press Association, Washington, D. C.	(C) C. P.			Do.
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. 13	WLAG	Life & Casualty Insurance Co., Nashville, Tenn.	(B) Mod. L.			Do.
Do.	New	M. L. Cabot, Georgetown, Tex.	(B) C. P.			Do.
Do.	WEHC	Head of the Lakes Broadcasting Co., Superior, Wis.	(B) Mod. L.			Do.
Do.	New	A. Torkian, Rockham, S. Dak.	(B) C. P.			Do.
Mar. 13	do.	Charles F. Brewitt, Oak Harbor, Ohio	do			Do.
Do.	WAAT	Bremer Broadcasting Corporation, Jersey City, N. J.	(B) Mod. L.			Do.
Mar. 14	WABF	Markle Broadcasting Corporation, Kingston, Pa.	(B) Gen. L.			Do.
Do.	WMBR	F. J. Reynolds, Tampa, Fla.	(B) C. P.			Do.
Do.		do.	(E) C. P.			Do.
Do.	(WBOB W6DA)	American Radio Specialty Co., Brooklyn, N. Y.	(B) Gen. L.			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					
Mar. 19	WLTR	Voices of Brooklyn (Inc.), Brooklyn, N. Y.	(B) Mod. L.	1,400 kc., from 600 to 6,000 w. night, 1,000 day	Denied.
Do.	WBBC	Brooklyn Broadcasting Corporation, Brooklyn, N. Y.	do	1,400 kc., from 600 to 6,000 w. night, 1,000 day	Denied in part. Granted in part.
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.		
Do.	New	Wired Radio, Ind., New York, N. Y.	(E) C. P.	20,000 w.	Denied.
Do.	WPPF	Don Lee (Inc.), Los Angeles, Calif.	(B) C. P.	5,000 kc., 200 w.	Do.
Do.	New	U. S. Shipping Board, Washington, D. C.	(C) C. P.	2,000 w.	Granted.
Mar. 21	New	Robin & Hoyett Radio Co., Trees, La.	(B) C. P.	1,200 kc., 50 w.	Denied.
Do.	New	F. L. Beglin, Tacoma, Wash.	do	750 kc., 100 w.	Do.
Do.	New	J. L. Echols & J. W. Pandren, The Music Shoppe, Goose Creek, Tex.	do	1,200 kc., 100 w.	Do.
Do.	do	Kidd-Russ Trunk & Bag Co., Beaumont, Tex.	do	do	Do.
Mar. 27	do	Great Lakes Broadcasting Co., Chicago, Ill.	do	5,000 kc., 5,000 w.	Granted.
Do.	New	Baltimore Radio Show (Inc.), Baltimore, Md.	(E) Lic., Exp. Dev.	500 w.	Do.
Do.	do	Great Lakes Radio Broadcasting Co., Chicago, Ill.	(F) C. P.	20,000 w.	Do.
Do.	do	The Associated Broadcasters, Oakland, Calif.	(K) C. P.	9,800 kc., 100 w.	Denied.
Do.	do	R. J. Rockwell, Omaha, Neb.	(E) Lic.	3,500 kc., 100 w.	Do.
Apr. 2	WBMH	Braun's Music House, Detroit, Mich.	(B) Man. L.	1,210 kc., 100 w.	Do.
Do.	WIBZ	Alexander D. Truax, Montgomery, Ala.	do	1,500 kc., 15 w.	Do.
Apr. 3	New	Charles Leonard Nelson, Corpus Christi, Tex.	(B) C. P.	1,300 kc., 250 w.	Do.
Do.	KFUL	Will H. Ford, Galveston, Tex.	(B) Mod. L.	1,500 to 1,250 kc., 500 to 1,000 w. night, 1,000 day.	Do.
Do.	KTSA	Lone Star Broadcasting Co. (Inc.), San Antonio, Tex.	(B) C. P.	1,250 kc., 1 kw. night, 2 kw. day	Do.
Apr. 4	WIBQ	Broadcasting Station WIBQ (Inc.), Memphis, Tenn.	do	1,370 to 1,250 kc., from 100 to 500 w.	Do.
Apr. 16	WCFL	Chicago Federation of Labor, Chicago, Ill.	(B) Mod. L.	970 to 770 kc., 1 1/2 kw. to 25,000 w., and 25,000 w. esp.	Do.
Do.	do	do	(E) C. P.	15,000, 10,000, 5,000 kc., 500 w.	Granted.
Apr. 18	do	R. H. Macy & Co., New York City	do	500 w.	Denied.
Do.	do	Devision-Paxon Co., Atlanta, Ga.	do	do	Do.
Do.	New	Moeller's Radio Shop, Eastrop, La.	(B) C. P.	1,420 kc., 100 w.	Do.
Do.	do	Universal Pictures Co. (Inc.), New York City	(B) C. P.	15,000 and 7,500 kc., 500 w.	Do.
Do.	WRBC	Immanuel Lutheran Church, Valparaiso, Ind.	(B) Mod. L.	3,500 kc., 500 w.	Do.
Do.	New	The LaSalle & Koch Co., Toledo, Ohio	(K) C. P.	70,000-4,500 kc., 500 w.	Do.
Do.	do	The C. Raisz Coal Co., Sheboygan, Wis.	(C) License	500 w.	Do.
Apr. 21	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.	(B) C. P.	10,000 w.	Granted.
Do.	KPA	Lincoln I. Jackson, Seattle, Wash.	(C) License	500 w.	Denied.
Do.	KFZ	Russell Reed, Los Angeles, Calif.	do	2,000 kc., 50 w.	Do.
Do.	KGV	Lanman Outfitting Co., Brooklyn, N. Y.	(E) C. P.	9,000 kc., 200 w.	Do.
Do.	New	do	do	do	Do.

Apr. 26	KTAB	The Associated Broadcasters (Inc.), San Francisco, Calif.	(H) C. P.	500 kc., 500 to 1,000 w.	Granted in part.
Do	New	Richard Prosser, Jr., St. Petersburg, Fla.	do	1,400 kc., 25 w.	Denied.
Do	KRLW	Earl L. White, Burbank, Calif.	(B) Mod. L.	750 kc., 500 w.	Do.
Apr. 28	KFOR	Howard A. Shuman, Lincoln, Nebr.	do	From 1,210 to 1,150 kc., 100 to 1,000 w. day, 500 night.	Granted.
May 1	KOH	Jay Peters (Inc.), Reno, Nev.	do	1,370 to 1,300 kc., 100 to 250 w.	Denied.
May 2	KUKO	White 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. Marvin Dobyns, Long Beach, Calif.	(E) C. P.	2,857, 4,050 kc., 250 w.	Do.
Do	do	Universal Broadcasting Co., Philadelphia, Pa.	(B) C. P., high frequency.	5,000 and 9,000 kc., 500 w.	Granted.
Do	do	Pacific-Western Broadcasting Fed., Pasadena, Calif.	do	14,150, 9,530 kc., 15,000 w.	Do.
May 8	do	Aviation Radio Station (Inc.) (Experimental Publishing Co.), New York City.	(E) License	6,800, 9,500, 11,800, 16,250, 17,780, 21,400 kc., 500 w.	Do.
May 8	do	Harold R. Smith, Beacon, N. Y.	(F) License	Any frequency in television band, 60 w. and higher as needed.	Do.
May 8	WNBQ	Gordon F. Brown, Rochester, N. Y.	(B) Reg. L.	1,400 kc., 15 w.	Denied.
Do	do	The Edison Electric Illuminating Co., Boston, Mass.	(E) License	Variable.	Do.
Do	WATT	do	(B) Reg. L.	1,400 kc., 100 w.	Do.
Do	KMTR	KMTR Radio Corporation, Hollywood, Calif.	(B) Mod. L.	560-500 w., 570 kc.; full time on 570 kc., present assigned hour.	Granted in part.
Do	do	Gordon F. 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 1,300 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	do	Radio Investment Co., Newark, N. J.	do	1,450 to 950 kc., 250 w.	Do.
May 21	WEBB	Howell Broadcasting Co. (Inc.), Buffalo, N. Y.	(do) Mod. L.	550 kc., 1,000 w.	Do.
May 22	do	Intercity Radio Telegraph Co., Cleveland, Ohio	(C) C. P.	1,310 to 550 kc., from 100 to 1,000 w.	Do.
Do	do	Radio Corporation of America, New York City.	do		Granted in part.
Do	do	Mechany Radio Telegraph Co., San Francisco, Calif.	do		Denied.
Do	do	The Wireless Telegraph & Communication Co., Northbrook, Ill.	do		Do.
Do	do	Western Radio Telegraph Co. (205, 215, 225, 237, 259 consolidated).	(C) C. P., 4 licenses.		Do.
May 24	WEBW	D. R. Kinsale, Philadelphia, Pa.	(C) Reg. L.	1,500 kc., 100 w.	Denied.
Do	WSRO	Harry W. Fairbairn, Hamilton, Ohio.	(B) Reg. L.	1,450 kc., 100 w.	Do.
Do	WHB	Sweeney Automobile School Co., Kansas City, Mo.	do	950 kc., 500 w.	Granted.
May 25	New	A. H. Niganda, New Orleans, La.	(B) C. P.	1,420 kc., 100 w.	Denied.
May 28	KGHI	Berman Bible Class, Little Rock, Ark.	do	1,500 to 530 kc., 100 to 500 w.	Granted.
Do	New	Leonard F. Besset, Klamath Falls, Oreg.	do	1,200 kc., 100 w.	Denied.
Do	KPFA	Western State College of Colorado, Gunnison, Colo.	(B) Reg. L.	1,300 kc., 50 w.	Granted.
Do	New	Mrs. Anna E. Stewart, Caryville, Mo.	(B) C. P.	1,540 kc., 50 w.	Denied.
Do	KPXF	Pikes Peak Broadcasting Co., Denver, Colo.	(B) Mod. L.	940 kc., 250 to 1,000 w.	Do.
June 3	do	News Syndicate Co. (Inc.), New York City.	(C) License, 2 applications.		Do.
June 6	New	Ralph A. Powers and Maynard Smith, Port Huron, Mich.	(C) C. P. 1.	550 kc., 200 w.	Do.
June 12	do	Hillard Co. (Inc.), Scottsburg, Ind.	(B) C. P.		Do.
Do	KTNT	Norbert Becker, Muscatine, Iowa.	(B) Mod. L.	1,210 kc., 1,000 w. 1,170 kc., from 5,000 to 10,000 of 5,000 w.	Do.

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1929					
June 13	WRRC	WRRC (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.	2,140 kc., 250 w	Denied.
June 14	do	O. L. Morris, P. E. Morris, O. B. Wray, O. W. Wray, Alton, Kans.	do	1,420 kc., 50 w	Do.
Do	KGON	The Concordia Broadcasting Co., Concordia, Kans.	(B) Ren. L.	do	Do.
Aug. 26, 27	WBUF	University of Florida, Gainesville, Fla. (heard in Florida)	(B) Mod. L.	From 1,470 to 560 kc., 5,000 w	Granted.
Sept. 2	WBIS	Sarasota Chamber of Commerce, Sarasota, Fla.	(B) Ren. L.	1,016 kc., 260 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. Caraglia, Monroe, La.	(B) C. P.	1,100 kc., 50 w	Do.
Do	do	Harry E. Soriman, Dunbar, Pa.	do	1,500 kc., 15 w	Do.
Do	do	Avanti-Morris Co., Brownwood, Tex.	do	1,490 kc., 100 w	Do.
Sept. 6	KWK	Greater St. Louis Broadcasting Corporation, St. Louis, Mo.	(B) Mod. L.	1,350 kc., 5,000 w	Do.
Do	KCRC	Champion Refining Co., Evid, Ohio.	(B) C. P.	1,100 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 Orphan's Home Mission, Dyerburg, Tenn.	do	1,210 kc., 50 w	Do.
Sept. 11	do	Norwood's Music Store, Bilz, Miss.	do	1,210 kc., 15 w	Do.
Sept. 17	do	The Ozark Radio Corporation, Sulphur Springs, Ark.	do	1,500 kc., 50 w	Do.
Do	do	A. L. Smith and J. M. Hamilton, Missoula, Mont.	do	1,260 kc., 50 w	Do.
Do	do	Portsmouth Broadcasting Co., Portsmouth, Ohio.	do	608 kc., 500 w	Do.
Do	do	Gardner-Helsheldt Music Co., Mitchell, S. Dak.	do	860 kc., 500 w	Do.
Sept. 19	do	Elgin National Watch Co., Elgin, Ill.	(E) Lic.	8,860 kc., 400 w	Granted.
Do	do	Public Service Electric & Gas Co., Newark, N. J.	(E) Ren. L.	do	Denied.
Do	New	James P. Lutz, South Hampton, N. Y.	(E) C. P.	1,100 kc., 250 w	Do.
Sept. 24	WTBO	Cumberland Broadcasting Co., Cumberland, Md.	(B) Mod. L.	520 kc., 500 w	Do.
Do	KGIR	Synco Broadcasting Co., Butte, Mont.	do	560 kc., 500 w	Do.
Sept. 26	KWSC	State College of Washington, Pullman, Wash.	(B) C. P.	850 kc., 1,000 w	Do.
Do	New	C. V. Hunter, Keenett, Mo.	do	1,100 kc., 5 kw	Granted.
Oct. 1	do	Oliver L. Ayers, Springfield, Mo.	do	1,060 kc., 100 w	Denied.
Oct. 1	do	Rev. Laurio W. Stewart, Ourterville, Mo.	do	1,340 kc., 500 w	Do.
Do	do	do	do	do	Do.
Oct. 2	KGRC	Eugene J. Roth, San Antonio, Tex.	(B) Lic.	do	Do.
Do	do	do	(B) Mod. L.	From 1,370 to 600 kc.; from 100 to 500 w. day.	Do.
Oct. 15	do	The Chicago Daily News, Chicago, Ill.	(F) C. P.	250 w. night	Granted.
Do	do	do	(A) C. P.	2,140 kc., 5 kw	Do.
Do	do	Athletic Broadcasting Corporation, New York City	(E) Ren. L.	5,900 kc., 1 kw	Do.
Do	do	do	(A) C. P.	6,120 kc., 6 kw	Do.
Do	do	do	(A) C. P.	6,120, 11,800, and 15,200 kc., 20 kw	Do.

Denied (order of denial set aside continued to Nov 14, 1929.)

Oct. 22				200 w	Decided.
Oct. 23	W3XB	Pilot Electric Manufacturing Co., Brooklyn, N. Y.	(E) License airplane channels.	100 w	Do.
		Merril D. Beam, Haddon Heights, N. J.	(E) C. P. for change in location Norberth, Pa., to Haddon Heights, N. J.		
Do.	W3XH	do	(E) License variable	100 w, 30,000-2,000 kc.	Do.
Do.		Southern Radio Corporation, New York City.	(E) C. P.	20,000, 25,000, 27,500, 30,000 kc., 1 kw	Granted.
Do.		Ward Leonard Electric Co., Mount Vernon, N. Y.	do	1,604, 2,368, 3,206, 4,795 kc., 250 w.	Do.
Do.		Doble Engineering Co., Medford, Mass.	do	1,500 kc., and 500 w.	Decided.
Oct. 24		Michigan College of Mining and Technology, Houghton, Mich.	do	7,500 kc., 200 w.	Granted.

Cases heard but not decided

Date of hearing	Call letters	Applicant	Power and frequency	Nature of application
1926 Dec. 11		Northern Seed & Nursery Co., Ipswich, S. Dak.	550 kc., 1,000 w.	C. P. (B).
1926 June 6	New	Edward A. and Philip F. 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 4,000 w.	Do.
June 14	KFH	Hotel Lassen, Wichita, Kans.	1,300 kc., 1,000 w.	Do.
Sept. 4		Wyandotte Trans. Co., Detroit, Mich.	760 w.	Assignment (C).
Do		Michigan Wireless Telegraph Co., Wyandotte, Mich.	do	Licenses (C).
Sept. 10	KMBC	Midland Broadcasting Co., Kansas City, Mo.	640 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	Ben. Klilmer & Bailey, Rayne, La.	1,190 kc., 130 w.	Do.
Oct. 8	do	Williamston Trans. Co., Wilmington, Calif.	2,610 kc., 100 w.	Ben. L. (C).
Do	do	Alaska Packers Association, San Francisco, Calif.	7,800 kc., 500 w.	Lic. (C).
Oct. 16	WQAO	Calvary Baptist Church, New York City	1,610 kc.; 1 kw. day, 500 w. night.	Mod. L. (B).
Do	WFBH	The Baltimore Radio Show (Inc.), Baltimore, Md.	1,270 kc., 1 kw.; unlimited time.	Do.
Do	New	Lynchburg Radio Broadcasting Co., Lynchburg, Va.	840 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 1,180,000 w. to 570 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.	1,250 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. 20	New	Raymond C. Hammett, Talladega, Ala.	1,420 kc., 100 w.; unlimited time.	C. P. (B).
Do	WKBZ	K. L. Aabbecker, Ludington, Mich.	1,200 kc., 100 w.; from 1,500 to 60 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, v. to General Broadcasting Co.).	do	Assignment of License (B).
Do	do	John Magaldi, Jr., Philadelphia, Pa.	do	Ben. L. (B).
Do	WBBH	Tremont Temple Baptist Church, Boston, Mass.	1,380 kc., 500 w.	C. P. (B).
Do	WMAF	Round Hills Studio Corporation, South Dartmouth, Mass.	do	Ben. Lic. (B).
Do	WFBE	Geo. M. Schott, Louis Schott, Wm. C. Schott, and Peter Miller, 475 Parkview Hotel, Cincinnati, Ohio.	1,300 kc., 100 w.; unlimited time.	Lic. (B).
Oct. 20	do	do	1,150 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 orders⁴ 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 orders⁴ 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 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. 51⁵

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 28, 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*

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, 1,600, 1,672, 1,684, 1,708, 2,320, 2,332, 2,350, 2,368, 2,380, 2,416, 2,428, 2,440, 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, 3,116, 3,130, 3,142, 3,420, 3,428, 3,436, 4,116, 4,148, 4,172, 4,188, 4,196, 4,755, 4,776, 5,526, 5,555, 5,585, 5,616, 5,645, 5,676.

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, 2,696, 2,722, 2,734, 3,070, 3,082, 3,100, 3,112, 3,124, 3,136, 3,148, 3,462, 3,480, 3,488, 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.

* Amended by General Order No. 74, p. 7.

3. Portable stations: The frequencies 1,600, 1,652, 1,664, 1,690, 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 8 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 23, 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 daylight-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)	Frequency (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 licensees 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 utilized 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. 66⁷

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 the 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. 48, 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,* 1,506,* 1,512,* 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.

* 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, 4,306, 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: 1,804, 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), 2,306, 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, 2,992, 2,998, 3,004, 3,034,* 3,034, 3,094, 3,154, 3,190, 3,232, 3,232, 3,232, 3,340, 3,348, 3,356, 3,364, 3,372, 3,380, 3,398, 3,398, 3,404, 3,412, 3,444, 3,476, 3,500 to 4,000, 4,012, 4,020, 4,028, 4,036, 4,044, 4,062, 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,

* 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 assignor 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 Denmark (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 1 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 WTRF 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 WTRJ, "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) 830; *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. Manila*, 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 faith 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 inter-continental 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 of applicant's default			Granted after hearing		
	Construction permits	Licenses	Renewals	Construction permits	Licenses	Renewals	Construction permits	Licenses	Renewals	Construction permits	Licenses	Renewals	Construction permits	Licenses	Renewals
FIXED SERVICE															
Broadcasting:	601	601	1,804	312	231	1,820	47	52	145	240	78	39	0	16	108
Point to point (domestic):	204	163	18	146	106	13	216	22	19	144	28	22	171	5	2
Point to point (international):	131	18	92	45	89	105	137	16	1	137	16	0	0	0	1
MOBILE SERVICE															
Ships:	0	1,426	834	0	1,426	598	0	0	0	0	0	0	0	0	0
Marine relay:	0	9	0	0	9	0	0	0	0	0	0	0	0	0	0
Airplanes:	39	54	1	44	84	0	36	3	1	0	0	0	36	3	0
Aeronautical:	0	22	0	0	22	0	0	0	0	0	0	0	0	0	0
Special:	67	105	6	16	84	28	90	16	0	0	0	0	89	0	1
Portable (including geophysical):	36	44	10	28	65	11	6	0	2	2	6	0	4	2	2
Coastal:	7	8	3	6	14	1	1	0	0	0	0	0	1	0	0
Fire and police:	47	22	0	0	2	2	73	0	0	0	1	0	16	0	0
Press:															
EXPERIMENTAL SERVICE															
General:	72	86	27	44	131	17	37	1	3	86	4	1	9	0	2
Visual:	32	23	3	16	15	5	4	2	1	33	1	3	1	3	1
Relay:	16	3	3	9	12	3	11	5	1	13	6	2	6	1	1
Airplane:	5	29	5	0	17	4	0	1	0	0	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	2,885	668	2,419	2,645	656	124	170	701	154	67	338	44	119
Final grand total:		5,927		668	5,732		656	980		701	923		338	401	

* Renewals include modifications and voluntary or involuntary assignments of license.

* Renewal applications for broadcasting licenses are received every 90 days. All other services are licensed for 1 year.

* 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	Renewals	Construction permits	Licenses	Renewals	Construction permits	Licenses	Renewals	Construction permits	Licenses	Renewals	Construction permits
FIXED SERVICE												
Broadcasting ¹	400	2,082	220	247	1,908	318	0	0	96	262	114	0
Point to point (domestic)	118	0	72	171	16	216	53	16	244	0	0	0
Point to point (international)	59	0	88	80	106	45	40	106	7	0	0	0
MOBILE SERVICE												
Ships	577	0	0	1,426	599	0	849	596	0	0	0	0
Marine relay	0	0	0	0	0	0	0	0	0	0	0	0
Airplanes	5	0	0	84	0	0	79	0	0	0	0	0
Aeronautical	0	0	0	51	1	79	51	1	79	0	0	0
Special ²	11	0	7	22	0	0	11	0	0	0	0	7
Portable (including geophysical)	5	0	5	58	23	104	53	23	99	0	0	0
Coastal	23	0	16	57	13	32	44	13	14	6	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	0	18	4	4	15	4	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	2,452	2,765	1,006	1,332	797	800	266	114	8
Final grand total	2,901			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, 1929¹⁴

PUBLIC POINT TO POINT—TRANSOCEANIC

Licensee or permittee	Location	Call letters	Remarks
American Telephones & 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	EDC.....	Construction permit.
Do.....	Musselrock, Calif.	KQQ.....	Do.
Do.....	Seattle, Wash.	EGR.....	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).	KNE.....	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.	KQQ.....	Construction permit.
Do.....	Little Neck, Long Island, N. Y.	WIN.....	Do.
Do.....	San Francisco, Calif.	KOI.....	Do.
Do.....	Los Angeles, Calif.	KOS.....	Do.
Do.....	do	KPO.....	Do.
Do.....	Chicago, Ill.	WJA.....	Do.
Do.....	do	WJC.....	Do.
Do.....	Near Milwaukee, Wis.	WJP.....	Do.
Do.....	Philadelphia, Pa.	WJG.....	Do.
Do.....	Upper Newton Falls, Newton, Mass.	WJK.....	Do.
Do.....	Washington, D. C.	WIM.....	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.	KBB.....	Do.
Do.....	do	KBE.....	Do.
Do.....	do	KEI.....	Do.
Do.....	do	KEJ.....	Do.
Do.....	do	KEI.....	Do.
Do.....	do	KEM.....	Do.
Do.....	do	KEN.....	Do.
Do.....	Hahuku, Hawaii	KKQ.....	Do.
Do.....	Bolinas, Calif.	KRR.....	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	KQQ.....	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.	KRS.....	Do.
Do.....	do	KUN.....	Do.
Do.....	do	KWE.....	Do.

¹⁴ 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—TRANBOCEANIC—Continued

Licenses or permits	Location	Call letters	Remarks
B. O. 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	WEO	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.	WH	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.	WIT	Do.
Do.	Rocky Point, N. Y.	WKC	Do.
Do.	do	WED	Do.
Do.	do	WEJ	Do.
Do.	do	WEL	Do.
Do.	do	WEM	Do.
Do.	do	WEO	Do.
Do.	do	WEP	Do.
Do.	do	WEQ	Do.
Do.	do	WEU	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.	Hiialeah, 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.
Ahtak 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	KZO	Do.
Far North Fisheries (Inc.)	Hydaburg, Alaska	KOIP	Do.
Florida Radio Telegraph Co.	Poincianna, 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.	WDL	Do.
Do.	Chicago, Ill.	WFL	Do.
Do.	Duluth, Minn.	WME	Do.
Do.	Cleveland, Ohio	WTK	Do.
Do.	do.	WTL	Do.
Katmai Packing Co. (Inc.)	Drinki, Alaska	KZU	Do.
Kennecott Copper Corporation	Latouche, Alaska	KIM	Do.
Killam, T. H.	Port Graham, Alaska	KFQ	Do. ¹
Killsnoo Fisheries (Inc.)	Killsnoo, 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.	KOH	Do.
Do.	Palo Alto, Calif.	KWT	Do.
Do.	Clearwater, Calif.	KNR	Do.
Mutual Telephone Co.	Sayville, N. Y.	WKI	Do.
Do.	Waialuku, Island of Maui	KHL	Do.
Do.	Lihoa, Hawaii	KHM	Do.
Do.	Lanai, Hawaii	KHN	Construction permit.
Do.	Kaunakakai, Island of Molokai	KHO	Licensed.
Do.	Hilo, Hawaii	ELN	Do.
Do.	Wahiawa, Hawaii	KHE	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.	Ikatat, Alaska	KXW	Do.
Para Marquette Railway Co.	Ludington, Mich.	WLD	Do.
Peril Straits Packing Co.	Todd, Alaska	KFP	Do.
Port Walter Herring & Packing Co.	Big Port Walter, Alaska	EPV	Do.
Porto Rico Telephone Co.	Ponce, P. R.	WJP	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.	WSE	Licensed.
E. C. A. Communications (Inc.)	Hocky Point, N. Y.	WQM	Do. ¹
E. P. Slayton	Pinecrest, Fla.	WRP	Do. ¹
South Porto Rico Sugar Co.	Ensenada, P. R.	WPR	Do.
Tropical Radio Telegraph Co.	Burrwood, La.	WRW	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.	WNUF	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.	WNUL	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, Mo.		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.	KQL	Do.
The Wireless Telegraph & Communication Co.	Northbrook, Ill.	WIW	Do.

POINT TO POINT—PRIVATE

Alaskan Livestock Co.	Nelsmoor, Alaska.	EGIY	Construction permit.†
Do.	Unalaska, Alaska.	KQIV	Do.
Do.	Umnak, Alaska.	KQIU	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.	Yee Bay, Alaska.	KRU	Do.
Alaska Packers Association	Moored vessel in Koggiung River, Alaska.	KDR	Do.
Do.	Alameda, Calif.	KFU	Do.‡
Do.	Uyak, Alaska.	KHA	Do.
Do.	Kvichak, Alaska.	KHB	Do.
Do.	Chignik, Alaska.	KHC	Do.
Do.	Snag Point, Alaska.	KHF	Do.
Do.	Clacks Point, Alaska.	KHG	Do.
Do.	Naknek, Alaska.	KHT	Do.
Do.	Loring, Alaska.	KRI	Do.
Do.	Naknek, Alaska.	KTZ	Do.‡
Do.	Koggiung River, Alaska.	KUB	Do.
Do.	Bacheroff, Alaska.	KUD	Do.
Do.	Pilot Point, Alaska.	KUL	Do.

† Term has expired and station not now operating.

‡ 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	Koglung River, Alaska (Kv-chak)	KVQ	Licensed.
Do	Karluk, Alaska	EYK	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	KJO	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.
Bethlehem 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.	Byron, Ky.	WLG	Do. ¹
Bristol Bay Packing Co.	Kvichak, Alaska	KYM	Do.
Buchan and Heinen Packing Co.	Point Armstrong, Alaska	KHH	Do.
Byrd Antarctic Expedition	Portable	WFA	Do. ¹
Do	do	WFD	Do. ¹
Do	do	KPK	Do. ¹
Do	do	WFE	Do. ¹
Carter Publications (Inc.)	Fort Worth, Tex.	KMB	Do. ¹
Caw Packing Co.	Raspberry 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	WRDX	Construction permit.
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.
Do	Marysville, Mich.	WPV	Do. ¹
Do	Ypsilanti, Mich.	WRH	Do. ¹
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.	WNI	Do.
Do	Palatka, Fla.	WNP	Do.
Do	Fort Lauderdale, Fla.	WNO	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	Polmelana, Fla.	WVU	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.
Do	Indio, Calif.	KGIB	Do. ¹
Do	Lodi, Calif.	KGIC	Do. ¹
Do	Santa Rosa, Calif.	KGID	Do. ¹
Do	Santa Maria, Calif.	KGIE	Do. ¹
Do	Modesto, Calif.	KGIF	Do. ¹
Do	Marysville, Calif.	KGJH	Do. ¹
Do	Fresno, Calif.	KGJI	Do. ¹
Do	Saknas, Calif.	KRB	Licensed.
Do	Sebastopol, Calif.	KRD	Do.
Do	San Francisco, Calif.	KRG	Do.
Do	San Jose, Calif.	KRH	Do.
Do	Sacramento, Calif.	KRI	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.)	Kaunapalapa, Hawaii	KRQ	Do. ¹
Do	Honolulu, Hawaii	KYB	Do. ¹
Henrich 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	Birmingham, Ala.	WPM	Do. ¹
Lincoln L. Jackson	Seattle, Wash.	KPA	Do. ¹
Kroeten Co.	Johnswood, Mich.	WMF	Do.
W. W. Kathan	Cheboygan, Mich.	WPI	Do.
Libby, McNeil & Libby	Yakutat, Alaska	KKA	Do.
Do	Egegik, Alaska	KMF	Do.
Do	Etuk, Alaska	KMG	Do.
Do	Lockagok, Alaska	KML	Do.
Do	Nushagak, Alaska	KNO	Do.
Do	Tally Scow, Alaska	KTP	Do.
Do	Taku Harbor, Alaska	KVG	Do.
Do	Koglung, Alaska	KVV	Do.
Do	Kenai, Alaska	KYZ	Do.
G. E. Maddox	Mary Island, Alaska	KJJ	Do.
Merland 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.	KQKI	Construction permit. ²
Do	Anahelm, Calif.	KGKJ	Do.
Nakat Packing Corporation	Hecla Island, Alaska	KGG	Licensed. 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	KOB	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.	WPI	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.	KIS	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.	WHC	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, 1923, to November 1, 1923—Continued

POINT TO POINT—PRIVATE—Continued

Licenses 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	KMC	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	KSH	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	KBIT	Do.
State of California, Division of Forestry	Portland	KQKN	Construction permit.
Do.	do	KGKP	Do.
Sunny Point Packing Co.	Kaka, 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. ¹
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 Hobeon, Alaska	KGL	Do.
Do.	Akutan, Alaska	KMW	Do.
West Penn Power Co.	Charleroi, Pa.	WBV	Do.
Do.	Chest Haven, W. Va.	WHH	Construction permit. ²
Do.	Butler, Pa.	WHJ	Do. ¹
Do.	Connellsville, Pa.	WOB	Licensed.
Do.	Springdale, Pa.	WOY	Do.
Wyandotte Transportation Co.	Wyandotte, Mich.	WCV	Do. ¹
Whitworth Fisheries (Inc.)	Point Ward, 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. I.	WOO	Do.
Bureau of Insular Telegraph	Munoz Rivera, Vieques, P. R.	WGW	Do.
Do.	Ceiba, P. R.	WKE	Do.
Chilkot 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	EDC	Construction permit.
Do.	Portland, Oreg.	KEB	Do.
Do.	Seattle, Wash.	KBA	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.	KQJY	Do.
Carol G. Fisher Co.	Miami Beach, Fla.	WFU	Licensed. ¹
Ford Motor Co.	Fordson, Mich.	WMD	Do.
Gulf Radio Service	Tampa, Fla.	WPD	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

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.	Birmingham, 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.	WDL	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. Lipka	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.	KFB	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.	WSP	Licensed.
Do.	Sayville, N. Y.	WBL	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.	Iktan, 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.	KBE	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. Rain Coal Co.	Sheboygan, Wis.	W8K	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 Rustis Pier, Va.	WPF	Do.
The Warehouse Co.	Port Hobron, Territory of Alaska	KGL	Do.
Do.	Aktan, Territory of Alaska	KMW	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

MOBILE SERVICE-MARINE RELAY

Licenses or permittees	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.	WDL	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. ¹
Do.	Burbank, Calif.	KEU	Do. ¹
Do.	Sacramento, Calif.	KFM	Licensed.
Do.	Oakland, Calif.	KFO	Do.
Do.	Medford, Oreg.	KOE	Do.
Do.	do.	KOE	Construction permit.
Do.	Fresno, Calif.	KOT	Licensed.
Do.	Tacoma, Wash. A.	EGEW	Construction permit.
Do.	Fresno, Calif.	KGT	Do.
Do.	Reno, Nev.	KJR	Do. ¹
Do.	Elko, Nev.	KEO	Do. ¹
Do.	Omaha, Nebr.	KMP	Do. ¹
Do.	North Platte, Nebr.	KMR	Do. ¹
Do.	Cheyenne, Wyo.	KOE	Do. ¹
Do.	Rock Springs, Wyo.	KQC	Do. ¹
Do.	Salt Lake City, Utah	KQD	Do. ¹
Do.	Des Moines, Iowa	KQM	Do. ¹
Do.	Iowa City, Iowa	KQQ	Do. ¹
Do.	Bakersfield, Calif.	KQX	Licensed.
Do.	Cedar Rapids, Iowa	KRA	Construction permit. ¹
Do.	Lincoln, Nebr.	KRF	Do. ¹
Do.	Redding, Calif.	KTU	Do. ¹
Do.	Portland, Oreg.	KVO	Do. ¹
Do.	Seattle, Wash.	KZJ	Do. ¹
Do.	Chicago, Ill.	WBQ	Do. ¹
Do.	Marion, Ill.	WEU	Do.
Egyptian Transportation System (Inc.)			
Ford Motor Co.	Dearborn, Mich.	WFO	Licensed.
Do.	Lansing, Ill.	WCQ	Do.
Maddux Air Lines (Inc.)	Phoenix, Ariz.	KGJR	Construction permit. ¹
Do.	San Diego, Calif.	KGJS	Do. ¹
Do.	San Bruno, Calif.	KGJT	Do. ¹
Do.	El Paso, Tex.	KGJU	Do. ¹
Do.	Los Angeles, Calif.	KGJV	Do. ¹
Monterey Peninsula Airport	Monterey County, Calif.	KGKV	Do. ¹
New York Air Terminals (Inc.)	Jackson Heights, N. Y.	WODJ	Do. ¹
Pacific Air Transport	Los Angeles, Calif.	KFU	Licensed.
Pan American Airways (Inc.)	Brownsville, Tex.	KG/W	Do.
Do.	Miami, Fla.	WKDL	Construction permit. ¹
Santa Maria Air Lines (Inc.)	Santa Maria, Calif.	KGKD	Do. ¹
Transcontinental Air Transport (Inc.)	Albuquerque, N. Mex.	KSI	Licensed.
Do.	Gallup, N. Mex.	KSP	Construction permit. ¹
Do.	Clovis, N. Mex.	KST	Licensed.
Do.	Winslow, Ariz.	KSY	Do.
Do.	Kingman, Ariz.	KSX	Do.
Do.	Waynoka, Okla.	KSY	Do.
Do.	Columbus, Ohio	WHG	Do.
Do.	Indianapolis, Ind.	WHM	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—AERONAUTICAL—Continued

Licenses or permits	Location	Call letters	Remarks
Universal Aviation Corporation	Garden City, Kans.	KGKQ	Construction permit.
Western Air Express (Inc.)	Oakland, Calif.	KQSR	Licensed.
Do.	Albuquerque, N. Mex.	KG8D	Do.
Do.	Amarillo, Tex.	KG8E	Do.
Do.	Dodge City, Kans.	KG8H	Do.
Do.	Phoenix, Ariz.	KG8I	Do.
Do.	Seligman, Ariz.	KG8L	Construction permit. ¹
Do.	El Paso, Tex.	KG8M	Licensed.
Do.	Denver, Colo.	KG8P	Do.
Do.	Pueblo, Colo.	KG8R	Do.
Do.	San Diego, Calif.	KG8X	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.	KGFA	Construction permit. ¹
Do.	Oklahoma City, Okla.	KOBC	Do. ²
Do.	Tucson, Ariz.	KG8F	Do. ²
Do.	Flagstaff, Ariz.	KG8G	Do. ²
Do.	Austin, Tex.	KG8J	Do. ²
Do.	Dallas, Tex.	KG8K	Do. ²
Do.	Fort Worth, Tex.	KG8N	Do. ²
Do.	Houston, Tex.	KO8O	Do. ²
Do.	Marec, Tex.	KG8Q	Do. ²
Do.	San Antonio, Tex.	KG8S	Do. ²
Do.	St. Louis, Mo.	KG8T	Do. ²
Do.	Sweetwater, Tex.	KG8U	Do. ²
Do.	Wichita Falls, Tex.	EG8V	Do. ²
Do.	Muskogee, Okla.	KG8W	Do. ²
Do.	Barstow, Calif.	KG8Y	Do. ²
Do.	Ashfork, Ariz.	KG8Z	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.	KGTE	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. ²
Do.	do	KHRA	Do. ²
Do.	do	KHBA	Do. ²
Do.	do	KHBC	Do. ²
Do.	do	KHBD	Do.
Do.	do	KHBE	Do.
Do.	do	KHBF	Do.
Do.	do	KHBG	Do.
Do.	do	KHHH	Do.
Do.	do	KHBI	Do.
Do.	do	KHBJ	Do.
Do.	do	KHJK	Do.
Do.	do	KHBL	Do.
Do.	do	KHHM	Do.
Do.	do	KHHN	Do.
Do.	do	KH8O	Do.
Do.	do	KHBP	Do.
Do.	do	KHRQ	Do.
Do.	do	KHBR	Do. ²
Do.	do	KHBS	Do. ²
Do.	do	KHBT	Do. ²
Do.	do	KHBU	Do. ²
Do.	do	KH8V	Do. ²
Commander Richard E. Byrd	do	WFB	Do. ²
Do.	do	WFC	Do. ²
Do.	do	WFF	Do. ²

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

Licenses or permits	Location	Call letters	Remarks
E. N. Chermant	Airplane	W10XN	Licensed.
Chicago Daily News (Inc.)	do	KHEH	Do.
Curtiss Aeroplanes Export Corporation	do	KHEN	Do.
Curtis Flying Service (Inc.)	do	KHEB	Do.
Do.	do	KHGA	Do.
Do.	do	KHGB	Do.
H. Elson	do	EDY	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	KHFO	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	KHFG	Do.
Do.	do	KHFI	Do.
Do.	do	KHFI	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.

*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. ¹
Do.....	do.....	KDE.....	Do. ¹
Do.....	do.....	KDL.....	Do. ¹
Do.....	do.....	WOC.....	Do. ¹
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.....	KOJQ.....	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.....	KEZ.....	Do.
Do.....	do.....	KIB.....	Do.
Do.....	do.....	KIC.....	Do.
Do.....	do.....	KI.....	Do.
Do.....	do.....	KED.....	Do.
Do.....	do.....	KKF.....	Do.
Do.....	do.....	KKU.....	Do.
Do.....	do.....	KKV.....	Do.
Do.....	do.....	KEX.....	Do.
Do.....	do.....	KKY.....	Do.
Do.....	do.....	KNL.....	Do.
Do.....	do.....	ENM.....	Do.
Do.....	do.....	ENQ.....	Do.
Do.....	do.....	ENS.....	Do.
Do.....	do.....	ENT.....	Do.
Do.....	do.....	ENU.....	Do.
Do.....	do.....	KNY.....	Do.
Do.....	do.....	KNZ.....	Do.
Do.....	do.....	KOD.....	Do.
Do.....	do.....	KOF.....	Do.
Do.....	do.....	KOL.....	Do.
Do.....	do.....	KOT.....	Do.
Do.....	do.....	KSB.....	Do.
Do.....	do.....	WFO.....	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.

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—GEOPHYSICAL—Continued

Licensee or permittee	Location	Call letters	Remarks
Geophysical Research Corporation	Portable	WFR	Licensed.
Do	do	WFS	Do.
Do	do	WFX	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	EJA	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	ERV	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.
McCullum 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	KOJZ	Construction permit. ¹

MOBILE SERVICE—POLICE AND FIRE

Berkeley Police Department	Berkeley, Calif.	KAW	Construction permit. ¹
Board of fire commissioners, Baltimore, Md.	Baltimore, Md.	WEQ	Licensed.
Boston Fire Department	Boston, Mass.	WBY	Do.
Bureau of police (department of public safety, city of Philadelphia)	Philadelphia, Pa.	WPDP	Construction permit.
City of Beaumont, Tex.	Beaumont, Tex.	KOKM	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. ¹
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. ¹
Detroit Police Department.	Belle Isle, Mich.	WCK.....	Licensed.
Pasadena Police Department.	Pasadena, Calif.	KGJK.....	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.	W2XAG..	Licensed. ¹
Chicago Police Department.	Chicago, Ill.	W9XAJ..	Do. ¹
Crosley Radio Corporation.	Airplane	W8XAA..	Do. ¹
H. P. Dray.	Columbus, Ohio.	WCAH..	Do. ¹
Examiner Printing Co.	Aboard press yacht Ambassador.	W5XZ..	Do. ¹
Global Bros. (Inc.)	Airplane	W2XBZ..	Do. ¹
National Battery Broadcasting Co.	do.		Do. ¹
National Broadcasting Co. (Inc.)	do.	W2XBF..	Do. ¹
WYAY (Inc.)	do.	W8XII..	Do. ¹

GENERAL EXPERIMENTAL

Anderson, Clayton & Co.	Houston, Tex.	W5NJ..	Construction permit. ¹
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. Beet	Piedmont, Calif.	W6XAO..	Do.
Joseph G. Branch	Chicago, Ill.	W9XAD..	Construction permit. ¹
C. F. Burgess Laboratories	Madison, Wis.	W8XH..	Licensed.
Bell Telephone Laboratories (Inc.)	Portable	W2XAV..	Do.
Do.	New York City, N. Y.	W2XB..	Do.
Do.	Ocean Township, N. J.	W2XG..	Do.
Do.	Deer, N. J.	W2XI..	Do.
Do.	Cliffwood, N. J.	W2XF..	Do.
Do.	Whippany, N. J.	W3XN..	Do.
Do.	Portable	W6XQ..	Do.
Do.	Airplane	W7XAA..	Do.
H. N. Chaminant	Los Angeles, Calif.	W6XBC..	Construction permit. ¹
Allen D. Cardwell Manufacturing Corporation.	Brooklyn, N. Y.	W2XCE..	Licensed.
Coco Manufacturing Co. (Inc.)	Providence, R. I.	W1KAC..	Do. ¹
Frank B. Chambers	Philadelphia, Pa.	W8XC..	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

Licenses or permits	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. ¹
Colorado School of Mines	Portable	W9XE	Do. ¹
Continental Broadcasting Corporation	Alexandria, Va.	W8XD	Do. ¹
Do.	Fredericksburg, Va.	W3XF	Do. ¹
Do.	do	W8XG	Do. ¹
Do.	Richmond, Va.	W3XH	Do. ¹
Howard C. Crossett	Winnon, Mass.	W1XA	Licensed.
De Forest Radio Co.	Passaic, N. J.	W2XCD	Do.
Fred Louis Dewey	Los Angeles, Calif.	W8XL	Do. ¹
Laurence E. Dutton	Miami Beach, Fla.	W1XQ	Do.
Do.	Culver, Ind.	W9XR	Do.
The Robert Dollar Co.	Portable	R6XAK	Construction permit. ²
The Electro-Spray Corporation	North Wenatchee, Wash.	W7XAB	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	W6XAG	Licensed.
Do.	Palo Alto, Calif.	W6XV	Do.
Reginald A. Fessenden	Chaunt Hill, Mass.	W1XS	Do.
Robert Anton Fleiss	Portable	W1XAY	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.	W6XBK	Do.
General Electric Co.	Portable	W6XAX	Licensed. ¹
General Radio Co.	Cambridge, Mass.	W1XO	Do.
David Grimes	Gramercy, N. Y.	W2XCB	Construction permit. ²
Do.	New York City, N. Y.	W2XCC	Do. ¹
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	W1XAW	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.	W1KI	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.
Lamert Engineering Corporation	Catalina Terminal, Calif.	W6XAE	Construction permit.
Mackay Radio & Telegraph Co.	Sayville, N. Y.	W2XBL	Licensed. ¹
Do.	do	W2XOM	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.	W1XB	Licensed.
Mockum-Kleinhardt Corporation	Chicago, Ill.	W6XO	Do.
Mackay Radio & Telegraph Co.	Palo Alto, Calif.	W6XAU	Do. ¹
Do.	Portable	W6XBE	Do.
Mutual Telephone Co.	Honolulu, Hawaii	W6XP	Do.
Nightingale Radios (Inc.)	Portable	W6XR	Do. ¹
Louis Gerard Parent	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.	W1XBD	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. ¹
Albert B. Pitts	Rantoul, Ill.	W9XE	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 Radlors Co.	Portable	W6XAB	Do.
John L. Reinartz	South Manchester, Conn.	W1XAM	Do.
J. Harris Rogers	Hyattsville, Md.	W8XR	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.	W2KAM	Do.
Do.	Rocky Point, N. Y.	W2KAS	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.	W8X1	Licensed.
Rev. Lennie W. Stewart	Cartersville, Mo.	W9XV	Do.
Stramberg-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.	W5XM	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. ¹
Do.	Portable	W8XU	Licensed.
Do.	Salt Lake City, Utah	W6XA	Construction permit. ¹
Do.	San Francisco, Calif.	W6XZ	Do. ¹
Do.	Buffalo, N. Y.	W8XH	Do. ¹
Do.	Chicago, Ill.	W9XM	Do. ¹
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. ¹
Ward Leonard Electric Co.	Mount Vernon, N. Y.	W2XBF	Do.
Warner Bros. Pictures (Inc.)	Portable	W8XBR	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.	W8XT	Construction permit. ¹
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.	W9KY	Do.
West Virginia University.	Portable.	W8XAW	Construction permit.
Wired Radio (Inc.)	Newark, N. J.	W2KCU	Do.

EXPERIMENTAL—VISUAL BROADCASTING

Aero Products (Inc.)	Chicago, Ill.	W9KAG	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	W10KU	Do.
Wilbur Ierman	Portland, Oreg.	W7XAO	Do.
The Lexington Air Stations	Lexington, Mass.	W1XAY	Do.
William Justice Lee	Winter Park, Fla.	W4XF	Do. ¹
Ben S. McGlashan	Los Angeles, Calif.	W6XAM	Construction permit. ¹
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.	W3KL	Do.
Radio Corporation of America	Portable	W2KRR	Do.
Do.	do.	W2KBV	Do.
Do.	Near New York City, N. Y.	W2XCO	Construction permit.
Do.	Portable	W3XAK	Licensed.
Radio Pictures (Inc.)	New York City, N. Y.	W2KR	Do.
Shortwave and Television Laboratory (Inc.)	Boston, Mass.	W1XAV	Construction permit.
Harold E. Smith	Near Beacon, N. Y.	W2XHU	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.	W2XK	Licensed.
Aviation Radio Station (Inc.)	Coytesville, N. Y.	W2XAL	Do.
L. Bamberger & Co.	Kearny, N. J.	W2XCX	Construction permit. ²
Baruchrome Corporation	Portable	W2KBR	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.
Mons 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 Easton, 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, 1928—Continued

EXPERIMENTAL—AIRPLANE

Licensee or permittee	Location	Call letters	Remarks
Aircraft Radio Corporation	Airplane	W10XI	Licensed.
American Aeronautical Corporation	do	W10XQ	Do.
Bell Telephone Laboratories (Inc.)	do	W2XBK	Do. ¹
Do	do	W7XAA	Do.
The Chicago Daily News (Inc.)	do	W10XF	Do.
Colonial Air Transport (Inc.)	do	W10XQ	Do.
Do	do	W10X8	Do.
Lieut. James H. Doolittle	do	W10XH	Do. ¹
Ford Motor Co.	do	W8XA	Do.
O. 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	W2XBE	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	Fort Washington, N. Y.	W2XC8	Do.
Bosong 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.)	Mincola, 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	Burger, 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 30 frequencies (2 per cent channels) 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	Kilo-cycles	Time and power limitations
WAAF WAAM	Chicago, Ill. Newark, N. J.	Drovers Journal Publishing Co. W. A. A. M. (Inc.)	WGCP, WODA	600 1 kw 2 kw	920 1,280	D. L.S.
WAAT WAAW WABC, WBOQ	Jersey City, N. J. Omaha, Neb. West of Cross Bay Boule- vard, Queens County, N. Y. C. F. to move and increase power to 50 kilo- watts, L.P.	Bruner Broadcasting Corporation Omaha Grain Exchange Atlantic Broadcasting Corporation		300 600 5 kw	1,070 600 800	C. D.
WABI WABO, WHEC. (See WHEC-WABO.) WABE WADC	Banger, Me. New Orleans, La. Akron, Ohio. C. F. to move to Tallmadge, Ohio. Royal Oak, Mich. Columbus, Ohio. Birmingham, Ala.	First Universalist Church of Banger Coliseum Place Baptist Church Allen T. Simmons Robert L. Miller (½ time) American Insurance Union Alabama Polytechnic Institute, University of Alabama, and Alabama College WABH Broadcasting Corporation	WJBW	100 140 1 kw	1,200 1,200 1,220	
WAGM WAU WAPI	Grand Rapids Township, Mich. West Lafayette, Ind. Harrisburg, Pa.	Purdue University Pennsylvania State Police, Commonwealth of Pennsylvania Consolidated Gas, Electric Light & Power Co. of Baltimore Carver Publications (Inc.) John H. Stenger, Jr.	WOOD WOMA, WBBF WHP, WCAH WTIC WFSA WJBU	50 500 5 kw	1,210 940 1,140	L.T.
WASH				500	1,370	
WBAA WBAX				500 500	1,400 1,420	C. P. only.
WBAL	Glen Morris, Md. S. = Baltimore, Md. North Worth, Tex. Wilkes-Barre, Pa. C. F. to move to move to Bear Creek Township.			18 kw	1,000	
WBAP WBAX				80 kw 100	800 1,210	L.P.

D. = Daytime. See General Order No. 41.

L.S. = Power until local sunset.

L.T. = Limited time. See General Order No. 43.

L.P. = Limited power. See General Order No. 42.

C. P. = Construction permit authorized.

S. = Where main studio location differs from transmitter site is shown below transmitter location.

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

B. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilo-cycles	Tune and power limitations
WBBC	Brooklyn, N. Y.	Brooklyn Broadcasting Corporation	WBOH, WSDA, WCGU, WLTH	500	1,400	
WBBL	Richmond, Va.	Grace Covenant Presbyterian Church	KFAB	100	1,370	
WBBM, WJBT	Channahon, Ill.	Atlas Co. (Inc.)		25 kw	1,770	
WBBS	Chicago, Ill.					
WBBS	Roseville, N. Y.	Peoples Pulpit Association	WHAZ, WHAP, WEVD	1 kw	1,308	
WBBS	Charleston, S. C.	Washington Light Industry		75	1,200	
WBBS	Ponca City, Okla.	C. L. Currell		100	1,200	
WBBS	Hampton Township, Mich.	James E. Davidson		500	1,410	
WBBS, WNAC. (See WNAC, WBBS)						
WBBS	Fort Lee, N. J.	WBBS Broadcasting Corporation	WNI, WEBC, WBS	280	1,400	
WBBS	New York, N. Y.	Barnhorns Corporation	WCDA, WKBQ, WMSG	250	1,300	
WBBS	Terrace, Ind.	Banks of Wabash (Inc.)		100	1,310	LS.
WBBS	Birmingham, Ala.	Birmingham Broadcasting Co. (Inc.)		500	930	
WBBS	Wilkes-Barre, Pa.	Louis G. Baltimore		1 kw		
WBBS	Tilton, N. H.	Booth Radio Laboratories (Inc.)		100	1,310	
WBBS	Wellesley Hills, Mass. C. P. issued to move to Needham, Mass., and increase power to 500 watts.	Babson's Statistical Organization (Inc.)		500	1,430	
WBBS	Charlotte, N. C.			250	920	D.
WBBS	East Springfield, Mass.					
WBBS	S. = Springfield, Mass.					
WBBS	Boston, Mass.	Station WBT (Inc.)	WBZA	5 kw	1,080	
WBBS	Storrs, Conn.	Westinghouse Electric & Manufacturing Co.		16 kw	900	
WBBS	Gaunt, N. Y.		WBZ			
WBBS	Pittsburgh, Pa.	Connecticut Agricultural College (M time)		500	900	
WBBS	Columbus, Ohio	St. Lawrence University		500	800	
WBBS	Lancaster, N. H.	Kaufman & Rose Co. (Inc.)		500	1,230	
WBBS	Northfield, Minn.	Commercial Radio Service Co.	WHP, WBAK	500	1,500	
WBBS	Camden, N. J.	Nebraska Wesleyan University	WOW	500	500	
WBBS	Baltimore, Md.	St. Olaf College	KFMX, WHIM, WLR	1 kw	1,260	
WBBS	Asbury Park, N. J.	City of Camden	WOAX, WCAP	500	1,280	
WBBS	Rapid City, S. Dak.	Monumental Radio (Inc.)	WCAM, WOAX	250	600	
WBBS	Byberry, Pa.	Radio Industries Broadcast Co.		500	1,280	
WBBS	S. = Philadelphia, Pa.	South Dakota State School of Mines		100	1,200	
WBBS	Burlington, Vt.	Universal Broadcasting Co.		10 kw	1,170	
WBBS	Carthage, Ill.	University of Vermont	WNBX	100	1,200	
WBBS	Allentown, Pa.	Carthage College	WSAN	50	1,070	D.
WBBS	Zion, Ill.	B. Bryan Musselman	WMBI	250	1,440	
WBBS		Wilbur Glenn Voliva		5 kw	1,080	LT.

WCBM	Baltimore, Md. (P. issued to increase power to 250 watts; L.S.)	Baltimore Broadcasting Corporation	100	1,370	
WCBH	Springfield, Ill.	Charles H. Maester and Harold L. Dewing	100	1,210	
WCCO	Ada, Minn.	Northwestern Broadcasting (Inc.)	7 1/4 kw.	830	
WCDA	S. - Minneapolis, Minn. S. - New York City, N. Y.	Italian Educational Broadcasting Co. (Inc.)	250	1,350	
WCFL	Chicago, Ill.	Chicago Federation of Labor	1 1/4 kw.	970	LT.
WCOU	Conry Island, N. Y.	U. S. Broadcasting Corporation	500	1,400	
WCKY	Crescent Springs, Ky. S. - Covington, Ky.	L. B. Wilson (Inc.)	5 kw.	1,480	
WCLO	Kenosha, Wis.	C. M. Whitmore	100	1,200	
WCLB	Joliet, Ill.	WCLA (Inc.)	100	1,310	
WCMA	Calver, Ind.	Calver Military Academy	500	1,400	
WCOA	Panama, Fla.	City of Panama, Fla.	500	1,120	
WCOG	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	1 kw.	1,200	L.S.
WCOH	Greenville, N. Y. S. - Yonkers, N. Y.	Westchester Broadcasting Corporation	100	1,210	
WCRW	Chicago, Ill.	Clinton H. White	100	1,210	
WCSH	Portland, Me.	Congress Square Hotel Co.	500	940	
WCBO	Springfield, Ohio.	Wittenberg College	500	1,430	
WDAB	Tampa, Fla.	Tampa Publishing Co.	1 kw.	620	
WDAA	Kansas City, Mo.	Kansas City Star Co.	1 kw.	610	
WDAG	Amarillo, Tex.	National Radio & Broadcasting Corporation	250	1,410	
WDAB	El Paso, Tex.	Trinity Methodist Church	100	1,210	
WDAY	West Fargo, N. Dak.	WDAY (Inc.)	1 kw.	1,280	
WDDJ	Rosabe, Va.	Richardson-Wayland Electrical Corporation	250	930	
WDBO	Orlando, Fla.	Rolling College (Inc.)	500	620	L.S.
WDEL	Wilmington, Del.	WDEL (Inc.)	250	1,120	
WDGY	Minneapolis, Minn.	Dr. Geo. W. Young	300	1,180	L.S.
WDOD	Chattanooga, Tenn.	Chattanooga Radio Co. (Inc.)	1 kw.	1,280	LT.
WDBC	New Haven, Conn.	Deedle Radio Corporation	2 1/4 kw.	1,330	L.S.
WDSU	New Orleans, La.	Joseph H. Uhall	500	1,250	
WDWF, WLSU	Cranston, R. I.	Durac W. Flint and The Lincoln Studios (Inc.)	1 kw.	1,210	
WDZ	Providence, R. I.	James L. Bush	100	1,070	D.
WEAF	Tuscola, Ill. Baltimore, N. Y. S. - New York, N. Y.	National Broadcasting Co. (Inc.)	50 kw.	900	L.P.
WEAL	Ithaca, N. Y.	Cornell University	500	1,270	D.
WEAN	Providence, R. I.	The Shepard Co.	250	780	L.S.

D. - Daytime. See General Order No. 41.
L.S. - Power until local sunset.
LT. - Limited time. See General Order No. 48.
L.P. - Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licenses	Shares with—	Power	Kilo-cycles	Time and power limitations
WEAO	Columbus, Ohio	Ohio State University	WKBN	750	570	
WEAR	Cleveland, Ohio	WTAM and WEAR (Inc.)	WTEM	1 kw	1,970	
WEBC	Superior, Wis.	Head of the Lakes Broadcasting Co.	WDAY	1 kw	1,200	
WEBS	S. = Duluth, Minn.	Roy W. Waller		100	1,210	
WEBQ	Cambridge, Ohio	First Trust & Savings Bank of Harrisburg	KFVS	100	1,210	
WEBH	Harrisburg, Ill.	Howell Broadcasting Co. (Inc.)		100	1,310	
	Buffalo, N. Y.			200		LS
WEBW	Beloit, Wis.	Beloit College		350	600	D.
WEDC	Chicago, Ill.	Emil Depenark (Inc.)	WCRW, WSDC	100	1,210	
WEDH	Erie, Pa.	Erie Dispatch Herald Broadcasting Corporation		30	1,420	
WEEI	Weymouth, Mass.	Edison Electric Illuminating Co. of Boston		1 kw	600	
	S. = Boston, Mass.					
WEHC	Emory, Va.	Emory and Henry College		100	1,270	
WEHS	Evanson, Ill.	Victor C. Carlson		100	1,310	
WELK	Philadelphia, Pa.	Howard R. Miller	WCLS, WKBB, WKBI, WHFC	100	1,370	
WEMC	Berron Springs, Mich.	Zinnwald Missionary College		1 kw	500	D.
WENR, WBCN	Chicago, Ill.	Great Lakes Broadcasting Co.	WLS	50 kw	570	LP.
WEVD	Forest Hills, N. Y.	Debs Memorial Radio Fund (Inc.)	WBBK, WHAP, WHAZ	500	1,300	
	S. = New York City					
WEW	St. Louis, Mo.	St. Louis University	WBAP	1 kw	700	D.
WFAA	Dallas, Tex.	The Dallas News & Dallas Journal (A. H. Belo Corporation)		10 kw	800	
	increase power to 50 kilowatts; LP.					
WFAN	Philadelphia, Pa.	Keytone Broadcasting Co.	WIP	500	610	
WFBC	Knoxville, Tenn.	First Baptist Church		80	1,200	
WFBO	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	1,200	
WFBR	Baltimore, Md.	Baltimore Radio Show (Inc.)		250	1,270	
WFDF	Phint, Mich.	Frank D. Fallain		100	1,310	
WFI	Philadelphia, Pa.	Strawbridge & Clothier	WLIT	500	500	
WFJW	Hopkinsville, Ky.	The Acme Mills (Inc.)		1 kw	940	
WFJC	Akron, Ohio	W. F. Jones Broadcasting (Inc.)	WCSD	500	1,450	
WFKD	Wisconsin, Pa.	Foultrod Radio Engineering Co.	WNAT, WABY	50	1,310	
	S. = Philadelphia, Pa.					
WFLA, WBUN	Clearwater, Fla.	Clearwater Chamber of Commerce and St. Petersburg Chamber of Commerce		1 kw	900	LS.
WGAL	Lancaster, Pa.	Lancaster Electric Supply & Construction Co.	WRAW	2 1/4 kw	1,310	
WGHE	Fresport, N. Y.	Harry H. Carman	WFRL, WINR, WCOH	15	1,210	
				100	1,210	

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licenses	Shares with—	Power	Kilo-cycles	Time and power limitations
WBK	Cleveland, Ohio. C. F. to move to Independence, Ohio.	Radio Air Service Corporation		1 kw.	1,300	
WEN	New York, N. Y.	Marxus Loan Booking Agency	WRNY, WQAO-WPAP	250	1,010	
WFO	Des Moines, Iowa.	Bankers Life Co.	WOC	5 kw.	1,000	
WHP	Lempyre, Pa.	Pennsylvania Broadcasting Co. (W. S. McCachren, president)	WBAK, WCAH	500	1,430	
WIAS	S. Harrisburg, Pa. 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	920	D.
WIBM	Jackson, Mich.	C. L. Carroll	WIBK	100	4,370	
WIBO	DeKalb, Ill.	Nelson Bros. Bond & Mortgage Co.	WPCC, WNAX	1 kw.	570	LS.
WIBR	B. Chicago, Ill.	George W. Robinson	WQBZ	1/4 kw.	1,420	
WIBS	Steubenville, Ohio.	New Jersey Broadcasting Corporation	WBMS, WNJ, WKBO	250	1,450	
WIBU	Jersey City, N. J.	Wm. C. Forrest		100	1,310	
WIBW	Poyntie, Wis. Near Topeka, Kans.	Topeka Broadcasting Association (Inc.)	KPH	1 kw.	1,300	LS.
WIBX	Utica, N. Y.	WIBX (Inc.)		2 1/4 kw.	1,200	LS.
WICC	Boston, Conn.	Bridgport Broadcasting Station (Inc.)		300	1,100	LS.
WTL	B. Bridgeport, Conn. St. Louis, Mo.	Missouri Broadcasting Corporation	KPWF, WMAY	500	1,100	D.
WTL	Urbana, Ill.	University of Illinois	KPNF, KUSD	100	1,200	LS.
WILM	Wilmington, Del.	Delaware Broadcasting Co. (Inc.)		250	960	LS.
WIOD, WMBF	Miami Beach, Fla.	Webb Jay & Jesse H. Jay, doing business as Isle of Dreams Broadcasting Co.		250	1,420	
WIF	Philadelphia, Pa.	Gimbel Bros. (Inc.)	WFAN	500	610	
WISN	Milwaukee, Wis.	Evening Wisconsin Co.	WHAJ	250	1,120	
WJAC (formerly WBBF)	Johnstown, Pa.	Johnstown Automobile Co.	WFBG	100	1,310	
WJAD	Waco, Tex.	Frank F. Jackson	KSAT	1 kw.	1,200	
WJAO	Norfolk, Nebr.	Norfolk Daily News		1 kw.	1,000	LT.
WJAK	Marion, Ind.	Marion Broadcast Co.	WLBC	50	1,310	
WJAR	Providence, R. I.	The Outlet Co.		250	1,300	LS.
WJAS	North Fayette Township, Pa. B. Pittsburgh, Pa.	Pittsburgh Radio Supply House		400	1,200	LS.
WJAX	Jacksonville, Fla.	City of Jacksonville		1 kw.	1,200	D.
WJAY	Cleveland, Ohio.	Cleveland Radio Broadcasting Corporation		500	620	
WJAZ	Mount Prospect, Ill. B. Champaign, Ill.	Zenith Radio Corporation	WBOA, WORD, WCKY	5 kw.	1,400	

K. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilo-cycles	Time and power limitations
WKY	Oklahoma City, Okla.	WKY Radiophone Co.	.....	1 kw.	900	
WLAC	Nashville, Tenn.	Life & Casualty Insurance Co. of Tennessee.	.....	1 kw.	1,400	
WLAF	Louisville, Ky.	American Broadcasting Corporation of Kentucky.	.....	30.	1,200	
WLB, WGMS	Minneapolis, Minn. (Call WGMBS used by WCCO when broadcasting over WLB)	University of Minnesota.	WCAL, KFPM, WRRM	400	1,200	
WLBG	Muncie, Ind.	Donald A. Burton.	.....	50.	1,310	
WLBW	Kansas City, Kans.	Everett L. Dillard.	.....	100	1,420	L.S.
WLBZ	Ettrick, Va.	Robert Allen Garrilla.	.....	250.		
WLBZ	S. Petersburg, Va.	.....	.....	
WLBZ	Stevens Point, Wis.	Wisconsin Department of Markets.	.....	2 kw.	900	D.
WLBZ	Oil City, Pa.	Radio-Wire Program Corporation of America.	.....	500.	1,200	
WLBZ	Long Island City, N. Y.	John N. Brady.	.....	100	1,500	
WLCY	Bacon, Me.	Maine Broadcasting Co. (Inc.)	WCLB, WWRL, WMRQ	500.	620	
WLEX	Ithaca, N. Y.	Lutheran Association of Ithaca, N. Y.	.....	50.	1,210	
WLEY	Lexington, Mass.	Carl S. Wheeler, doing business as the Lexington Air Station.	WMAF	500.	1,300	
WLIB, WGN (Sec WLN, WLJB)	do	do.	WSSH	100. 250.	1,420	L.S.
WLIT	Philadelphia, Pa.	Lit Bros.	.....	500.	500	
WLOE	Chelsea, Mass.	Boston Broadcasting Co.	WFI, WMB	100. 250.	1,500	
WLS	S. Boston, Mass.	.....	WENR, WBCN	5 kw.	670	L.S.
WLSJ, WDWL (Sec WDWL, WLSL)	Crete, Ill.	Agricultural Broadcasting Co.	.....		
WLTH	B. Chicago, Ill.	C. P. issued to increase power to 50 kilowatts; L.P.	.....		
WLW	Brooklyn, N. Y.	Voices of Brooklyn (Inc.)	WCGU, WSGH, WSDA, WBBC	500. 50 kw.	1,400 700	L.P.
WLWL	Mason, Ohio.	Crosley Radio Corporation.	.....		
WMAK	S. Cincinnati.	Missionary Society of St. Paul the Apostle.	WFO	5 kw.	1,100	
WMAK	Kearny, N. J.	.....	.....	
WMAK	S. New York City.	.....	.....	
WMAK	Cazenovia, N. Y.	Clive B. Meredith.	.....	250.	570	
WMAK	Martinsville, N. Y.	WMAK Broadcasting System (Inc.)	WFB	750.	900	
WMAK	S. Buffalo, N. Y.	.....	.....	
WMAK	Washington, D. C.	M. A. Lease.	.....	200.	600	L.S.
WMAN	Columbus, Ohio.	W. R. Heckett.	.....	500 50.	1,210	

Call Letters	Address	Class of Station	Power (kw)	Frequency
WMAQ	Chicago, Ill. S. = Chicago, Ill. St. Louis, Mo.	Chicago Daily News (Inc.)	670	L.S.
WMAY	St. Louis, Mo.	Kingshighway Presbyterian Church	100 200	L.S.
WMAZ	Macon, Ga.	Macon Junior Chamber of Commerce	250 500	L.S.
WMBA	Newport, R. I.	Leroy Joseph Beebe	100	L.S.
WMBC	Detroit, Mich. C. P. issued to increase power to 250; L.S.	Michigan Broadcasting Co. (Inc.)	1,500 1,420	L.S.
WMBD	Peoria Heights, Ill.	E. M. Kahler (owner Peoria Heights Radio Laboratory)	500 1 kw	L.S.
WMBF, WIOD, WMBF, WMBG, WMBH	Richmond, Va. Joplin, Mo.	Havens & Martin (Inc.) Edwin Dudley Aber	100 100 200	L.S.
WMBI	Addelem, Ill. S. = Chicago.	The Moody Bible Institute Radio Station	1,000	L.T.
WMBO, WMBQ, WMBE, WMC	Auburn, N. Y. Brooklyn, N. Y. Tampa, Fla. Memphis, Tenn. (C. P. issued to move to Bartlett, Tenn.)	Radio Service Laboratories Paul J. Gollhofer F. J. Reynolds Memphis Commercial Appeal (Inc.)	100 100 100 500 1 kw	L.S.
WMCA	Hoboken, N. J. S. = New York City, N. Y.	Knickerbocker Broadcasting Co. (Inc.)	570	L.S.
WMES, WMMN	Boston, Mass. Fairmont W. Va.	Massachusetts Education Society Holt-Rowe Novelty Co.	50 250 500	L.S.
WMPC, WMRJ, WMSG, WMT, WNAC, WBIS	Lapeer, Mich. Jamaica, N. Y. New York, N. Y. Waterloo, Iowa. Quincy, Mass. S. = Boston, Mass.	First Methodist Protestant Church of Lapeer Peter J. Prins Madison Square Garden Broadcast Corporation. Waterloo Broadcasting Co. Shepard Norwell Co. (Trade name The Shepard Stores.)	1,500 1,420 1,200 500 1 kw	L.S.
WNAD, WNAT, WNAX, WNBX, WNBH	Norman, Okla. Philadelphia, Pa. Yankton, S. Dak. Binghamton, N. Y. New Bedford, Mass.	University of Oklahoma Albert A. Walker Gurney Seed & Nursery Co. Howitt-Wood Radio Co. (Inc.) Irving Vermilya, doing business as New Bedford Broadcasting Co.	500 100 1 kw 50 100	L.S.
WNBJ, WNBQ, WNBK, WNBW	Knoxville, Tenn. Washington, Pa. Memphis, Tenn. Carbondale, Pa.	Lelandale Baptist Church John Brownlee Springs John Ulrich G. F. Schlessler & M. E. Stephens, doing business as Home Cut Glass & China Co.	50 100 500 10	L.S.
WNBX, WNBZ	Springfield, Vt. Barnes Lake, N. Y.	First Congregational Church Corporation Earl J. Smith & William Mace, doing business as Smith & Mace.	10 50	D.

D. = Daytime. See General Order No. 41.
L.S. = Power until local market.
L.T. = Limited time. See General Order No. 43.
L.P. = Limited power. See General Order No. 42.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilo-cycles	Time and power limitations
WNI	Newark, N. J.	Radio Investment Co.	WBMS, WIBS, WKBO	200	1,450	
WNOX	Knoxville, Tenn. (C. F. issued to increase power to 2 kilowatts; L.S.)	Sterchi Bros.		1 kw	550	
WNBC	Greensboro, N. C.	Wayne M. Nelson	WMCA	250	1,440	
WNYC	New York, N. Y.	City of New York, department of plant and structures.		500	570	
WOAI	San Antonio, Tex. (C. P. issued to increase power to 50 kilowatts; L.P.)	Southern Equipment Co.		5 kw	1,100	
WOAN	Lawrenceburg, Tenn.	James D. Vaughan	WKEC	500	600	
WOAX	Trenton, N. J.	Franklyn J. Wolf	WCAM, WCAP	500	1,200	
WOBT	Union City, Tenn.	A. F. Pittsworth, trading as Pittsworth Radio & Music Shop.		100, 250	1,310	L.S.
WOB	Near Charleston	Charleston Radio Broadcasting Co.	WSAZ	250	580	
WOC	Davenport, Iowa	Palmer School of Chiropractic	WHO	5 kw	1,000	
WOC	Jamestown, N. Y.	A. E. Newton		25	1,210	
WODA	Fairson, N. J.	Richard E. O'Dea	WGCP, WAAM	1 kw	1,250	
WODX	Springhill, Ala.	Scott Helt, trustee, Mobile Broadcasting Corporation. (C. P. only.)	WSFA	500	1,410	
WOI	Si. Mobile, Ala.	Iowa State College of Agricultural and Mechanical Arts.	KFEQ	5 kw	500	D.
WOKO	Mount Lebanon, N. Y.	H. F. Smith & R. M. Curtis, doing business as Hudson Valley Broadcasting Co.	WHEC, WABO	500	1,440	
WOL	S. = Poughkeepsie, N. Y.	American Broadcasting Co.		100	1,310	
WOMT	Washington, D. C.	Francis M. Kadow		100	1,210	
WOMT	Manitowoc, Wis.	Walter B. Stiles (Inc.)	WASH	500	1,270	
WOO	Furnwood, Mich.					
WOP	S. = Grand Rapids, Mich.					
WOP	Ristol, Tenn.	Wilson Radiophone Service Co.	WDAP	100	1,500	
WOP	Kansas City, Mo.	Unity School of Christianity		1 kw	610	
WOP	Kearny, N. J.	L. Bamberger & Co.		5 kw	770	
WOP	S. = Newark, N. J.		WEPS	100	1,200	
WOP	Auburn, Mass.	Alfred Frank Kleindienst.				
WOP	S. = Worcester, Mass.	People's Pulpit Association	WIAZ, WSOA, WCKY	5 kw	1,680	
WOP	Batavia, Ill.	Missouri State Marketing Bureau	WGBF, KFRU	500	630	
WOP	S. = Chicago, Ill.	International Broadcasting Corporation		1 kw		
WOP	Jefferson City, Mo.	Woodmen of the World Life Insurance Association.	WCAJ	1 kw	1,130	L.S. to 6 p.m.
WOP	Securus, N. J.	Main Auto Supply Co.	WWVA	10 kw	1,180	
WOP	S. = New York City.					
WOP	Omaha, Nebr.					
WOW	Fort Wayne, Ind.					

B. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licenses	Shares with—	Power	Kilo-cycles	Times and power limitations
WBAJ	Grove City, Pa.	Grove City College		100	1,810	
WBAN	Allentown, Pa.	Allentown Call Pub. Co. (Inc.)		250	1,460	
WBAR	Fall River, Mass.	Dwight & Welsh Electric Co. (Inc.)		200	1,400	
WBAZ	Huntington, W. Va.	WBAZ (Inc.)		200	280	
WBB	Atlanta, Ga. (C. P. issued to increase power to 5 kilowatts.)	Atlanta Journal Co.		1 kw.	780	
WBBC	Chicago, Ill.	World Battery Co. (Inc.)		100	1,210	
WBBT	South Bend, Ind.	South Bend Tribune		500	1,290	
WSDA, WSGH (See WSGH, WSDA.)	Montgomery, Ala.	Howard E. Pitt and S. G. Persons, doing business as Montgomery Broadcasting Co. (C. P. only).		500	1,410	
WSDA	Brooklyn, N. Y.	Abraham Hess and Salvatore D. Angelo, doing business as Amateur Radio Specialty Co.		500	1,400	
WSIX	Springfield, Tenn.	Jack M. and Lewis B. Droughen, doing business as 608 Tire & Valve-making Co.		100	1,310	
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.		6 kw.	650	
WSMB	New Orleans, La.	Seanger Theaters (Inc.) & Malson Blarctie Co.		500	1,320	
WSMK	Dayton, Ohio	Stanley M. Krohn, Jr.		200	1,360	
WSOA	Deerfield, Ill.	Radio-phone Broadcasting Corporation		5 kw.	1,400	
WSPD	S. - Chicago, Ill.	Toledo Broadcasting Co.		500	1,340	L.S.
WSRH	Toledo, Ohio	Treatment Temple Baptist Church		1 kw.		
WSUN, WFLA (See WFLA, WSUN.)	Lowell, Mass.	State University of Iowa		100	1,420	L.S.
WSVB	Lowell, Mass.	State University of Iowa		250		
WSVR	Buffalo, N. Y.	Sutton Vocational High School (Elmer S. Pierce, principal)		50	1,370	
WTAD	Syracuse, N. Y.	Oliver B. Meredith		200	570	
WTAG	Quincy, Ill.	Illinois Stock Medicine Broadcasting Corporation		500	1,440	
WTAM	Worcester, Mass.	Worcester Telegram Publishing Co. (Inc.)		250	580	
WTAQ	Brecksville Village, Ohio.	WTAM & WEAR (Inc.)		50 kw.	1,070	L.P.
WTAR, WFOR	S. - Cleveland, Ohio.	Guillette Rubber Co.		1 kw.	1,200	
	Township of Washington, Wisconsin.	WTAR Radio Corporation		500	760	
	S. - East Chairo, Wis.					
	Norfolk, Va.					

WTAW	College Station, Tex.	KDT	500	1,120
WTAX	Streator, Ill.	WCBH	50	1,210
WTBO	Cumberland, Md.		50	1,420
WTPI	Toconoa, Ga.	WBAL	250	1,450
WTIC	Avon, Conn.		50 kw	1,000
	S. - Hartford, Conn.			
WTMI	Brookfield, Wis.		1 kw	620
	S. - Milwaukee, Wis.		2 1/2 kw	
	Nashville, Tenn.	WLAG	5 kw	1,480
WTNT (formerly WBAW)				
WTOC	Savannah, Ga.		500	1,200
WWAB	Hammond, Ind.	WBAF	100	1,200
WWJ	Detroit, Mich.		1 kw	920
WWL	New Orleans, La.		5 kw	860
WWNC	Ashville, N. C.		1 kw	570
WWBL	Woodside, N. Y.	WMBQ, WLBX, WCLB	100	1,500
WWVA	Wheeling, W. Va.	WOWO	5 kw	1,160
KCBC	Enid, Okla.	KQFG	100	1,370
			250	
KDB	Santa Barbara, Calif.		100	1,500
KDFN	Casper, Wyo.		100	1,210
KDEA	Wilkins Township, Pa. (C. P. issued to move near Saxonsburg, Pa.)		50 kw	900
	S. - Pittsburgh, Pa.			
KDLR	Devils Lake, N. Dak.		100	1,210
KDYL	Salt Lake City, Utah		1 kw	1,200
KECA (formerly KFLA)	Los Angeles, Calif.		1 kw	1,000
KEJK	Beverly Hills, Calif.		500	1,170
KELW	Burbank, Calif.	KTM	500	1,780
KEX	Portland, Oreg.	KOB	5 kw	1,180
KFAB	Lincoln, Neb.	WBBM, WJBT	5 kw	1,770
KFBB	Great Falls, Mont.	KQIR	500	1,200
KFBK	Sacramento, Calif.		100	1,310
KFBL	Everett, Wash.	KVL	50	1,370
			500	600
KFDM	Beaumont, Tex. (C. P. issued to increase power to 1 kilowatt, L.S.)			
KFDY	Brookings, S. Dak.	KFYR	500	560
KFEL	Denver, Colo.	KFFY	1 kw	940
KFEQ	St. Joseph, Mo.	WOL	350	560
KFGQ	Boone, Iowa	KWCR, KFJY	2 1/2 kw	1,310
KFH	Wichita, Kans. (C. P. issued for 1 kilowatt.)	WIBW	100	1,300
			500	
KFHA	Gunnison, Colo.		50	4,300
KFI	Los Angeles, Calif.		5 kw	640
KFIF	Portland, Oreg.	KXL	100	1,430

L.T. = Limited time. See General Order No. 63.
L.S. = Limited power. See General Order No. 42.

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

H. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilo-cycles	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	
KFIB	Marshalltown, Iowa	Marshall Electric Co. (Inc.)		100	1,206	
KFIF	Oklahoma City, Okla.	National Radio Manufacturing Co.		5 kw.	1,470	
KFJI	Astoria, Oreg.	KPJI Broadcasters (Inc.)		100	1,370	
KFIM	Grand Forks, N. Dak.	University of North Dakota		100	1,370	
KFIR	Portland, Oreg.	Ashley C. Dixon, trading as Ashley C. Dixon & Son	KTBR	500	1,300	
KFYJ	Fort Dodge, Iowa	C. S. Tunwell	KFGQ, KWCR	100	1,310	
KFJZ	Fort Worth, Tex.	H. C. Mearham		100	1,370	
KFKA	Greeley, Colo.	Colorado State Teachers College	KPOF	500	880	
KFKB	Millard, Kans.	John R. Brinkley		1 kw.		L.S.
KFKU	Lawrence, Kans.	University of Kansas	WRBN	5 kw.	1,050	L.T.
KFKX				1 kw.	1,230	
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.	1,260	
KFNF	Shenandoah, Iowa	Henry Field Seed Co.	WILL, KUSD	500	880	
KFOR	Lincoln, Nebr.	Howard A. Shuman		1 kw.		L.S.
KFOX	Long Beach, Calif.	Nicholas & Warriner (Inc.)		100	1,210	L.S.
KFPL	Dublin, Tex. (C. P. issued to increase power to 100 watts.)	C. C. Barter		250		
KPFM	Greenville, Tex.	Dave Ablowich, trading as the New Furniture Co.		1 kw.	1,200	
KPFW	Siloam Springs, Ark.	Rev. Lennie W. Stewart		15	1,310	
KFPY	Spokane, Wash.	Synona Broadcasting Co.	KMO	50		D.
KFQA, KMOX, (See KMOX, KFQA.)				500	1,340	
KFQD	Anchorage, Alaska	Anchorage Radio Club		100	1,230	
KFQU	Holy City, Calif.	W. E. Riker	KGOC	100	1,420	
KFQW	Seattle, Wash.	KFQW (Inc.)		100	1,420	
KFQZ	Hollywood, Calif.	Taft Radio & Broadcasting Co. (Inc.)		240	860	L.T.
KFRG	San Francisco, Calif.	Don Lee (Inc.)		1 kw.		
KFRU	Columbia, Mo.	Stephens College	WOS, WGBF	500	630	
KFSB	San Diego, Calif.	Airtan Radio Corporation		500	600	
KFSG	Los Angeles, Calif.	Kobo Park Evangelical Association		1 kw.		L.S.
KFUL	Galveston, Tex.	Will H. Ford	KMIC, KTSA	500	1,120	
				500	1,200	

KFUM	Colorado Springs, Colo.	W. D. Corley	1 kw.	1,270	
KPUO	Clayton, Mo.	Evangelical Lutheran Synod of Missouri, Ohio, and other States, Rev. R. Kretschmar, chairman, board of control of Concordia, Seminary.	500 1 kw.	550	L.S.
KPUP	Denver, Colo.	Fitzsimons General Hospital, U. S. Army.	100	1,310	L.T.
KFVD	Culver City, Calif.	Los Angeles Broadcasting Co.	200	710	
KFVB	Cape Girardeau, Mo.	Oscar C. Hirsch, trading as Hirsch Battery & Radio Co.	100	1,210	
KFWB	Hollywood, Calif.	Warner Bros. Broadcasting Corporation.	1 kw.	930	
KFWF	St. Louis, Mo.	St. Louis Truth Center (Inc.)	100	1,200	
KFWI	San Francisco, Calif.	Radio Entertainments (Inc.)	500	900	
KPWW	Richmond, Calif.	Oakland Educational Society	500 1 kw.	950	L.S.
KPKD	Jerome, Idaho	Frank E. Hurt, trading as Service Radio Co.	50	1,430	
KPXF	Denver, Colo.	Pikes Peak Broadcasting Co. (Inc.)	250	940	
KFKJ	Edgewater, Colo.	R. G. Howell	50	1,310	
KPXM (formerly KFWC)	San Bernardino, Calif.	J. C. & E. W. Lee (Lee Bros. Broadcasting Co.)	100	1,200	
KFXR	Oklahoma City, Okla.	Exchange Avenue Baptist Church	100	1,310	
KFXV	Flagstaff, Ariz.	Mary M. Coeclgan.	100	1,450	
KFYO	Abilene, Tex.	T. E. Kirksey, trading as Kirksey Bros.	100 250	1,430	L.S.
KFYR	Bismarck, N. Dak.	Hoskins-Meyer	500	550	
KGA	Spokane, Wash.	Ralph A. Holt, 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	1,300	
KGBU	Ketchikan, Alaska	Alaska Radio & Service Co. (Inc.)	500	900	
KGBX	St. Joseph, Mo.	Foster-Hall Tire Co.	100	1,370	
KGBZ	York, Nebr.	Dr. George R. Miller.	500	950	
KGCA	Decorah, Iowa	Chas. W. Greenley	1 kw.	1,270	L.S.
KGCI	San Antonio, Tex.	Sam Liberto, trading as Liberto Radio Sales Co.	50	1,370	D.
KGCR	Wartown, B. Dak.	Cotler's Radio Broadcasting Service (Inc.)	100	1,210	
KGCU	Mandan, N. Dak.	Mandan Radio Association	100	1,200	
KGCK	Wolf Point, Mont.	First State Bank of Vida.	100 350	1,310	L.S.
KGDA	Deer Rapids, S. Dak.	J. R. Nelson, trading as Home Auto Co.	50	1,370	
KGDE	Fergus Falls, Minn.	Chas. J. Jaran (Jaran Drug Co.)	50	1,200	
KGDM	Stockton, Calif.	E. F. Peffer	50	1,100	D.
KDDY	Oldham, S. Dak.	J. Albert Leesch and Geo. W. Wright	10	1,200	
KDEP	Los Angeles, Calif.	Trinity Methodist Church South	1 kw.	1,300	
KDEK	Yuma, Colo.	Elmer G. Beehler, trading as Beehler Electrical Equipment Co.	50	1,200	
KDEB	Long Beach, Calif.	C. Merwin Dobyns	100	1,370	
KDEW	Fort Morgan, Colo.	City of Fort Morgan	100	1,200	
KGEZ	Kalispell, Mont.	Kalispell Chamber of Commerce.	100	1,310	
KGFF	Alva, Okla.	D. R. Wallace, owner KGFJ Broadcasting Co.	100	1,430	
KGFG	Oklahoma City, Okla.	Faith Tabernacle Association (Inc.)	100	1,370	
KGFI	Corpus Christi, Tex.	Eagle Broadcasting Co. (Inc.)	100	1,500	
KGPI	Los Angeles, Calif.	Ben B. McGlashan	100	1,430	

L.T. = Limited time. See General Order No. 40.

D. = Daytime. See General Order No. 41.

L.S. = Power until local sunset.

B. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licenses	Shares with—	Power	Kilo-cycles	Time and power limitations
KOFK	Hallock, Minn.	R. W. Lautzenbeiser and O. R. Mitchell, doing business as Lautzenbeiser & Mitchell.		50	1,200	
KOFL	Reison, N. Mex.	Lamont A. Hubbard and T. F. Murphy, doing business as Hubbard & Murphy.		50	1,370	
KPFW	Ravenna, Nebr. (C. P. to increase power to 100 watts.)	Otto F. Rothman and Roy H. McConnell.		50	1,315	D.
KQFX	Piara, S. Dak.	Dana McNeil.	KFQU	200	860	
KQGC	San Francisco, Calif.	The Golden Gate Broadcasting Co.	WNAD	50	1,470	
KQGF	Picher, Okla.	D. L. Connell, M. D.		500	1,010	
KQGM	Albuquerque, N. Mex.	New Mexico Broadcasting Co.		250	1,200	L.S.
KOHF	Pueblo, Colo. (C. P. to increase power to 500 watts; L.S.)	Curtis P. Ritchie and Joe E. Finch		500	1,330	
KGHI	Little Rock, Ark.	Bernan 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	1,600	
KGIQ	Twin Falls, Idaho.	Radio Broadcasting Corporation.	KID	250	1,200	
KGIR	Butte, Mont.	Synanon Broadcasting Co.	KFBB	250	1,900	
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	860	
KGKB	Brownwood, Tex.	E. M. C. T., and E. E. Wilson, doing business as Eagle Publishing Co.		100	1,500	
KGKL	San Angelo, Tex.	EGKL (Inc.)		100	1,370	
KGKO	Wichita Falls, Tex.	Wichita Falls Broadcasting Co.		250	570	
KGKX	Sandpoint, Idaho. (C. P. to increase power to 100 watts.)	C. E. Twiss and F. H. McCann		500	1,420	L.S.
KGO	Oakland, Calif.	General Electric Co.	KGCL	774 kw	700	
KGRC	San Antonio, Tex.	Eugene J. Roth.	WDAG	100	1,370	
KGRS	Amarillo, Tex.	E. S. Gish (Gish Radio Service)		1 kw	1,410	
KGU	Honolulu, Hawaii. (C. P. to increase power to 1 kilowatt.)	Marion A. Mulroby and Advertiser Publishing Co. (Ltd.)		500	940	
KQW	Portland, Oreg.	Oregonian Publishing Co.		1 kw	620	
KQY	Lacey, Wash.	St. Martin's College		50	1,200	L.S.
KRHJ	Los Angeles, Calif.	Don Lee (Inc.)		1 kw	930	
KHQ	Spokane, Wash. (C. P. to increase power to 2 kilowatts; L.S.)	Louis Wessner (Inc.)		1 kw	590	
KICE	Red Oak, Iowa	Red Oak Radio Corporation		100	1,420	

Call Letters	Location	Owner	Power	Class
KID	Idaho Falls, Idaho	Jack W. Duckworth	1,320	
KIDO	Boise, Idaho	Frank L. Hill and C. G. Phillips, doing business as Boise Broadcast Station	1,250	
KIT	Yakima, Wash.	Carl E. Haymond	1,370	D.
KJBS	San Francisco, Calif.	Jullius Brunton & Sons Co.	1,070	
KJR	Seattle, Wash.	Ralph A. Holt, receiver for Northwest Radio Service Co.	970	
KLCN	Blytheville, Ark.	Charles Leo Lintzenich	1,200	D.
KLO	Ogden, Utah	Peary Building Co.	1,370	LS.
KLFM	Minot, N. Dak.	E. C. Reinecke	1,420	
KLRA	Little Rock, Ark.	Arkansas Broadcasting Co.	1,500	D.
KL8	Oakland, Calif.	E. N. and B. W. Warner, doing business as Warner Bros.	1,440	
KLX	do.	The Tribune Publishing Co.	880	
KLZ	Denver, Colo.	Reynolds Radio Co. (Inc.)	1 kw	
KMA	Shenandoah, Iowa	May Seed & Nursery Co.	500	LS.
KMBC	Independence, Mo.	Midland Broadcasting Co. (Inc.)	1 kw	LS.
KMED	St. = Kansas City, Mo.	Mrs. W. J. Virgin	2 1/4 kw	
KMIC	Medford, Oreg.	Dalton's (Inc.)	80	
KMJ	Inglewood, Calif.	James McClatchy Co.	500	
KMMJ	Fremont, Calif.	The M. M. Johnson Co.	100	LT.
KMMJ	Clay Center, Neb.		1 kw	
KMO	Tacoma, Wash.	KMO (Inc.)	500	
KMOX, KFQA	Kirkwood, Mo.	Voice of St. Louis (Inc.), C. P. to move and increase power to 80 kilowatts, LP.	1,000	
KMTR	St. = St. Louis, Mo.	KMTR Radio Corporation	500	
KNX	Hollywood, Calif.	Western Broadcast Co. C. P. to increase power to 80 kilowatts, LP.	1,120	
KOA	Los Angeles, Calif.	General Electric Co.	1,210	
KOAC	Denver, Colo.	Oregon State Agricultural College	740	
KOB	Corvallis, Oreg.	New Mexico College of Agricultural and Mechanical Arts. C. P. to increase power to 20 kilowatts	1,340	
KOCW	State College, N. Mex.	Okla. State College for Women	1,000	
KOH	Chickasha, Okla.		570	
KOIL	Reno, Nev.	Jay Peters (Inc.)	1,000	
KOIN	Council Bluffs, Iowa	Moza Motor Oil Co.	5 kw	
KOL	Sylvan, Oreg.	KOIN (Inc.)	1 kw	LS.
KOMO	St. = Portland, Oreg.	Seattle Broadcasting Co. (Inc.)	1 kw	
KO8	Seattle, Wash.	Flaher's Blend Station (Inc.)	1 kw	
KORE	do.	H. H. Henseth	60	
KOY	Marion, Oreg.	Frank L. Hill & C. G. Phillips, doing business as Eugene Broadcast Station	100	
KPCB	Eugene, Oreg.	Nielson Radio Supply Co.	500	
	Phoenix, Ariz.	West Coast Broadcasting Co.	60	
	Seattle, Wash.	C. P. to move locally and increase power to 100 watts.	1,260	
			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	Licenses	Shares with—	Power	Kilo-cycles	Time and power limitations
KPJM	Prescott, Ariz.	A. P. Miller and Geo. H. 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.)	KPKA	500	890	
KPPC	Pasadena, Calif.	Pasadena Presbyterian Church	KFXM	50	1,200	
KPQ	Seattle, Wash. C. P. to move to Wenatchee, Wash. power, 50 watts.	Westcoast Broadcasting Co.	KPCB	100	1,210	
KPRC	Sugarland, Tex.	Houston Printing Co.		1 kw.	920	L.S.
KPSN	S. Houston, Tex.	Pasadena Star-News Publishing Co.		2 1/2 kw.		
KPWF	Pasadena, Calif.	Pacific Western Broadcasting Federation (C. P. only).	KFWB	1 kw.	960	
	Westminster, Calif.			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	
KRRP (formerly KFAD)	Phoenix, Ariz. C. P. to move locally and increase power to 1 kilowatt; L.S.	KAR Broadcasting Co.		500	520	
KRGV	Hartigan, Tex.	Valley Radio-Electric Corporation	KWVG	500	1,200	
KRLD	Dallas, Tex.	KRLD Radio Corporation	KTIS	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	WBLI	500	1,580	L.S.
KSAT (formerly KTAT)	Hirdeville, Tex.	Texas Air Transport Broadcast Co.	WIAD	1 kw.	1,240	
KBCI	S. Fort Worth, Tex. Stout City, Iowa	Perkins Bros. Co. (publishes the Stout City Journal).	WTAQ	1 kw.	1,230	
KSD	St. Louis, Mo.	Pulitzer Publishing Co.	KFCO	500	550	
KSEL	Pocahontas, Idaho	KSEL Broadcasting Association (Inc.)		250	900	
KSL	Salt Lake City, Utah	Radio Service Corporation of Utah		5 kw.	1,120	
KSMR	Santa Maria, Calif.	Santa Maria Valley Railroad Co.		100	1,200	
KSO	Clarinda, Iowa	Barry Seed Co.	WKBB	500	1,380	
KSOO	Sioux Falls, S. Dak.	Sioux Falls Broadcast Association (Inc.)		2 kw.	1,110	LT.
KSTP	Westcott, Minn.	National Battery Broadcasting Co.		10 kw.	1,450	
	S. St. Paul, Minn.					
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	
KTBK	Portland, Oreg.	M. E. Brown	KFJR	500	1,300	
KTBS	Shreveport, La.	B. R. Elliott and A. C. Steer		1 kw.	1,400	

Call Letters	Station Name	City	Power	Class
KTBS	Hot Springs National Park, Ark	Hot Springs	1,040	
KTM	Santa Monica, Calif. (C. P. issued to move locally and increase power to 1 kilowatt; L.S.)	Santa Monica	750	
KTNT	S. - Los Angeles, Calif.	Los Angeles	5 kw	LT.
KTSA	Muscatine, Iowa	Muscatine	1 kw	LT.
	San Antonio, Tex	San Antonio	2 kw	L.S.
KTSL	Cedar Grove, La.	Cedar Grove	100	
	S. - Shreveport, La.	Shreveport	100	
KTSM	El Paso, Tex	El Paso	5	
KTUE	Houston, Tex. (C. P. issued to increase power to 100 watts.)	Houston	1 kw	
KTW	Seattle, Wash	Seattle	10	
KUF	Longview, Wash. (C. P. issued to increase power to 100 watts, sharing with KVEP)	Longview	10	
KUGA	Fayetteville, Ark	Fayetteville	1,200	L.S.
KUSD	Vermilion, S. Dak	Vermilion	1,120	
KUT	Austin, Tex	Austin	1,600	LT.
KVPP (formerly KWBS)	Portland, Ore	Portland	1,700	
KVI	Des Moines, Wash.	Des Moines	15	
	S. - Tacoma, Wash.	Tacoma	1 kw	
KVL	Seattle, Wash	Seattle	100	
KVOA	Tucson, Ariz	Tucson	500	D.
KVOO	Tulsa, Okla	Tulsa	5 kw	
KVOS	Bellingham, Wash	Bellingham	100	
KWCR	Cedar Rapids, Iowa	Cedar Rapids	1,310	
KWEA	Shreveport, La.	Shreveport	1,210	
KWG	Stockton, Calif	Stockton	1,200	LT.
KWJ	Portland, Ore	Portland	1,050	
KWK	St. Louis, Mo.	St. Louis	1,200	
KWKC	Kansas City, Mo.	Kansas City	1,370	
KWKH	Kennonwood, La	Kennonwood	850	D.
KWLC	Decorah, Iowa	Decorah	1,270	
KWSC	Pullman, Wash	Pullman	1,800	
KWVO	Brownsville, Tex	Brownsville	1,200	
KXA	Seattle, Wash	Seattle	1,570	
KXI	Portland, Ore	Portland	1,420	
KXO	El Centro, Calif	El Centro	1,200	
KXRO	Aberdeen, Wash	Aberdeen	75	
KRLD	Hot Springs Chamber of Commerce	Hot Springs		
KELW	Pickwick Broadcasting Corporation	Hot Springs		
KFUL	Norman Baker	Hot Springs		
KRMD	Loze Star Broadcast Co. (Inc.)	Hot Springs		
WDAH	Houseman Sheet Metal Works (Inc.)	Hot Springs		
	W. S. Riedson and W. T. Blackwell	Hot Springs		
	William John Uhalt (Uhalt Electric)	Hot Springs		
KOL	First Presbyterian Church	Hot Springs		
	Columbia Broadcasting Co. (Inc.)	Hot Springs		
KLRA	University of Arkansas	Fayetteville		
KFNP, WILL	University of South Dakota	Sioux Falls		
WTAW	M. A. English, D. W. English, and W. G. Stacy, doing business as KUT Broadcasting Co. Schneider Radio Co.	Austin		
	Puget Sound Broadcasting Co. (Inc.)	Seattle		
KYBL	Arthur C. Dalley	Seattle		
WAFI	Robert M. Riehl	Seattle		
	Southwestern States Corporation	Seattle		
KFY, KFUQ	KVOS (Inc)	Seattle		
	Harry F. Paar	Seattle		
	William E. Antony	Seattle		
	Portable Wireless Telegraph Co. (Inc.)	Seattle		
	Wilbur Jerman	Seattle		
	Greater St. Louis Broadcasting Corporation	St. Louis		
	Wilson Duncan, trading as Wilson Duncan Broadcasting Co.	St. Louis		
WWL	W. K. Henderson	St. Louis		
KGCA	Luther College	Decorah		
14 time	State College of Washington	Pullman		
KRGV	Chamber of Commerce, City of Brownsville	Brownsville		
	American Radio Telephons Co.	Seattle		
KFIF	KXLL Broadcasters (Inc.)	Portland		
	E. R. Irey and F. M. Bowles	El Centro		
	KXRO (Inc.)	Aberdeen		

LT. - Limited time. See General Order No. 45.

D. - Daytime. See General Order No. 41.

L.S. - Power until local sunset.

E. Outstanding broadcast station authorizations—Continued

Call letters	Transmitter location	Licensee	Shares with—	Power	Kilo-cycles	Time and power limitations
KYW, KPXX.....	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, KPXX.....	500.....	1,020	

Respectfully submitted.

FEDERAL RADIO COMMISSION.
CARL H. BUTMAN, Secretary.

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