

**EMERGENCY CONTROL OF ELECTROMAGNETIC
RADIATING DEVICES**

HEARINGS
BEFORE THE
COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE
UNITED STATES SENATE
EIGHTY-SECOND CONGRESS
FIRST SESSION

ON

S. 537

A BILL TO PROVIDE FOR THE GREATER SECURITY
AND DEFENSE OF THE UNITED STATES
AGAINST ATTACK

JANUARY 24, 1951*
FEBRUARY 21 AND 22, 1951

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Interstate and Foreign Commerce



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requested that further justification for the urgent necessity of this legislation be given to you in secret session.

Legislative references.—Some Executive authority is provided by section 606 (c) of the Communications Act of 1934, as amended. However, it is believed that that authority is inadequate for the purpose stated above.

Cost and budget data.—Section 3 provides for just compensation to the owner for use by a department or agency of the United States of any instrument, device, apparatus, or thing. It is impossible to estimate the extent of such compensation and the resulting cost to the Government.

Department of Defense action agency.—The Department of the Air Force has been designated on the representative of the Department of Defense for this legislation.

In accordance with a long-established custom, the Department of Defense submitted to the Senate Committee on Armed Services a proposal identical with this proposal for consideration by the Eighty-first Congress. We have been informed that that earlier proposal was referred by the Committee on Armed Services to your committee. In view of the referral of that earlier proposal to your committee and in view of the urgency of this proposal, we are forwarding this proposal directly to your committee for consideration.

Sincerely yours,

MARX LEVA.

ASSISTANT SECRETARY OF DEFENSE,
Washington, D. C., January 23, 1951.

Hon. EDWIN C. JOHNSON,
*Chairman, Committee on Interstate and Foreign Commerce,
United States Senate.*

MY DEAR MR. CHAIRMAN: I want to thank you, on behalf of the Department of Defense, for your promptness in introducing the draft of proposed legislation to provide for the greater security and defense of the United States against attack, and for other purposes (S. 537).

I want to thank you, also, for the willingness expressed in your letter of January 18 to hear the witnesses of the Department of Defense in both open and executive sessions.

As I mentioned in my letter of January 16 transmitting the proposed legislation to you, the Department of the Air Force has been designated as the representative of the Department of Defense for this legislation. Under our legislative procedures, we normally designate the military department having the predominant interest in a given bill as the action agent of the Department of Defense as a whole, for purposes of representing the Department of Defense in connection with congressional hearings on the bill. The proposed Electromagnetic Radiation Control Act is a bill which was originally drafted by the Air Force, in pursuance of its responsibility for the air defense of the United States. The bill, as submitted to you, has been approved by the Department of Defense and the Bureau of the Budget.

In view of the Air Force's great interest in speedy action on this bill, and in view of the willingness to hold hearings at an early date, as expressed in your recent letter, I am taking the liberty of calling your letter to the personal attention of the Secretary of the Air Force, the Honorable Thomas K. Finletter, in order that he may get in touch with you for a further discussion of this matter.

Sincerely,

MARX LEVA.

FEDERAL COMMUNICATIONS COMMISSION,
Washington, D. C., February 19, 1951.

Hon. EDWIN C. JOHNSON,
*Chairman, Senate Committee on Interstate and Foreign Commerce,
Washington, D. C.*

DEAR SENATOR JOHNSON: The Commission is in receipt of your letter of January 18, 1951, requesting us to comment on S. 537, a bill introduced by you at the request of the Department of Defense which would provide for the greater security and defense of the United States against attack. An examination of the bill reveals that it would authorize the President in time of war, national emergency, or when he deems it advisable in the interest of national security, to control the use by any person of any article of equipment capable of emitting any electromagnetic radiation between 10 kilocycles and 100 megacycles or to

direct specified departments or agencies in the Federal Government to use such equipment.

The proposal makes clear that any such control or use of electronic equipment by the President or his delegate which it authorizes may be exercised only to the extent that the President deems it necessary to minimize or prevent navigational aid to any foreign country in an attack on the United States. It is not concerned with or intended to provide authority for censorship of radio and wire communications the establishment of priorities among users of electronic equipment, or the general requisitioning of such equipment by the Government. The bill gives the President discretion to determine the proper agency or persons to carry out the program envisaged by the proposed legislation, provides for just compensation to persons whose equipment is used by the Government in connection with the program, and provides for criminal penalties for knowing violations of the bill's provisions or any regulations established pursuant to its terms.

As the letter from the Secretary of Defense accompanying the submission of the instant proposal explains, the instant legislation has been sponsored by the Department of Defense because of its belief that the present statutory authority given to the President by section 606 (c) of the Communications Act may not be sufficiently broad to cover the use and control of all types of electronic devices which they believe may be of aid to enemy aircraft in an attack upon the United States. As you are aware, section 606 (c) of the act presently authorizes the President in times of war or national emergency, such as that proclaimed by him to exist on December 16, 1950, to set aside the rules and regulations of the Commission pertaining to radio stations, to close any station for radio communication and to order the removal of its apparatus and equipment, or to authorize any department of the Government to use or control any such station or equipment. We believe that this authority is clearly broad enough to authorize the President to initiate such action as he may deem necessary to prevent the use of radio stations, licensed by the Commission or operated by and department or agency by the Federal Government, in any manner in which would aid the enemy in an air attack upon the United States. But since section 606 (c) of the Communications Act is phrased in terms of the use, closure, or control of "any station for radio communication" there is, as the Department of Defense has suggested, some doubt whether this section is applicable to all of the various types of electronic devices, particularly equipment not primarily intended for radio communications purposes which, in operation, may cause radiation of potential use by enemy airplanes.

Moreover, it is believed that such authority as the Commission may already have over electronic devices not primarily intended to be used as a means for transmitting radio communications, pursuant to the provisions of section 301 of the Communications Act, is not adequate for achieving the purposes of the instant legislation. For section 301 is couched in terms of the Commission's licensing powers until title III of the act. And this licensing authority which expressly affords all licensees a right to be heard before they can be required to cease or modify their normal operation, and to appeal from any Commission determination made after hearing, clearly does not lend itself to the types of emergency control contemplated by the present proposal or to the necessary security precautions which would be an essential part of any such plan.

The Department of Defense has affirmatively stated its belief that various types of electronic equipment, not primarily intended for communications purposes, may emit radiations which could be useful for guiding enemy aircraft in an attack on this country, and that it may be necessary to take emergency action to limit or control the operators of such devices as part of any program to protect this country from such air raids. In light of these representations, the Commission is in agreement with the Department of Defense that it would be advisable at this time to spell out, either in an amendment to the existing provisions of section 606 of the Communications Act or in separate legislation such as that provided in the instant proposal, the authority of the President to control and use all such radiation devices potentially useful to an enemy, so that necessary planning and preparatory activities can be undertaken immediately without any question as to the authority for such action.

The Commission appreciates this opportunity to comment on this bill and will be pleased to provide any additional information concerning the problems involved in this legislation which it has available or to afford the committee with such other assistance in connection with this matter as you may desire. The

Bureau of the Budget has advised us that it has no objection to the submission of these comments.

By direction of the Commission :

PAUL A. WALKER,
Acting Chairman.

DEPARTMENT OF JUSTICE,
Washington, February 9, 1951.

HON. EDWIN C. JOHNSON,
*Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.*

MY DEAR SENATOR: This is in response to your request for the views of the Department of Justice concerning the bill (S. 537) to provide for the greater security and defense of the United States against attack, and for other purposes.

The purpose of the bill is to provide for the greater security and defense of the United States by controlling or using electromagnetic radiation in such a manner as to minimize or prevent navigational aid to any foreign country in an attack upon the United States.

Section 606 of the Communications Act of 1934 (47 U. S. C. 606) gives some authority to the President in times of war or national emergency to suspend the rules promulgated by the Federal Communications Commission and to close or use, by Federal agencies, radio stations. The proposed legislation goes much further and provides for criminal penalties.

Section 2 (a) of the bill provides that the President may control the use by any person ("person" defined in sec. 5 as "any individual," etc.) "of any instrument, device, apparatus, or other thing capable of emitting * * * radiation * * *." These broad terms would permit the President to control the use anywhere in the world of instruments which might give navigational aid to any foreign country in an attack upon the United States. Section 2 (a) also provides that the President may make such regulations and issue such orders as he considers necessary and states that these regulations and orders shall, consistent with the requirements of national security, be published in the Federal Register.

Section 2 (b) provides that the President may delegate to Government departments, agencies, and officers such authority, duties, and functions as he considers necessary to accomplish the purposes of the bill.

Section 3, which provides for compensation, is in somewhat the same terms as section 606 (a) of the Federal Communications Act of 1934, as amended.

Section 4 of the bill would amend chapter 37 of title 18 of the United States Code by adding a new caption to the table of contents, entitled "798. Electromagnetic Radiation Usable by an Enemy" and also adds a new section 798 entitled "Electromagnetic Radiation Usable By An Enemy." This new section provides that whoever in violation of any regulation or order promulgated under this act knowingly has or retains controls, custody, or possession of any instrument, device, apparatus, or other thing capable of emitting electromagnetic radiation between certain specified limits which might be used to aid any foreign country in an attack upon the United States, or whoever, having such control, custody, or possession, knowingly uses the instrument, device, apparatus, or other thing in violation of any regulation or order for the security of the United States promulgated under this legislation, or knowingly suffers the same to be used in violation of any such regulation or order, shall if an individual, be fined not more than \$10,000 or imprisoned not more than 5 years, or both, and if a firm, partnership, association, or corporation, be fined not more than \$50,000. Since this is a complete bill, with definitions given in section 5 pertaining to section 4, it is suggested that this new section should not be placed in title 18 of the United States Code.

Section 5 defines the "United States" and "person" as used in this act.

Section 6 authorizes to be appropriated such sums as may be necessary to carry out the provisions of this act.

Section 7 states that the act may be cited as the "Electromagnetic Radiation Control Act."

Section 8 provides that the Congress by concurrent resolution, or the President by proclamation, may terminate the authority granted by section 2 of the bill.

Whether this measure should be enacted presents a question of policy concerning which the Department of Justice prefers not to make any recommendation.

The Director of the Bureau of the Budget has advised that there is no objection to the submission of this report.

Yours sincerely,

PEYTON FORD,
Deputy Attorney General.

The CHAIRMAN. I would like to put the letter of the Acting Secretary of Commerce in the record. It reads as follows:

DEAR MR. CHAIRMAN: This letter is in further reply to your request of January 18, 1951, for our comments concerning S. 537, a bill to provide for the greater security and defense of the United States against attack, and for other purposes.

This bill would provide Executive authority to control or use electromagnetic radiation whenever such control or use is deemed necessary to prevent or minimize navigational aid to any foreign country in an attack upon the United States.

Although the terms of the bill are broad enough to include not only radio transmission devices but also such other equipment as electrodiathermy machines, radio receiving sets of the superheterodyne or superregenerative type, television receiving sets of the superheterodyne type, automobiles, and electric shavers, legislation of this nature would appear to be a necessary concomitant to a program for assuring the national security, and we therefore recommend its enactment.

We have been informed by the Bureau of the Budget that there is no objection to this report.

If we can be of further assistance, please call on us.

Sincerely yours,

PHILIP B. FLEMING,
Acting Secretary of Commerce.

Here is another letter I would like to read and have it go in the record along with the other letters. It is a letter written by Millard Caldwell who is director of the Federal Civil Defense Administration, the new office that was created in December of last year, I believe. Millard Caldwell, former Governor of Florida, was appointed the Administrator. This letter is addressed to me. It reads as follows:

This letter is in reply to your request of February 15 for comments on S. 537, relating to the control of electromagnetic radiation in such manner as to prevent navigational aid in any attack on the United States.

We have been somewhat concerned with the broad terms of the bill, inasmuch as our civil defense functions might be hindered by the administration of the law if the bill is passed.

Here is a man whose main and principal function is to handle an attack by an enemy. He said that—

We have been somewhat concerned with the broad terms of the bill.

Then he goes on:

However, we have reviewed with General Ankenbrandt, Director of Communications, Department of the Air Force, our civil defense obligations in some detail. We have been assured through such discussions that our functions will not be impaired through the administration of the law in the event the bill is enacted into law.

What disturbs me is that men come and go. If General Ankenbrandt could live forever and could be placed in charge of the operation of this law, we might have no trouble. But men come and go, and that is true of generals as well as the rest of us. When we write a law, it is more permanent than men. While General Ankenbrandt has assured Millard Caldwell of how he wants to administer this law, and has relieved his concern about it, the very fact that he did have concern with the broad terms of the bill should be a warning to

the Congress that we ought to have concern about the broad terms of the bill, and that we ought not to rely upon the assurance of any person, no matter even if we are going to admit that the assurances are made in the best of faith and by men of integrity, we ought not to rely on them.

The letter goes on :

In view of this, we are pleased to recommend the approval of the bill. The Bureau of the Budget has advised that there is no objection to the submission of this report.

It is signed by Millard Caldwell.

I think the letter speaks for itself. If you have any comments with respect to it, we would be pleased to hear them.

Senator MAGNUSON. It is the same kind of letter that the Department of Commerce wrote.

The CHAIRMAN. Yes; it is. They are concerned about the language in the bill, but they are reassured by the assurances that General Ackenbrandt has made to them. That is a great tribute to the general. If we could be assured that he was everlasting, we might be able to accept those assurances, too. But we are writing a law here, a permanent law. We don't want to write anything into the law that is not good over the long term and over the administration of other men than the present officers who will enforce this act.

STATEMENT OF MAJ. GEN. FRANCIS L. ANKENBRANDT, DIRECTOR OF COMMUNICATIONS, USAF

The CHAIRMAN. Our first witness is Maj. Gen. Francis L. Ankenbrandt, director of communications, Department of the Air Force.

General, will you come forward, please?

General ANKENBRANDT. My only comment on that, Mr. Chairman, is to verify that we have met with the Civil Defense Administration people on a number of occasions; we have arrived at a clear understanding of how the Administration would be handled so as not to hurt CDA in their functions. And that is the view of the Department of Defense. That is one of our duties, to see that we do not hinder or cripple Civil Defense Administration in their functions.

The CHAIRMAN. That is a great tribute to you, sir. You may proceed in your own way, sir. If we ask you any questions which border on security, we will let you be the judge and we will accept and excuse you, if you desire, from answering such questions. We will let you be the judge of what is necessary to protect the security of this country and as to what you can answer freely.

General ANKENBRANDT. Thank you.

The CHAIRMAN. I may say to you, General, that after the hearing is over, this committee will want to discuss with you in executive session testimony with respect to this bill, your own testimony, and the testimony of others. So I hope that you keep in close touch with the testimony that is offered here because we will want to talk to you about it if there is any controversy remaining after we get through with this hearing, and I presume there will be. You may proceed in your own way.

General ANKENBRANDT. Mr. Chairman, although I am a member of the staff of the Department of the Air Force, Headquarters United

States Air Forces, I am speaking for the Department of Defense in this matter. I have a statement which I would like to read and which is for the record.

I appreciate the opportunity to appear before this committee to discuss the need for the adoption of the electromagnetic radiations control bill. The purpose of this legislation is to provide the necessary Executive authority to control electromagnetic radiations, not only during hostilities or proclaimed emergencies but also during time of strained relationships when a surprise attack on the United States is a possibility.

One of the primary missions of the United States Air Force, as part of the Department of Defense, is the defense of the United States against air attack. In order for the Air Force to fulfill its responsibilities in this regard and in order to develop a defense system for the United States against air attack, measures must be taken to deny or to minimize the use by a potential enemy as air navigational aids any electromagnetic radiations which are suitable for the purpose and which could be controlled by the United States.

Current concepts of warfare indicate the necessity of controlling electromagnetic radiations in the United States, its territories and possessions during periods of critical international relationships for the purpose of denying their use to a potential enemy for the navigation of piloted or pilotless aircraft or missiles directed toward targets in the United States. It is the considered belief of the Department of Defense that those charged with the military defense of our country must have the authority to act to prevent hostile action against the United States by military force of an enemy. This authority must extend to the control and use of any aids regardless of ownership.

The only section of existing law (the Communications Act of 1934) which provides authority to close any station without the licensee's consent or public hearing is section 606—War emergency—Powers of the President. The applicable paragraph of this section reads as follows:

(c) Upon proclamation by the President that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations within the jurisdiction of the United States as prescribed by the Commission, and may cause the closing of any station for radio communications and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station and/or its apparatus and equipment by any department of the Government under such regulations as he may prescribe, upon just compensation to the owners.

Since the President's proclamation of the existence of national emergency on December 16, 1950, the authority under section 606 (c) of the Federal Communications Act of 1934 is now available. However, the limits of the authority under section 606 are not felt to be broad enough for the purposes set forth above.

Section 606 (c) limits the power to the control of stations for radio communication where radio communication is defined as—

the transmission by radio of writing, signs, signals, pictures, and sounds of all kinds * * *

The existing law is inadequate because many new types of devices which emit electromagnetic radiations are not believed to fall within the definition quoted above.

There is evidence that potential enemies possess the atomic bomb and are diligently striving to develop long-range piloted aircraft and guided missiles for carrying the atomic bomb, or any other future type of weapon. Instruments utilizing electromagnetic radiations continue to be excellent means for solving navigational problems for piloted aircraft and guided missiles.

During World War II the German military made some use of electromagnetic radiations emanating from the British Isles as aids to air navigation. It is known that many German scientists are now working for the U. S. R. R. It is believed that some of these scientists are undoubtedly working toward the development of equipments capable of utilizing electromagnetic radiations for the purpose of aids to navigation. Furthermore, the art of precise airborne direction finding and homing is very well advanced and widely known.

In view of the destructive power that can now be delivered by small numbers of aircraft or missiles it is imperative that we deny or minimize any aid which an enemy might derive from electromagnetic radiations which are susceptible to our control. Because of the speed with which these attacks can be delivered, close coordination of the interested agencies will be essential in order to insure that the controls are applied in time to be effective.

Based upon intensive research, 0.010 to 100,000 megacycles per second appears to be the most desirable and useful portion of the electromagnetic spectrum for navigational assistance. In the implementation of the controls requested, this portion of the spectrum would be further broken down into subbands of frequencies.

As an illustration, the lower portion of the spectrum will be most beneficial for "initial guidance" for long-range navigation. Based on current planning the 0.010 to 100,000 megacycles per second band will be divided into three main divisions: (a) Initial guidance, (b) midcourse guidance, (c) terminal guidance.

It is not contemplated that a complete shut-down of the 0.010 to 100,000 megacycles band will ever be necessary or ever desirable throughout the United States. However, in order to meet any contingency of a surprise attack or sneak raid, the President should have the authority to control in whole or in part, for such time as appropriate, operations in the 0.010 to 100,000 megacycle band to the greatest advantage of the Nation.

The United States Air Force is preparing extensive plans in coordination with the Federal Communications Commission, the Civil Aeronautics Administration, and other interested governmental and non-governmental agencies to implement the proposed bill.

The exact portions of the electromagnetic spectrum for which control is planned at any one time will be studied carefully in conjunction with the state of the art of homing devices so that only those devices which may give positive navigational guidance to a potential enemy are included.

It is not intended that the military will exercise peacetime control of normal transmissions or radiations to the detriment of authorized individuals and public activities except when there is evidence that the international situation has deteriorated to an alarming state and that a raid is imminent. It is contemplated that this proposed legislation will provide the authority to counteract the activities of saboteurs,

fifth columnists, or other subversive elements who would use or attempt to use electromagnetic radiations to guide aircraft and missiles of a hostile nation.

This bill has been very carefully reviewed by the Department of Defense, including the Army, the Navy, the Air Force, and the Joint Chiefs of Staff, and all concur that a requirement exists for the enactment of firm, broad, statutory authority which will provide a legal means of control by the President, in the interest of national security, of any device capable of emitting electromagnetic radiation which could be utilized for positive navigational guidance by an enemy attacking the United States.

Admittedly, the measure is very broad insofar as the radio-frequency band which it covers is involved. This is necessary in order to have a law which would take into account current and future developments in the electronic-guidance field.

The key to the problem is the determination of the value of radiated electromagnetic energy to a foreign enemy as an aid to military aggression. The threat of any one particular type of radio transmission will vary from time to time.

In considering the problem it should be appreciated that an enemy may navigate his aircraft, ship, or submarine with varying degrees of success to the general area of a target by a number of means other than direction finding on a radiating device. These means include celestial navigation, dead reckoning, radar mapping, and so forth.

Those devices which radiate in very broad radio-frequency bands and which are not fixed in place or times of operation would probably be of little immediate value to an enemy.

For example, although it is theoretically possible to locate New York City by its electrical noise level—from sources of automobile ignition, defective light bulbs, arcing switches, and so forth—it is considered unlikely that the degree of accuracy to be obtained by such navigation would be of sufficient value to warrant the development of homing devices for this particular purpose or the dependence on this means of navigation as the primary aid for precision-target location.

In this respect an enemy could ill afford to attack the United States without reasonable assurance of some success in striking the intended targets. On the other hand, further study of this particular field might materially change the importance of this method of location.

There are two general types of devices for which control must be provided:

(a) Those devices, the existence, location, and hours of operation of which can be determined by the enemy through his intelligence channels, and which will permit either a good degree of precision in locating a target, or long-range navigation to the target area.

(b) Those devices which might be operated by enemy agents for the purpose of providing guidance to their nation's aircraft, ships, or submarines. To satisfy the above requirements, the wording of the bill must be sufficiently broad to include any device which might fall in the above classification.

It is realized that if the broadest interpretation to this bill were exercised the entire life of the sections of the country in which such controls were imposed might be paralyzed. If the bill were interpreted so broadly as to include items such as defective home light bulbs and if the Department of Defense were to implement the bill

by arbitrarily decreeing that all electromagnetic radiations were to cease, a community would be able to carry on few if any of its essential activities. It is believed, however, that two considerations would prevent such an occurrence:

(a) To be controlled, the radiating radio energy must be of a nature that might be employed by a foreign enemy in an attack upon the United States. There are vast numbers of devices which, although they do radiate radio waves, do not radiate a type which would be useful to an enemy for positive guidance in an attack on the United States.

(b) The Department of Defense has a greater responsibility than simply shooting down or diverting an enemy attack. In modern warfare, the civilian economy and morale of a nation are as important to the nation's security as military might. The Department of Defense could not afford to suspend even temporarily the entire life of any section of the country and is fully conscious of its responsibility and obligations in this respect.

In the furtherance of its mission, the Department of Defense would be required to retain in operation all aspects of the civilian economy that could practically be retained from a calculated risk point of view, and would not desire to discontinue operation of anything which might contribute to the total war effort unless discontinuance or other control was essential to the security of the location involved.

Although it may be extremely unlikely a war would start without a period of prior warning, it should be kept in mind that one of the basic principles of warfare is surprise. Since the United States will not precipitate a war, it can be expected that war would be forced upon us under circumstances favorable to the enemy.

The development of weapons of mass destruction has made the element of surprise—that is, the first blow—perhaps the most important phase of modern warfare. The United States must be prepared for that first blow in order to minimize its effect and to permit immediate retaliation.

The United States Armed Forces have, during the the past few years, been making every possible effort to restore the Department of Defense to a position as a potent military force. The requested legislation is a part of the task of restoration and reorientation of the forces to the timetable of warfare in the air-atomic age.

In addition to the authority to control stations, there must be readiness on the part of those who must carry out the controls. To this end the Air Defense Command as stated above is preparing extensive plans to accomplish this and has carefully coordinated this planning with the Federal Communications Commission, the Civil Aeronautics Administration, and other agencies.

Mr. Chairman, that concludes my statement.

The CHAIRMAN. We thank you very much, General.

I am going to hand you a list of some of the instruments and devices that will be covered by this legislation. You have stated that you expect to cover all instruments and devices that radiate electromagnetic waves between 0.010 and 1,000 megacycles per second.

This list is meant to include the devices that technical language would cover. I would like to hand this to you and ask you to read this list and add such other devices as you think of that might be

covered also. We want to get as many of the devices as we can in here now so that we can understand the bill and what it proposes to do.

General ANKENBRANDT. Mr. Chairman, as I understand, what you want is a statement from me as to whether or not these devices listed, and other devices, could be controlled by this bill, rather than whether we intend to control them at this time?

The CHAIRMAN. That is right. Whether they are affected by the bill, whether they are included.

General ANKENBRANDT. In other words, whether it would be possible to control these devices under the broad terms of this bill.

Senator MAGNUSON. You may not do it but we want to know how broad it is.

The CHAIRMAN. We would be glad to have you read that list into the record and add whatever devices you wish.

General ANKENBRANDT. Some of the instruments and devices that will be covered by this legislation are: Campus broadcast.

Senator MAGNUSON. What do you mean by campus broadcast? Within the college?

General ANKENBRANDT. I presume that means a local radio station of a college which is of extremely low power. That is the way I would interpret that.

The CHAIRMAN. Nick, you wrote that. Is that what you mean?

Mr. ZAPPLE. That is correct.

General ANKENBRANDT. That would be one of the devices included under these terms.

The CHAIRMAN. There is a lot of broadcasting that goes on at college.

Senator MAGNUSON. That probably should be controlled.

General ANKENBRANDT. And will not be included under this bill.

The CHAIRMAN. Electromagnetic emissions are all we are talking about.

General ANKENBRANDT. It is fair to state that we do not conceive that a campus broadcast would come under control of the Department of Defense.

The CHAIRMAN. But that is a matter of defense, and it would come under the bill.

General ANKENBRANDT. The answer is "Yes"; they would come under the broad provisions of this bill.

Remote-control devices is the next item. If they are wire devices, no. If they are radio devices, yes.

I am not sure what you had in mind on that point. Most remote-control devices are operated by wire connections and these would not come under the terms of this bill.

The CHAIRMAN. Such as touching off a charge of dynamite.

General ANKENBRANDT. Yes, sir. That is not included in this bill.

The CHAIRMAN. But if it were controlled by electromagnetic radiation, as you control a ship in the air, for example?

General ANKENBRANDT. If they are by radio, yes; if by wire or other means, no.

The CHAIRMAN. The radiation by wire would be very slight.

General ANKENBRANDT. That is right.

Tube life test oscillators: I believe the answer to that is "No." So far as I know, they are not radiators in the sense of the word. The

answer to that, in my interpretation, is "No," not covered by this bill.

Phono-oscillators: No, for the same reason.

Burglar-alarm systems: No. I don't believe they are radio devices anyway, are they?

Senator MAGNUSON. They are usually wired. But they do have some radio devices for protection, security.

General ANKENBRANDT. I will answer that the same as radio-controlled devices. If they are radio-burglar-alarm systems, yes.

Industrial heaters: Yes, if they are in fact radiators. If they are not radiating, the answer is "No."

Diathermy: I believe it is agreed that they do radiate to a sufficient degree that they would fall under the provisions of this broad bill.

Senator MAGNUSON. Didn't you testify before that manufacturers of diathermy machines were now putting them on the same frequency? Isn't that correct?

General ANKENBRANDT. I think the Federal Communications Commission made a statement on that point.

Commissioner Sterling?

Mr. STERLING. They are on certain bands allocated for that purpose. However, there are certain types which can allocate outside the bands allocated for that purpose, but there is a higher restriction on radiation.

General ANKENBRANDT. Ultrasonic generators: I believe that the answer is "No," for the same reason as those oscillators above. They are not considered to be radiators.

Vacuum tube bombarders: I am not familiar with that term.

The CHAIRMAN. Can you throw any light on what you mean? Nick, did you prepare this list?

Mr. ZAPPLE. This was prepared by the Chief Engineer of the Federal Communications Commission.

General ANKENBRANDT. Maybe we had better get Mr. Sterling to answer that question.

The CHAIRMAN. I notice that he states some of the instruments and devices that will be covered by this legislation. He doesn't have any "No" answer to any of these. I wish the engineer would come up and take this seat, and we will have a little debate right here.

We have gotten down to the ultrasonic generators. If you do not mind, General, I would like to go back with this gentleman and take up these "No" answers. He does not say that these are all the instruments, but he says here are some of the instruments and devices that will be covered by this legislation.

Let us start in with the tube life test oscillators.

STATEMENT OF CURTIS PLUMMER, CHIEF ENGINEER, FEDERAL COMMUNICATIONS COMMISSION

Mr. PLUMMER. Tube life test oscillators are essentially transmitters that are used to test tubes. They may be a high power of several kilowatts. We have had a number of cases already whereby the radiation got out on the air and we went back to the companies and they did additional shielding to fix it up.

The CHAIRMAN. You have those tube testers and any radio shop has them?

Mr. PLUMMER. No, sir; the manufacturers. Tube life test oscillators and vacuum tube bombardiers are almost the same thing. They are in the tube manufacturing plants in many cases.

The CHAIRMAN. All tube manufacturing plants would have such devices?

Mr. PLUMMER. Yes, sir; especially those that make the larger tube, the transmitting tube.

General ANKENBRANDT. Mr. Chairman, I think I said the answer is "No," if they did not radiate. Mr. Plummer said they radiate, so obviously the answer is "Yes," if they radiate.

I think it is possible to prevent them from radiating.

Senator MAGNUSON. This bill covers everything that radiates?

General ANKENBRANDT. That is right.

Senator MAGNUSON. Whatever technical devices radiate, it covers?

General ANKENBRANDT. That is right.

The CHAIRMAN. Between those two points?

General ANKENBRANDT. Between 10 kilocycles and 100,000 megacycles.

Senator MAGNUSON. That includes a vast variety of things used in our American scientific life.

General ANKENBRANDT. That is right.

Senator MAGNUSON. And medical life.

General ANKENBRANDT. That is correct.

The CHAIRMAN. Let us go to the burglar alarm systems. We are interested in them.

Mr. PLUMMER. There has been some recent work by several of the companies that make burglar alarms that use radio frequency energy or some small variation of a transmitter to make the burglar alarm work. It is part of the system. It is a form of control radiation.

The question is how much is it controlled? We have run into a certain amount of trouble in enforcement of these.

Senator MAGNUSON. Would this also affect the new device where you break a wave and that causes an alarm?

Mr. PLUMMER. That is the idea exactly.

Senator MAGNUSON. Rather than opening the door by wire.

Mr. PLUMMER. That is it exactly. You walk through a radio beam or something.

Senator MAGNUSON. And that starts the alarm.

Mr. PLUMMER. Yes, sir.

The CHAIRMAN. We are down to the ultrasonic generators.

Mr. PLUMMER. They are another device that are used in industry for various processes such as metal treating, tempering, and there are also uses of it in the chemical industry. It is a low frequency transmitter in most cases, at variable powers. But the use is industrial.

Senator MAGNUSON. What about a regular generator?

Mr. PLUMMER. You mean a power generator?

Senator MAGNUSON. Yes.

Mr. PLUMMER. The probabilities of any trouble on a regular generator are rather small. I think all of these have to be expressed in probabilities of trouble.

Senator MAGNUSON. What about a generator in a huge hydroelectric dam? Does that radiate?

Mr. PLUMMER. Usually they are in pretty good condition and the probability is small. Sometimes there is trouble after it gets out on

to the lines due to leaks or something. But that is a broad noise that can always be fixed. At least the cooperation of the power companies is usually pretty good.

The CHAIRMAN. That includes all types of dynamos? There is a possibility that any dynamo might radiate?

Mr. PLUMMER. The probabilities of something like that being useful for navigation are rather small. It is not a first-line matter.

Senator MAGNUSON. But under the bill you could control them?

Mr. PLUMMER. Yes, sir. I think General Ankenbrandt mentioned something here awhile ago. I think he said something about "city noise," general electrical noise. Dynamos contribute to an over-all average noise that has a possibility of being used.

Senator MAGNUSON. You mean being picked up?

Mr. PLUMMER. Yes, sir. I think it has actually been done.

The CHAIRMAN. Suppose that you were in an airplane approaching the United States: Could you tell by the over-all electromagnetic noise whether it was a large city or a small city, that is from the volume of the noise?

Mr. PLUMMER. There is a possibility; yes.

The CHAIRMAN. You could tell when you were approaching New York or whether you were approaching—

Senator MAGNUSON. Washington?

The CHAIRMAN. A much smaller town or even a medium-sized town like Washington?

Mr. PLUMMER. That is cutting it rather fine, Senator.

General ANKENBRANDT. Mr. Chairman, today I would categorically state "No" to that question. Ten years from now I do not know.

Mr. PLUMMER. The general noise level is rising all the time.

General ANKENBRANDT. We do not know how to do it today, sir.

The CHAIRMAN. In a city like Washington or New York, would there be any separation in the electromagnetic radiations that come from one city as against another, such as an overwhelming volume of a certain type of electromagnetic radiation?

General ANKENBRANDT. No, sir. I think it is well to point out that many of these devices are potentially powerful radiators if hooked up to antenna systems that would radiate. But as normally used, they are not radiators to the extent that they are useful in any of the navigational devices that I have outlined.

Senator MAGNUSON. Isn't this true: Without aid within the country, these things are quite remote in possibility. But any one of these things in its general field, if you had a saboteur here who might hook it up, or change it, then you would have a direct homing device? In other words, they could be used?

General ANKENBRANDT. These are all transmitters which, if hooked up to antenna systems—they are not supposed to be—but if they were—

Senator MAGNUSON. Suppose you had one man who took a high-tension wire and hooked it up, or one of these transmitters, you would have a homing device?

General ANKENBRANDT. Yes, sir; some of which might be useful. And others which might not be.

The CHAIRMAN. Let us go to vacuum tubes.

Mr. PLUMMER. Vacuum tube bombarders?

The CHAIRMAN. Yes.

Mr. PLUMMER. I have already mentioned that. Those are used in vacuum tube factories in the industrial process of building tubes. They are essentially radio transmitters. It is possible for them to radiate. We have already had a number of cases of interference from these devices.

The CHAIRMAN. General, if you differ with the engineer's answers, will you please speak up?

General ANKENBRANDT. The question is whether they radiate or not. They are all potential radiators if hooked up to an antenna. They are normally not. In that respect I would say that none of them really are not, in the minds of the Department of Defense at least, being covered. However, if they become useful radiators by subversion or otherwise, then they do come within the provisions of this bill.

The CHAIRMAN. The question is whether they are covered by the bill or not. That is the point we are working on now.

Senator MAGNUSON. They probably all radiate. It is a question of degree.

General ANKENBRANDT. May I make one general statement on that, Mr. Chairman? I would like to invite your attention to the first five sentences of the bill which describes the purpose, and that is where our minds are. It says:

The purpose of this Act is to provide for the greater security and defense of the United States by controlling or using electromagnetic radiation in such a manner as to minimize or prevent navigational aid to any foreign country in an attack upon the United States.

That is the purpose of the bill.

Senator MAGNUSON. Those recitals sometimes do not mean too much.

General ANKENBRANDT. No, sir, but that goes behind why I say if this is a powerful radiator, it would come under this because it could be useful. But if it is only a minor radiator or not radiating but a few feet or a few hundred feet, the answer is "No," it does not come under the purposes of this bill.

The CHAIRMAN. The object of the present question that is before us is to reduce this language to cover specific devices. That is what we are trying to do here. We are trying to find out what devices are controlled.

If you have any difference of opinion with Mr. Plummer, we would be very glad to have you speak up. If you agree with him—

General ANKENBRANDT. I think we have a complete meeting of the minds. These are potential radiators. Not all of them are radiating to the point that they fall under the purposes of this bill, normally.

The CHAIRMAN. Let us get away from the purposes of the bill and stick to the technical language of the bill.

General ANKENBRANDT. All right, sir.

The CHAIRMAN. What the purposes of the bill are and what the bill does might be two different things, and that is what this committee is interested in and trying to find out at the present time.

Is there anything further on vacuum tubes?

Mr. PLUMMER. No, sir.

The CHAIRMAN. Neon signs?

Mr. PLUMMER. The next three—neon signs, Pasteur ray lamps, and mercury vapor sun lamps—are all devices used in the home or in stores to give a certain amount of radiation, broad-band radiation on which we get a certain amount of interference cases at the Commission.

As to neon signs, there is one kind that is being manufactured now that gives a little more trouble. It consists of a 25- to 100-watt radio transmitter or generator, and the output is put on the neon sign behind the sign.

The letters and the sign have no physical connection with the output loop. They plug in the letters so they can change the sign. The owner of the store has a lot of these letters made up and he can plug them in. We have run a lot of those on the west coast, manufacturers out there.

We have tried to guide those on to the diathermy frequency, 27.12 megacycles.

Food cookers are next. Those I believe we have all heard of. I often hear them called "hot dog cookers." They are manufactured by several manufacturers. The idea is to cook food very quickly. They again are small radio transmitters. I believe one manufacturer has about a 150-watt transmitter. It is around 2,400 megacycles. Potentially it can radiate. There are other possibilities.

Senator MAGNUSON. That is what they call the radar ranges.

Mr. PLUMMER. Yes, sir. Exactly what I am talking about.

The CHAIRMAN. Do they have many of them in the city of Washington? I have seen one at the Statler Hotel.

Mr. PLUMMER. Yes, sir; there is one there. I have not seen very many. They are used in hotels, restaurants.

The CHAIRMAN. Your monitor system searches them out, does it not?

Mr. PLUMMER. Let me say this about our monitoring system: We operate mostly on the basis of interference complaints. There is a vast difference in going out aggressively and finding potential sources of interference that may be in the radio spectrum and operating on interference complaints.

The vast difference is the size of the budget, because if we chase everything down it takes a lot more people than we have now.

The CHAIRMAN. In other words, you do not do anything unless somebody squawks?

Mr. PLUMMER. That is about the present situation, Senator.

The CHAIRMAN. And you do not keep any patrol or try to correct these electronic noises unless somebody complains about them?

Mr. PLUMMER. I would not say any. In what spare time we have, between cases, we cruise the spectrum to look for various troubles. But our cruising is not anywhere near complete.

The CHAIRMAN. This is a little off the subject, but it is very interesting. I would like to pursue it very briefly.

How many monitors do you have operating in the 24-hour period in Washington, D. C.?

Mr. PLUMMER. Our nearest monitoring station is at Laurel. We have an around-the-clock crew at that particular station. However, as I say, they are working principally on cases that come to us from many sources, the other Government agencies, including General Ankenbrandt's shop, and they are principally cases where somebody comes in and says "There is interference with my aviation frequency" or something, and we chase it down.

We only sample check the spectrum looking for trouble. I do not know the exact figure, but I doubt if it is over 4 hours a day that we are just cruising to look for trouble.

The CHAIRMAN. What do you mean by cruising?

Mr. PLUMMER. We set a man down with a receiver and he just tunes through the various frequencies looking for something that is unidentified or looks like it is giving interference, or trouble.

The CHAIRMAN. Does he continue that during the 24 hours?

Mr. PLUMMER. No, sir. We do not have sufficient staff to do that for 24 hours. We just sample check.

The CHAIRMAN. Food cookers: you covered that.

Mr. PLUMMER. And we have already covered motors and generators. Substation switching gear is next.

The CHAIRMAN. On motors and generators, all motors and all generators do radiate, do they not? Every motor of every kind, even an electric razor?

Mr. PLUMMER. An electric razor radiates. It is all a matter of degree. Well-built ones, there is practically nothing. When you get into some of the older motors we get interference complaints from listeners about interference to their radio.

We generally find there is some motor in the building. There has been quite a bit of trouble with elevator motors.

Substation switching gear, I have already partially mentioned. After the power gets out of the powerhouse, in some cases there are leaks in the switching gear or transformers or lines, and we get interference complaints from that type of situation.

Senator MAGNUSON. Why is it that when you are driving, say, particularly in my country when you hit the great, big, huge transmission lines, your radio is so bad that you can not hear it? Is that radiation from the lines?

Mr. PLUMMER. Yes, sir. Generally there is a little leak somewhere from that line to the ground which causes an arc which generates a form of radiation.

Senator MAGNUSON. You find that frequently when you are driving. When you hit a high power line your radio will go bad. But that is a leak, that is not the normal process of the line?

Mr. PLUMMER. Usually it is a leak, because most of the cases we have had of interference on this, if the power company really went to work on this they generally could get the noise level down so it would not bother you much.

The CHAIRMAN. I have never driven close to a line yet that it did not leak.

Senator MAGNUSON. I want to get this clear on the record because this is very important to me. Those huge generators, say the generators in a dam the size of Grand Coulee, generating 60,000 kilowatts apiece, they are not radiators?

Mr. PLUMMER. Our experience has shown that there has been very little trouble with that.

Senator MAGNUSON. Is that because of the huge concrete that they are encased in?

Mr. PLUMMER. I think it is just a case of well-designed generators, so that the radiation is down. As I say, the trouble usually comes out on the line.

Senator MAGNUSON. After it gets out on the high power line?

Mr. PLUMMER. Yes, sir.

The CHAIRMAN. If there are no shorts or no leaks in a generator, they do not radiate? Is that the point?

Mr. PLUMMER. That is about it. If they are in good electrical mechanical condition.

Spectroscopes: There are some now that have a small radio oscillator or transmitter in them. They are a scientific instrument. Usually very low power. We just have that on the list. We happened to have had an interference case or two on them.

Welders: There are quite a few welders used in industry today that use a radio frequency generator to either start the arc or to sustain it. We have recently had a petition from the welders' industry to change our rules to make it clearer how they fit under our rules. There is very definitely a small radio transmitter there.

The problem is that the welder has to go around in a plant, go inside of an aircraft or tank or an automobile or a piece of industrial equipment, and there is a chance for radiation there.

General ANKENBRANDT. Mr. Chairman, I think I would like to clear up one point. As I read this bill, ten-thousandths of a megacycle is 10,000 cycles. Ten thousand cycles, motors and generators do not radiate. None of these 60 power devices are covered by the terms of this bill. They fall outside of the frequency spectrum we are talking about.

Mr. PLUMMER. Fundamental frequency.

General ANKENBRANDT. The harmonics of those, which became smaller and smaller, would possibly fall in. We are talking about 10,000 cycles on the bottom-side radiation, up to 100,000 megacycles. That is another factor, you have to determine how many harmonics there are, how much it is radiating and so on.

Senator MAGNUSON. You have also to gage that by the possibilities at the receiving end as to how sensitive they are.

General ANKENBRANDT. They might become sensitive enough to get down into the lower level, and that we do not know.

You are talking about harmonic radiation of some of these 60-cycle divisions, perhaps.

Mr. PLUMMER. In the case of the leak in the power line it is not harmonic, it is like any high spark generator and gives out a radio frequency energy.

Spark gap diathermy and therapeutic devices: That is another variation of the diathermy machine. In this case instead of using a narrow band radio frequency generator or transmitter they use a broad band. At one time, many years ago, the spark gap machines were actually used for radio transmitters.

They are practically gone now, but they happened to work very nicely in this diathermy.

X-ray equipment: Again it is mostly a case of leaks. Right at the moment I cannot think of any cases of X-ray machines using radio frequency generators. It is a case of the condition of the apparatus.

I would like to make one remark about this list. This is only a partial list that we made up based mostly on our interference cases we have had over the past several years. These particular items happen to crop up oftener. There are lot of others.

Senator MAGNUSON. Here is a letter from the Secretary of Commerce on the bill, from which I will quote one paragraph:

Although the terms of the bill are broad enough to include not only radio transmission devices but also much other equipment as electrodiathermy ma-

chines, radio receiving sets of the superheterodyne or super-regenerative type, television receiving sets of the superheterodyne type, automobiles, and electric shavers—

although they say it does cover that—

legislation of this type would appear necessary.

Mr. PLUMMER. Yes, sir. The ignition systems of automobiles are another broad band radiator. They are a radiating system of sorts. We did considerable work 2 or 3 years ago with the Automobile Manufacturers Association and the Radio Manufacturers Association to see if they could get the general level of interference from the automobile ignition systems down.

Unfortunately I am unable to tell you the progress in that at the moment, because I have not had close contact with it lately. I know there was some progress. I believe the Radio Manufacturers Association at the time was worrying about the potential interference from automobile ignition systems to television sets.

Senator MAGNUSON. But radio receiving sets in automobiles do not radiate, do they?

Mr. PLUMMER. I do not ever remember any particular cases of that. This item of superheterodyne receivers has been a problem. Many radio receivers have a little oscillator in them that puts out a watt or so that is used to change the frequency in the receiver.

There has been some trouble lately that these oscillators radiate onto the air and cause interference to other receivers. That came up especially in the case of television sets. We have had a case where FM receivers were radiating, causing a certain amount of trouble to CAA.

Senator MAGNUSON. This may not be pertinent, but how do those new sets work, where there is no manual on them. They run along until they hit a station and they stop, no matter where you are. That is a homing device in reverse, is it?

Mr. PLUMMER. That is an electromechanical method of tuning your receiver.

Senator MAGNUSON. There is no manual control on them. No matter where you are, whether here or in San Francisco, you just press a button and it runs along until it hits a station and stops.

Mr. PLUMMER. It is some method of remote tuning of the receiver?

Senator MAGNUSON. Yes.

Mr. PLUMMER. Some years ago Philco had a receiver of that type on the market, where you dialed a little dial and it tuned your receiver across the room. We actually put out rules at that time to cover that particular short-distance communication. That was part 15 of the rules.

Senator MAGNUSON. What about the television sets? We want to be sure that we do not stop America's entertainment.

Mr. PLUMMER. We have been working for a number of months with the Radio Manufacturers Association and other radio manufacturers, to see if we cannot get them to get the value of radiation from their television sets down to a much lower value than the sets they were putting out, we will say, a year ago. There has been considerable progress in that field.

Senator MAGNUSON. But they would be included under the bill?

Mr. PLUMMER. Yes, sir. It is a radio device.

General ANKENBRANDT. I must take exception to that. I cannot support that view.

Senator MAGNUSON. That is what the Department of Commerce says.

General ANKENBRANDT. I think we are wrong, also. The point that I must go back to is that this bill revolves around the question of the interpretation of the words "capable of emitting electromagnetic radiation." But directly in the same sentence it is coupled "which are deemed necessary to minimize or prevent navigational aid to a foreign enemy."

Senator MAGNUSON. It probably would not be practical to do this, but under the terms of the bill you could issue an order if this bill were passed to stop all television receiving.

General ANKENBRANDT. I do not think so, because no one could prove that would be denying any navigational aid to an enemy, and that is not permitted otherwise under this bill.

The CHAIRMAN. They would not have a chance to prove it. You would say they cannot do it and that would be the end of it under the bill. They could not prove that they were not guilty, too. You could not prove they were guilty and they could not prove they were not guilty under the terms of the bill.

That is all there would be to it. I would like to read a couple of paragraphs from Broadcasting Magazine on this very point:

Excessive oscillator radiation in FM and television sets is snowballing into an orgy of nightmares for both the radio industry and the Government because of serious interference problems, particularly conflicting with vital nonbroadcast services, such as air navigation aids.

That is the very thing we are talking about, air navigation aids. This article is by Larry Christopher, in Broadcasting Magazine of June 5, 1950. It says:

After considerable study, Telecasting last week learned first that Civil Aeronautics Administrator D. W. Rentzel has asked FCC Chairman Wayne Coy for immediate action to curb FM receiver radiation affecting CAA's new multi-million dollar VHF omnidirectional radio range system VOR being installed to blanket the United States.

So there have been already complaints between two departments, Commerce and CAA—CAA being in Commerce—and the FCC chairman, Mr. Coy, on this very point.

They are talking about navigation, and that is what this bill is about, navigation.

General ANKENBRANDT. No, sir. That is referring to interference with our own navigational devices, which is not covered in this bill. This is to prevent navigational devices, radiating devices from becoming navigation aids to an enemy. They are two different things, sir.

The CHAIRMAN. If they are an interference could not they also be an aid at the same time? It would look to me like that would just naturally follow. If these electronic noises are sufficient to interfere, it looks to me like they might also be an aid.

I know that we are going at it from the other end, but it does seem to me that they would be covered.

Senator MAGNUSON. What about police broadcasting stations?

General ANKENBRANDT. They are covered in the terms of this bill.

Senator MAGNUSON. Would not that present a serious problem, an integrated problem? Suppose you would need, in case of any threat-

ened attack or attack, those police radio stations to keep law and order going all the time.

General ANKENBRANDT. Yes, sir; and they are not considered at this time useful navigation devices.

Senator MAGNUSON. They are too high?

General ANKENBRANDT. They are within certain bands normally that are not useful to the present-day state of the art for an aeronautical navigational aid.

The CHAIRMAN. They are not above the 100,000 megacycles?

General ANKENBRANDT. No, sir; they are all within the over-all band. But I am talking now about the details of what portions are we interested in.

The CHAIRMAN. You are talking about the purposes, and not the possibility?

General ANKENBRANDT. That is right.

Senator MAGNUSON. What about ship to shore?

General ANKENBRANDT. That is included in the technical provisions of the bill. They are also not considered useful navigational devices for aeronautical purposes.

The CHAIRMAN. What about cab companies broadcasting?

General ANKENBRANDT. They are included technically in the bill. They are not considered to be useful today for the purposes of this bill.

Senator MAGNUSON. Is that a regular radio station that the cabs use?

Mr. PLUMMER. Yes, sir. They have radio transmitters. You must remember, many of these low power mobile devices are intermittent, which makes it much harder to use them for navigational assistance, whereas a broadcast station, for instance, is on all the time at relatively high power.

This whole thing is a question of probabilities in my mind.

Senator MAGNUSON. All amateur radios come under this, do they not?

General ANKENBRANDT. Yes, sir; technically, but not under the purposes.

Senator MAGNUSON. Some of those are pretty powerful, aren't they?

General ANKENBRANDT. Yes, sir; but the amateur bands that are available are normally not in the bands that are useful for navigational purposes.

The CHAIRMAN. General, in enforcing this act would you do a super job of monitoring, or would you do any monitoring at all?

General ANKENBRANDT. We would not plan to have a large monitoring system; no, sir.

The CHAIRMAN. Then would it not be possible for the enemy to station someone in New York City, for instance, and transmit radiation, and you would never catch on to it? The FCC says they do not do a very good job, or a perfect job of monitoring; they only follow complaints. Would it not be possible for that to happen?

General ANKENBRANDT. I think I indicated a large monitoring system. Certainly there will be some monitoring required by the air defense people.

Senator MAGNUSON. You surely now are trying out some of these things, otherwise you would not come up here with this bill.

General ANKENBRANDT. Yes, sir; we are.

Did I answer your question, Senator?

The CHAIRMAN. You answered it. But it seems to me that monitoring is extremely important if we are going to do anything. If we are going to accomplish any purpose there would have to be a complete monitoring job done by someone.

General ANKENBRANDT. Perhaps I should answer the question, "Yes, we will monitor," but it does not require an elaborate extra-purpose, special-purpose agency to do that because we already have a large number of receivers in operation in the air-defense organization which are being used for other purposes and would quickly bring out any spurious radiations that are in bands that we know are useful. And of course we collaborate directly with the Federal Communications Commission in this respect.

Senator MAGNUSON. Suppose this bill were now law, and you strongly suspected that maybe next week there might be an attack say on New York or Washington. What orders would you issue right now, knowing what you know now?

General ANKENBRANDT. None.

Senator MAGNUSON. You would let the stations go?

General ANKENBRANDT. Yes, sir. The mechanics of this, if you would like me to explain it very briefly, are that—

Senator MAGNUSON. You did explain that before.

General ANKENBRANDT. I can explain this in open hearing, this much of it. The plans are first drafted between the agencies concerned—the FCC, the CAA, the National Association of Broadcasters and other individuals who are involved.

Those plans are then submitted as proposed plans to the Department of Defense, and it is only after they are approved in the Department of Defense that the authority is decentralized under the terms of this bill to the local commanders.

In other words, he will not be given blanket authority under this bill. He will only be given authority for plans which he has submitted in advance and which we, in the Department of Defense, have approved.

Senator MAGNUSON. Let us break it down to the plan. Suppose the plan has been approved and you suspect that next week there might be an attack say on Washington. What would you have on the air or off the air? How would you do it?

General ANKENBRANDT. That is today? You are talking about today?

Senator MAGNUSON. Yes; if this bill were law. Knowing what you know now.

General ANKENBRANDT. To clarify it, what would be on the air today if an attack were impending a week from now?

Senator MAGNUSON. Suppose you did not know what day it was coming but you thought it was coming next week and you did not want any homing devices on next week into this geographical area. Then you would close down quite a few things, would you not?

General ANKENBRANDT. No, sir; we would not.

Senator MAGNUSON. Then I do not quite understand what the purpose of the bill is.

General ANKENBRANDT. The purpose of the bill is to permit the control of those radiating devices that are useful for navigational aid when you have determined that an attack is imminent or in progress.

And it is only at that time, and not before, when these controls are exercised.

In other words, if the attack is imminent in the next 15 minutes, there would be certainly controls exercised in the area of the attack.

Senator MAGNUSON. Suppose you got word that squadrons of enemy planes were right this minute crossing Alaska, coming down to the United States. What would you do then if this bill were law? That is imminent enough, is it not?

General ANKENBRANDT. Yes. You would transmit that into hours of flight from Alaska, that is about 2,000 miles down.

Senator MAGNUSON. But they are on their way.

General ANKENBRANDT. Say it is at 500 miles an hour, that is 4 hours away. You would certainly have everyone on their toes and looking, to say the least. The raid might only be a fake. You would not invoke these controls long distances ahead of when an actual attack would be under way.

It is a matter of 1 or 2 or 3 hours at the most. It is not a matter of 6 hours or 24 hours.

Senator MAGNUSON. Whatever you would do, you would do 2 or 3 hours prior to the possible attack?

General ANKENBRANDT. Yes, sir.

The CHAIRMAN. That is what is bothering me about the whole approach to this problem.

Senator MAGNUSON. You mean about being on your toes?

The CHAIRMAN. No. About getting the right fellow on his toes. We do not want to scare a lot of housewives to death. What we want to find out is on what electromagnetic radiation the enemy ship is homing on. That is the important thing. That is the object of this bill, it seems to me. It occurs to me that monitoring is the important part about it.

You talk about 4 hours away. It seems to me that that is not going to give you very much time to take the matter up with some generator or some motor or some other device that the enemy may be using that you do not know anything about.

It looks to me like you have to know about these things, and before that ship gets within 4 hours of you, the controls ought to be taken care of. I thought the objective of the bill was to get all of these devices that radiate, get them on a common wave length which I understand can be done, so that they would not be able to follow some specific radiation to the target.

That is what I thought the bill was for. I supposed that this work was going to be done many months ahead of that 4-hour interval.

General ANKENBRANDT. You are right.

The CHAIRMAN. I am surprised at the approach to this problem.

General ANKENBRANDT. I think perhaps I have misled you in saying that "No," we would not set up a specific monitoring agency. I should probably change that to "Yes," we will monitor the portions of the band that would be useful.

Senator MAGNUSON. Supposing the same situation, and say in Seattle there was a big manufacturing plant that had some radiation machines which you would have to know about. Surely the orders under the plan would be for that particular radiation item, or that machine, to stop for at least that time? Would you not have to

EMERGENCY CONTROL OF ELECTROMAGNETIC RADIATING DEVICES

WEDNESDAY, FEBRUARY 21, 1951

UNITED STATES SENATE,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The committee met, pursuant to notice, at 10 a. m., in the committee hearing room, United States Capitol, Washington, D. C., Senator Edwin C. Johnson of Colorado (chairman) presiding.

Present: Senators Johnson and Magnuson.

Also present: Nicholas Zapple, professional staff member.

The CHAIRMAN. The hearing will please come to order. This is a hearing on Senate bill 537 which was introduced by me by request. (The bill is as follows:)

[S. 537, 82d Cong., 1st sess.]

A BILL To provide for the greater security and defense of the United States against attack, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the purpose of this Act is to provide for the greater security and defense of the United States by controlling or using electromagnetic radiation in such a manner as to minimize or prevent navigational aid to any foreign country in an attack upon the United States.

SEC. 2. (a) In time of war, national emergency, or whenever the President deems it advisable in the interest of national security, the President may control the use by any person, and authorize the use by such departments or agencies of the United States as he may direct, of any instrument, device, apparatus, or other thing capable of emitting electromagnetic radiation between ten thousandths and one hundred thousand megacycles per second to the extent that he deems such use or control necessary to minimize or prevent navigational aid to any foreign country in an attack upon the United States. To this end the President may make such regulations and issue such orders as he considers necessary, which regulations and orders shall, consistent with the requirements of national security, be published in the Federal Register.

(b) The President may delegate to government departments, agencies, and officers such authority, duties, and functions as he considers necessary to accomplish the purposes of this Act.

SEC. 3. The owner of any instrument, device, apparatus, or thing which is used by a department or agency of the United States under the provisions of section 2 of this Act shall be entitled to just compensation for such use.

The President shall determine the amount of such compensation. Each determination of just compensation shall be made, as of the time of the use, in accordance with the provisions for just compensation in the fifth amendment to the Constitution of the United States. If the person entitled to receive the amount determined by the President as just compensation is unwilling to accept the same as full and complete compensation for such use thereof, he shall promptly be paid 75 per centum of such amount and shall be entitled to sue the United States, in an action brought in the Court of Claims or, without regard to whether the amount involved exceeds \$10,000, in a district court of the United States, within three years after the date of the President's determination, to recover such additional amount which, when added to the amount so paid to him, shall be determined by the court to constitute just compensation.

Sec. 4. Chapter 37 of title 18 of the United States Code is amended by adding the following new caption at the end of the table of contents:

"968. Electromagnetic radiation usable by an enemy"

This chapter is further amended by adding the following new section after section 797:

"§ 798. Electromagnetic radiation usable by an enemy

"Whoever, in violation of any regulation or order for the security of the United States promulgated under the Electromagnetic Radiation Control Act, knowingly has or retains control, custody, or possession of any instrument, device, apparatus, or other thing capable of emitting electromagnetic radiation between ten thousandths and one hundred thousand megacycles per second which might assist any foreign country in an attack upon the United States; or whoever, having control, custody, or possession of any instrument, device, apparatus, or other thing capable of emitting electromagnetic radiation between ten thousandths and one hundred thousand megacycles per second which might assist any foreign country in an attack upon the United States, knowingly uses such instrument, device, apparatus, or other thing in violation of any regulation or order for the security of the United States promulgated under the Electromagnetic Radiation Control Act, or knowingly suffers the same to be used in violation of any such regulation or order, shall, if an individual, be fined not more than \$10,000 or imprisoned not more than five years, or both, and if a firm, partnership, association, or corporation be fined not more than \$50,000."

Sec. 5. When used in this Act—

(a) The term "United States" shall include the several States, the District of Columbia, the Territories and possessions of the United States, and all other areas under the control of the United States.

(b) The term "person" shall include any individual, firm, partnership, association, or corporation as well as any vessel or aircraft within the jurisdiction of the United States.

Sec. 6. There are hereby authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act.

Sec. 7. This Act may be cited as the "Electromagnetic Radiation Control Act."

Sec. 8. The Congress by concurrent resolution, or the President by proclamation, may terminate the authority granted under section 2 of this Act.

The CHAIRMAN. I desire to place in the record at this point, and without objection will do so, four letters. Two of them are from the Assistant Secretary of Defense, Mr. Marx Leva; one from the Federal Communications Commission; and the fourth is from the Department of Justice.

(The letters are as follows:)

ASSISTANT SECRETARY OF DEFENSE,
Washington, D. C., January 16, 1951.

Hon. EDWIN C. JOHNSON,
Chairman, Senate Committee on Interstate and Foreign Commerce,
Washington, D. C.

DEAR MR. CHAIRMAN: There is forwarded herewith a draft of proposed legislation, to provide for the greater security and defense of the United States against attack, and for other purposes. This proposal is a part of the Department of Defense legislative program for 1951, and has been approved by the Bureau of the Budget. The Department of Defense recommends that it be enacted by the Congress at an early date.

Purpose of the legislation.—The purpose of the proposed legislation is to provide the necessary Executive authority to control electromagnetic radiation, not only during hostilities or a proclaimed emergency, but also during time of strained international relationships when a surprise attack on the United States is a possibility.

Current concepts of warfare and recent experience demonstrate the necessity to control electromagnetic radiation in the United States, its Territories and possessions, during periods of critical international relationships, for the purpose of denying their use to a potential enemy for navigation of piloted or pilotless aircraft or missiles directed toward targets in the United States. The authority of this proposed legislation must be provided now in order that further planning and preparations may be completed so that Air Defense plans may be implemented without delay in the event of an air attack. It is re-

know different places, as the chairman points out, where you would have to say "Quit, otherwise you may be a homing device"?

You know certain things such as radio stations. But there might be other things that you would have to know about that you might have to keep going even though they were radiation devices, but which you would have to close down in that 4-hour period.

The CHAIRMAN. 606 (c) now gives them that control. They have that full authority. It is these other devices that are outside of 606.

Senator MAGNUSON. You would have to know where they are.

General ANKENBRANDT. Yes, sir.

Senator MAGNUSON. Suppose you knew on these big power lines that there were leaks all the time. Would you not have to shut off the power for that 4-hour period?

General ANKENBRANDT. No, sir. Not today.

Senator MAGNUSON. You mean they could not come in on the leak?

General ANKENBRANDT. That is right.

Senator MAGNUSON. If they could come in on that, you could not handle it now under the Federal Communications Act?

General ANKENBRANDT. Specifically there is a question of whether radar beacons are included in the terms of section 606 (c). They could certainly come in on a radio beacon.

Senator MAGNUSON. Radar beacons are under Government control. You could shut them down or keep them going.

The CHAIRMAN. Nobody operates them except Government.

General ANKENBRANDT. Radar stations are licensed but they are not communications stations.

Mr. PLUMMER. In the marine field.

Senator MAGNUSON. They would have to close down if you found they were homing devices?

General ANKENBRANDT. I don't believe there is any authority in the present bill for that purpose. They are not communications stations certainly.

Mr. PLUMMER. I think maybe I can clear up one point here. We keep saying close down this and close down that. It is not entirely a matter of closing down stations. It may be a matter of manipulating the stations a bit to do something with them.

Senator MAGNUSON. You do something with them. I appreciate that. You might want to keep the homing device going for deception purposes, and another one you might want to close down or change. But if this bill is worth anything you are going to have to do something when that 4-hour period comes along.

Mr. PLUMMER. There are months of preparatory work needed before that 4-hour period.

The CHAIRMAN. That is what I was trying to get at.

General ANKENBRANDT. That I outlined in my statement, that we were doing that today.

Senator MAGNUSON. In my opinion you would have to find out where these things were.

General ANKENBRANDT. I am sorry I gave you the impression there was no monitoring. It is a question of an elaborate monitoring system in addition to what is already in existence.

Senator MAGNUSON. Under the bill you could issue an order and close down everything and have a complete blackout, as it were, could you not?

General ANKENBRANDT. If you term that all of those gadgets were useful navigation devices; yes.

Senator MAGNUSON. You would just do it as a matter of precaution, have everything quit for that 4-hour period? In other words, when you start to run, you would turn your television set off, or stop the police stations and broadcasting stations?

Mr. PLUMMER. To me it is still a job of working on the ones first that have the greatest potentiality.

Senator MAGNUSON. The ones that you now know are homing devices?

Mr. PLUMMER. Yes, sir.

Senator MAGNUSON. You would work out a plan for them?

Mr. PLUMMER. Yes, sir.

Senator MAGNUSON. So that when the 4-hour period came there would be something done. As you say, it might be shut down, or you might even want to speed some of them up for deception purposes?

Mr. PLUMMER. Yes; that is right.

Senator MAGNUSON. But that would have to be done first on the known homing devices?

Mr. PLUMMER. Yes, sir.

General ANKENBRANDT. That is correct.

Senator MAGNUSON. Many of these things we are talking about have not reached that point yet; is that correct?

General ANKENBRANDT. That is correct. We are talking about things that are in research and development today, that will ultimately come out, we feel sure.

Senator MAGNUSON. As the receiving end becomes more sensitive, naturally they will dip down further into these low levels of radiation.

General ANKENBRANDT. That is correct.

Senator MAGNUSON. But the bill does control all those things in case you want it to dip down there?

General ANKENBRANDT. That is correct; yes, sir.

Senator MAGNUSON. It controls practically everything?

General ANKENBRANDT. Down to 10,000 cycles; yes.

Senator MAGNUSON. We will probably have to have an amendment here to have this inoperative the day before elections.

General ANKENBRANDT. It might be that the word "capable" of emitting is bothering us here. Obviously any of these devices are capable under certain conditions of radiating, but you have to in fact radiate, and it must be a useful radiation. Those are the two limiting factors as I read them in this bill.

Senator MAGNUSON. Those are the limiting factors that we would presume that the Department of Defense would normally use as a criteria in carrying out the purposes of the bill.

General ANKENBRANDT. And it is our official statement that we would attempt that.

Senator MAGNUSON. What we have to worry about here is that sometimes the administration, when it is provided, goes way beyond that.

General ANKENBRANDT. I recognize that, sir.

Senator MAGNUSON. It depends sometimes on who is administering the bill. The power that is given under this act is such that you could almost paralyze the country by an order.

The CHAIRMAN. If it were a necessary order, fine, but if it were not necessary it would not be so fine. If it were done without good judgment it could prove very disastrous, and cause a lot of inconvenience.

General ANKENBRANDT. On the Department of Defense, talking again on how we intended to administer it, our obligation is greater than just preventing an attack. It is also to keep the life of the country going.

We could not afford to do it, even if we wanted to.

The CHAIRMAN. I do not think that any of us differ as to that. The security of the country is very necessary, but we do not want arbitrary action and unnecessary action on the part of anybody, or foolish action. And we are not accusing you or the national defense of doing things that are unnecessary or foolish.

But when we write a law we ought to be very careful about what we do in that law because a law is supposed to protect all of the people. It is not only that, but it is a standard for the people so that they will be advised and know what they can do.

If you have anything further, we would like to have you say so now. I want to read into the record, before you leave the witness stand, General, an amendment which the staff of this committee has drawn to section 606 (c). The bill we have before us, S. 537, is a five-page bill filled with technical language. The amendment that the staff has drawn is about four lines of language which amends section 606 (c) and which the staff believes contains all of the objectives which you stated are desirable and all of the things that S. 537 contains except the penalty provision.

Of course, the penalty provision is contained in another part of the communications law. If that provision is not adequate, or pertinent enough, it will not be a difficult matter to amend the penalty provision. I want to read this, and I want to give it to you.

We are not going to ask you for an answer today with respect to this language because it is technical and will probably require study, perhaps change or amendment. Perhaps you will want to reject the whole thing. If we can agree upon it, I think it would greatly accelerate the legislative action with respect to this legislation.

But I do want to read it to you and I am not going to ask you to testify with respect to it now unless you want to. But it seems to me that this approach is a very desirable approach to the problem.

The amendment is not long. I will read the present language of 606 (c), and then tell you where we make the changes. The amendments are all italicized and the present bill is the language that is not italicized. I will read 606 (c) :

SEC. 606 (c). Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, and the removal therefrom of its apparatus and equip-

ment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the Government under such regulations as he may prescribe upon just compensation to the owners.

Then, as I say, there would probably have to be another provision if we need to change the penalty provision of existing law. We may have to change the penalty provision.

That we and our staff think covers all the authority that national defense is asking, and does everything that ought to be done to solve the present problem that we are dealing with. We would like to have you take that, General, and have your experts go over it and see whether you are in agreement with that approach.

Let us know about that. Or if you think that the language needs to be altered or changed or added to or some of it deleted, let us know. We want to have both bills before our committee when we go into executive session, both S. 537 and this amendment to 606 (c).

We must not lose sight of the fact that there is at the present time existing legislation on this subject. Perhaps it does not go as far as it should, but it would seem to us that the thing to do is to bring existing legislation up to what it should be in view of the developments, the electromagnetic radiation developments of today, so that the security of the United States might be perfected. (See p. 83 for various comments on staff amendment.)

General ANKENBRANDT. May I make a statement, sir?

The CHAIRMAN. Yes.

General ANKENBRANDT. The view of the Department of Defense was that the present law is deficient for the purposes for which we have in mind, and which I have clearly outlined. There were three alternatives: One is to have the present law clearly interpreted by the Congress, that it did mean what may be interpreted in some of the language there. In other words, the language is not clear.

Perhaps the Congress did mean what we had in mind all the time. Either get that interpretation, or to amend the existing law, or to write a new law.

The majority of the legal advice that we were able to obtain from people who had studied all of the pros and cons indicated that a new bill was probably the best way to do it. It would be the cleanest-cut way to do it.

We hold no brief for that view. That is what we were advised was the case.

The CHAIRMAN. Was it unanimous? Was that position unanimous?

General ANKENBRANDT. No, sir. The majority view was that. It was not unanimous; no, sir. I will be very glad to take this proposed amendment to section 606 (c) and to have it examined and give you the Department of Defense view as quickly as possible, in the next day or two.

The CHAIRMAN. That is all we can ask. I would like to have you take that up with your legal staff and see whether or not that does the job or in what way it fails to correct the difficulties that we are facing, or what might be added to our language that would do the job if it does not do the job.

General ANKENBRANDT. Yes, sir; I will do that.

Senator MAGNUSON. General, I would like to have you enlarge upon the possibility if a new bill were passed, such as S. 537, whether or

not there would not be a duplication of authority as between the FCC and the Department of Defense in regard to radio stations and devices and all such things.

It seems to me that you would have a duplication of authority in handwriting, because S. 537 really covers pretty nearly everything that the Federal Communications Commission has under its jurisdiction and can cover.

The CHAIRMAN. That is right. I am glad you made that suggestion, Senator, because there is a feeling here in Congress that we have set up the Federal Communications Commission and placed them in charge of communications and we ought not to scatter such authority as we have given them, divide it or otherwise.

If they do not have authority enough we ought to add authority to what authority they now have. If they are not doing a job with such authority as they have, we ought to correct whatever that problem may be.

I have a strong feeling on this, and I will have to admit that I have changed my position only in recent months on this question, and that is the question of monitoring. I believe that monitoring is an extremely important matter directly affecting the security of our country.

I know there is a bill which passed the Senate and is in the House, the McFarland bill, which has other provisions, but one of which essential provisions relates to monitoring by the Federal Communications Commission. That is a peacetime operation. That is a continuous operation. That is an operation which not only affects the security of the country but affects something which is extremely important, which is the broadcasting and telecasting of the country.

It seems to me that we ought to approach this problem not only in the spirit of protecting and enhancing the security of the country, but the very essential telecasting and broadcasting of the country, which, it seems to me, is essential to the proper and effective and efficient operation and desirable operation of democracy.

Senator MAGNUSON. General, I believe you answered this before, but what is the situation of border stations, a powerful station on the Canadian border and the Cuban border? Could that be used by taking sights from both of them?

General ANKENBRANDT. Certainly they might be useful. However, those are certainly not in the areas that we are really worrying about for air-defense purposes.

Senator MAGNUSON. But it could be used for directional, could it not?

General ANKENBRANDT. Yes; but there is some question.

Senator MAGNUSON. You could be on a Toronto station and know that you were so many miles from the industrial area of Detroit.

General ANKENBRANDT. Yes, sir.

Senator MAGNUSON. Then by calculating you probably could almost pin-point it, by beaming in on Toronto, couldn't you?

General ANKENBRANDT. That is a possibility. It depends on where the station is with respect to our borders. On the other hand, the chances are that an enemy might do as well without that radiation.

Senator MAGNUSON. By calculating?

General ANKENBRANDT. By dead reckoning or his own devices.

Senator MAGNUSON. Have you had any discussions with Canada or Mexico on this program, the joint defense program?

General ANKENBRANDT. There are discussions on this problem, direct discussions, between the Air Defense Command of the Department of Defense and similar organizations in Canada; yes, sir. It is on a service-to-service basis.

The CHAIRMAN. Is there anything further, general?

General ANKENBRANDT. No, sir.

The CHAIRMAN. We thank you, general. We will hear from you again after you have looked over the proposed changes.

General ANKENBRANDT. Yes, sir. Thank you, gentlemen.

STATEMENT OF GEORGE STERLING, COMMISSIONER, FEDERAL COMMUNICATIONS COMMISSION

The CHAIRMAN. Commissioner George Sterling, of the Federal Communications Commission.

Mr. STERLING. My name is George Sterling, and I am a member of the Federal Communications Commission. I am appearing here today at the request of the committee to present the views of the Commission on S. 537, a bill which has been proposed by the Department of Defense for the purpose of providing for the greater security and defense of the United States against attack.

The provisions of this bill would authorize the President in time of war, national emergency, or when he deems it advisable in the interest of national security, to control the use by any person of any equipment capable of emitting any electromagnetic radiation between 10 kilocycles and 100,000 megacycles.

The bill would further authorize the President to direct such departments or agencies in the Federal Government as he may specify to use such equipment.

The legislation which you are considering makes clear that it authorizes the President or his delegate to control or use electronic equipment only—

to the extent that the President deems it necessary to minimize or prevent navigational aid to any foreign country in an attack on the United States.

This bill is not concerned with or intended to provide authority for censoring radio and wire communication, establishing priorities among users of electronic equipment or for the general requisitioning of such equipment by the Government. The bill gives the President discretionary authority to determine the proper agencies or persons to carry out the program contemplated by the proposed legislation.

The bill also provides that just compensation will be paid to persons whose equipment is used by the Government in connection with the program provided for by this bill. In addition, there is a provision for criminal penalties for knowing violations of the bill's provisions or of any regulations which are adopted pursuant to the terms of the bill.

It is the understanding of the Commission that the Department of Defense has sponsored this legislation because of its belief that the existing statutory authority given to the President by section 606 (c) of the Communications Act may not be sufficiently broad to cover the use and control of all types of electronic devices which the Department of Defense believes may be of assistance to enemy aircraft or missiles in an attack upon the United States.

As the committee is aware, section 606 (c) of the Communications Act presently authorizes the President—and here I should like to quote:

Upon proclamation by the President that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States—

to set aside the rules and regulations of the Commission pertaining to radio stations, to close any station for radio communication, and to order the removal of its apparatus and equipment, or to authorize any department of the Government to use or control any such station or equipment.

The Commission is of the belief that the authority contained in section 606 (c) is clearly broad enough to authorize the President to initiate such action as he may deem necessary to prevent the use of any private or Government radio stations in any manner which would aid a potential enemy in an air attack upon the United States.

The CHAIRMAN. You are talking about existing law?

Mr. STERLING. Yes, sir; 606 (c) of the act.

Accordingly, and I should like to emphasize this, Mr. Chairman, because there seems to be some confusion on the point—during a proclaimed state of national emergency such as the present one, this bill would not in any way enlarge the authority the President already has over broadcasting stations and all other stations for radio communication.

However, since section 606 (c) speaks in terms of the use, clouture, or control of “any station for radio communication” there is, as the Department of Defense has suggested, some doubt whether this section of the Communications Act is applicable to all of the various types of electronic devices—particularly equipment which is not primarily intended for radio-communications purposes—which may emit radiation which might be of potential use to enemy airplanes or missiles.

A further reason, as we understand it, for the proposal before you, is that section 606 as presently written does not contain any express provision providing criminal sanctions for violations of orders or regulations issued pursuant to Presidential authority. As I have already indicated, any such doubt concerning applicable sanctions is removed since the bill before you contains an express criminal sanction to be added to the Criminal Code.

Moreover, the Commission believes that the authority it already has over electronic devices which are not primarily intended to be used for transmitting radio communications, pursuant to the provisions of section 301 of the Communications Act, is not adequate for achieving the avowed purposes of the legislation now being considered.

For section 301 speaks in terms of the Commission’s licensing powers under title III of the Communications Act. This licensing authority, however, expressly affords to all licensees a right to be heard before they can be required to cease or modify the normal operation of their facilities.

Moreover, licensees are afforded the right to appeal to the courts from any Commission determination made after a hearing has been held. It is clear that while these rights to a hearing and to appeal from Commission orders involving its licensing authority are essential safe-

guards to normal Government regulation of the communications industry, such a procedure does not lend itself to the types of emergency control contemplated by the present proposal or other necessary security precautions which would be an essential part of any such plan.

It appears, therefore, that the powers of the President under section 606 of the Communications Act and the licensing powers of the Commission under section 301 of the Communications Act are not adequate to cope with the problems which prompted the Department of Defense to sponsor this legislation.

In the light of that fact, the Commission is in agreement with the Department of Defense that it would be advisable at this time to spell out, either in an amendment to the existing provisions of section 606 of the Communications Act or in separate legislation such as that provided in the instant proposal, the authority of the President to control and use all such radiation devices potentially useful to an enemy as an aid to navigation.

The CHAIRMAN. Mr. Sterling, I hand you the staff's proposed amendment. Will you take this copy and discuss it with your technicians and give us your opinion on whether that is adequate, whether it does the job or whether it doesn't do it?

Mr. STERLING. Certainly. I will be pleased to, Mr. Chairman.

Senator MAGNUSON. In other words, that amendment, Mr. Sterling, follows one suggestion that you have made in your testimony that either we amend the act or go on with the new bill.

Mr. STERLING. Yes, sir; that is the way I understand it.

Senator MAGNUSON. In your statement you say that the bill is not concerned with or intended to provide "authority for censoring radio wire communications, establishing priorities among users of electronic equipment or for general requisition of such equipment by the Government." I agree with that statement. But do you also not agree with me that the bill itself, the new bill, suggested—although it is not intended to do that—that authority exists in the bill to do that if you wanted to?

Mr. STERLING. Yes, sir.

Senator MAGNUSON. Whereas the amendment presented here merely broadens 606 so that you would have the control which the President now has under the Communications Act to go further and cover electronic devices.

Mr. STERLING. Yes, sir. From an offhand reading of it it would appear that it is broader than the defense bill contemplates, because if you were to read the purpose of the bill it is concerned only as aids to navigation, and giving comfort to the enemy.

The CHAIRMAN. Mr. Sterling, I hope that when you give us your report you will give us your opinion of the penal provisions in the Communications Act of 1934. More specifically, section 501 and section 502. And tell us whether those provisions are adequate or whether they should also be amended in addition to the amendments that we have suggested for 603 (c).

Mr. STERLING. I will do that.

Senator MAGNUSON. Mr. Chairman, if we should follow this procedure of amending the Communications Act we would have to add some penal provisions.

Mr. STERLING. I think I made that clear in my statement. There is an area of considerable doubt in there. It is our feeling that if you amended 606 (c) you would have to provide sanctions which could be invoked at the time the president put control under the provisions of 606 (c).

The CHAIRMAN. I ask that those provisions be made a part of the record at this time, sections 501 and 502. If in your opinion they should be amended, please tell us in what respect they should be amended.

We thank you for your statement.

Mr. STERLING. Thank you, Senator.

(Secs. 501 and 502 are as follows:)

SEC. 501. Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing, in this Act prohibited or declared to be unlawful, or who willfully and knowingly causes or suffers such omission or failure, shall, upon conviction thereof, be punished for such offense, for which no penalty (other than a forfeiture) is provided herein, by a fine of not more than \$10,000 or by imprisonment for a term of not more than 2 years, or both.

SEC. 502. Any person who willfully and knowingly violates any rule, regulation, restriction, or condition made or imposed by the Commission under authority of this Act, or any rule, regulation, restriction, or condition made or imposed by any international radio or wire communications treaty or convention, or regulations annexed thereto, to which the United States is or may hereafter become a party, shall, in addition to any other penalties provided by law, be punished, upon conviction thereof, by a fine of not more than \$500 for each and every day during which such offense occurs.

STATEMENT OF W. R. G. BAKER, DIRECTOR OF ENGINEERING DEPARTMENT, RADIO-TELEVISION MANUFACTURERS ASSOCIATION

The CHAIRMAN. Mr. W. R. G. Baker is our next witness. Mr. Baker represents the Television and Radio Manufacturers Association. He is appearing on their behalf.

Mr. BAKER. Mr. Chairman, my name is W. R. G. Baker. I am appearing as a director of engineering for the Radio and Television Manufacturers Association.

A bill has been introduced in the Congress which proposes allowing the Government to control practically all electromagnetic radiations in time of war or national emergency.

The intent of this bill is to deprive an enemy of means for guiding aircraft. This is a brief study of the proposal directed to a determination of—

(a) Whether electromagnetic radiations would, in fact, be useful to enemy aircraft.

(b) If so, to what extent?

(c) If so, which type of radiation will be most effective and which will be of little value, if any?

Obviously if electromagnetic radiations can be of aid to an enemy then they should be cut off during periods of potential bombing. On the other hand, electromagnetic radiations and operations associated with them, or giving rise to them inadvertently, have become an important part of the economy of the country and are the result of normal course of industry and commerce. To halt arbitrarily, activities causing these radiations for frequent or lengthy periods, unless they do in fact represent a hazard, would seriously damage the industrial out-

put of the country and would prove a definite hazard to lives and public safety.

It is a well-established fact that the direction of origin of an electromagnetic radiation can be approximately determined by suitable apparatus. Such apparatus makes certain assumptions in regard to the nature and the propagation of the wave. These assumptions are not always reliable, the result being errors in the apparent direction of the source of the radiation.

In general, the accuracy of navigation (see appendix No. 1) achievable by homing on general radiations is not greater than that available to a navigator by celestial navigation. This statement is not true for navigational systems such as loran where, under some conditions, accuracies may be obtained which are superior to those obtainable by conventional navigational means. At this point it should be borne in mind that a flight of enemy bombers flying long distances would fly high enough to eliminate lack of visibility as an obstacle to celestial navigation.

Requirements for radio navigation: In order that an airplane may use an electromagnetic emission as a direction-finding device certain basic requirements must be fulfilled:

(a) The geographical position of the emitting source must be known and fixed.

(b) The radiating source must be identifiable.

(c) The strength of the received signal must be great enough to override static and noise originating in the receiver circuits.

(d) The radiated signal must be of a frequency giving rise to a minimum of directional propagation errors, and within a range where efficient receivers can be constructed.

(e) The radiation must be steady and more or less continuous in nature.

Considering the following points in detail:

(a) Obviously to home on a signal its geographical position must be fixed and known. This would eliminate all of the mobile ground radiators, aircraft radiators, and any temporary or recently installed radiators whose location and frequency had not been made public.

(b) Unless the radiator can be identified through its own radiations it is useless as a navigational tool. Note that identifications can only be achieved by association of frequency and location (in the case of a well-established transmitter, for instance) or by disclosing the identity of the transmitter during the radiation. It should be observed that here is a fruitful field for confusing an enemy by falsely identifying a transmitter.

Effectiveness of radiations: Not all frequencies are equally effective for direction finding. The extremely long-wave transmissions are probably most accurate and least susceptible to fading. Furthermore, these transmissions are usually at high power and can be received over great distance. These wave lengths, however, are greatly affected by static. The medium waves (in the standard broadcast range) are highly susceptible to fading and to errors of direction, especially of a change of terrain or a land to water boundary intervenes.

The short waves in the order of those used for international broadcasting are erratic due to fading and are subject to static interferences. They are, however, receivable over great distances. The VHF ranges such as are used for television broadcasting are usable over only com-

paratively short distances but are free of static. The range of these frequencies, almost regardless of power, is limited to line-of-sight transmission. As the frequency is further increased the range is further reduced for two reasons:

1. The available power is less because of inability to generate large power at these frequencies, and

2. The radiation becomes more truly line-of-sight. It should be pointed out here, however, that certain devices using very short pulses of radiation such as radar, can generate very large amounts of power, and the range of these devices is limited more by line-of-sight considerations than because of power.

In general the effectiveness of emissions for navigational purposes depends upon:

- (a) The frequency: The most effective frequencies, considering all factors, lie in the range of 150 kilocycles and these are the frequencies properly chosen for such services. The ranges of such purposeful transmissions would be in the order of 50 to 200 miles and the error would be from one-half to two degrees under ideal conditions.

- (b) The power: The greater the power radiated the more effective the signal for homing purposes. Purposeful transmissions for navigation employ power in the range of 1 to 25 kilowatts. The power radiated incidentally from devices not fundamentally intended as radiators usually is in the order of a small fraction of a watt.

- (c) Ability to identify and locate the emission: Radiators such as high power, long-wave communication transmitters, and broadcast transmitters are effective homing devices limited, as stated before, as regards range and accuracy. Incidental radiators such as radio receivers, laboratory equipment, high frequency heaters, diathermy equipment and the like are worthless as homing devices because:

1. They cannot be located geographically.
2. The apparent source of the signal is diffuse.
3. The operation is erratic both as to being in operation or not, and as to frequency.

4. The power radiated is very low.

The most effective radiators would be as follows on the assumption that identity and location are known:

1. Radio beams—if the direction of the beam were proper to be useful.

2. Direction-finding transmitters.

3. Loran navigational transmitters.

4. Long-wave, high-power communications transmitters.

5. Broadcast transmitters.

6. Short wave amplitude and frequency modulated transmitters.

7. Standard frequency transmitters.

8. Television transmitters.

9. Amateurs.

10. Radar transmissions.

It must be stressed that these radiators are only useful as homing devices if they can be properly located geographically, and if the signals are essentially continuous.

Useless as radiators would be the following:

1. All kinds of receivers because of low power, diffuse location, and intermittent usage.

2. Medical and therapeutic equipment because of unknown location and intermittent use.
3. All mobile equipment, ground and air, because of variable location.
4. High-frequency furnaces because of unknown location.
5. Radio frequency control gear because of unknown location.
6. Carrier current devices; it is impossible to define the source of the signal.
7. Narrow beam relay transmissions, unless the radiated beam is used and the radiations can be located geographically. These transmitters do not identify themselves over the air.

Errors in bearings: A receiver identifies the direction of the transmitter by determining the direction of the arriving wave front and assuming that no change in propagation has taken place. This is only rarely true. If the reception is from a sky wave, as would be the case when receiving short-wave broadcasts over long distances, then the wave front will be distorted and large errors can be encountered. Also, if the transmitted wave traverses at an angle, a coastline or any irregularity in terrain then serious errors are introduced.

Guided missiles: Consideration should be given to the possible use which a guided missile might conceivably make of intentional or incidental radiations in the target area. The exact guidance means employed by guided missiles is classified and must be dealt with only in broad terms.

In general, so far as guidance is concerned, missiles fall into two general groups:

(a) Those for short range where the missile and the target can be kept under surveillance during the flight. Surveillance can be achieved either by radar or optically, depending upon conditions. Guidance to a specific source of radiation could be achieved but is not in good repute because of the uncertainty of the radiation.

(b) Those missiles intended for ranges beyond optical or radar surveillance and control. In these cases, maximum use could be made of a target radiation but the same disadvantages exist as to identification and location of the radiation and the likelihood of misrepresentation of the radiation by the target.

The favored navigational means which are surely known to the enemy involve presetting the course of the missile and insuring the course by self-contained devices. There exist certain characteristics of large populated areas which would be far more effective in homing a missile and much more difficult to eliminate or confuse than radio emissions and an enemy would probably tend to use these for homing at the termination of flight. Other navigational means which are available to an enemy involve establishment of beams and crossed beams emanating from locations under his control.

Summary: Fixed and identifiable transmitters are usable as homing devices with limitations.

Miscellaneous incidental radiators are useless.

A bombing mission coming from, say Moscow, would set an initial course and fly at a very high altitude. At the start of the flight signals undoubtedly would be heard from transmitters in the United States. At the outset, however, it would be dangerous to use these signals for navigation because:

(a) The greater the distance the greater the error. An error in course at the outset might have serious consequences on fuel consumption.

(b) The transmitters might deliberately misidentify themselves.

It is reasonable, therefore, that celestial navigation would be relied upon at the outset.

As the flight progressed there would come a time (say when the distance to target was approximately 1,000 miles) when an automatic pilot might be set on a known radiation. This would be more in the nature of a convenience than a necessity, and it is believed that any such navigation would be used mainly as a check on the celestial fixes because the enemy knows full well that only his sextant and the stars or a signal established in his own country are free from misrepresentation and confusion caused by us.

As the enemy approaches the target he can home exactly on the transmitter and if there are several transmitters in known locations an accurate fix can be determined, but not accurate enough to pinpoint a specific target. It must be realized that the plane is flying at a very high speed, and direction-finding equipment cannot be operated fast enough to obtain fixes where small distances are concerned.

It is conceivable, if any enemy wished to do so, that automatic means could be developed which, for instance, would accomplish a simultaneous bearing on each of three transmitters. The likelihood of this, however, is not great because of the acknowledged superiority of radar for such purposes. Radar is the most preferred method of pinpointing a target, and it almost goes without saying that an important bombing mission involving material to the extent of hundreds of millions of dollars would certainly be equipped with radar.

It is safe to assume, in summary, that a bombing mission will use or at least be equipped with means for celestial navigation for the major portion of the journey, or will use a loran type signal or a crossed beam type of signal emanating from an enemy-controlled country. Broadcast signals from the United States may be used by the enemy for checking periodic fixes, but will not be relied upon. At close range fixes on our transmissions are very inferior to direct observation by radar, as was proved in the last war.

In conclusion it is interesting to observe that greater safety may lie in unimpeded transmission of all kinds, because of the confusion which would result to the enemy, especially if the transmissions were to be purposely misrepresented.

To reiterate, I sincerely believe that the defense of the United States against enemy attack, the safety of our citizens, and the defense of the industrial might which can provide us with an edge of superiority, must receive the first consideration in establishing emergency regulations.

It naturally follows that there should be control of those radiators which could be used as a navigational aid by the enemy, and it is inescapable that many communications devices are designed to be efficient radiators and therefore should be controlled in time of emergency.

I have read Senate bill S. 537 and feel that the powers which would be granted if it were to be enacted are much broader than are neces-

sary to protect the public and national interest. Many of the types of radiation covered by the bill, I repeat, cannot be used as navigational aids. They are the result of the normal operation of industry and commerce, and to restrict them arbitrarily would hamper the industrial effect of the Nation and endanger life and public safety.

I would recommend, therefore, that an effective program of jamming, of propagating false signals and radiations would prove more confusing to an enemy than would attempting to restrict or halt all radiations at the time of a suspected enemy attack.

That is all, Mr. Chairman.

The CHAIRMAN. You have some exhibits. Do you want them placed in the record?

Mr. BAKER. Yes, sir; I think that might be fine.

The CHAIRMAN. Very well exhibits 1, 2, and 3 may be made a part of the record. Exhibits 1, 2, and 3 include all of what you think should go in the record?

Mr. BAKER. Yes, sir.

Senator MAGNUSON. Mr. Baker, you feel, summing up your testimony, No. 1, that this bill goes too far in the delegation of authority?

Mr. BAKER. Yes, sir.

Senator MAGNUSON. No. 2, that in your technical opinion it is not necessary to go that far, that the problem of defense could be met in the other way that you suggest, by probably having everything on, or deliberately misleading on known homing devices?

Mr. BAKER. I would like to distinguish, Senator, between two types of radiation. One is the type of radiation in which the device is designed to radiate. Its figure of merit is determined on that basis.

The other is designed to not radiate. When I say not radiate, that is a matter of degree, because all devices radiate.

Transmission lines, generators, everything else, they all radiate. I was impressed with the chairman's discussion on monitoring. We need to monitor those devices which can be used for navigation purposes; we need to monitor so that no device which we do not think today has a navigational possibility could be used.

I would like to give you accrued analogy and it certainly is not scientifically true. I wanted this because of the difference between an intended radiation and a diffuse radiation. Let us assume that we had the job of bombing New York City. During World War II, when they had the black-outs, they blacked out Times Square, which was the outstanding pin point of light in New York City. When they blacked that out an enemy plane coming over had a diffused radiation from the street lights and everything else over New York City, but he could not pin point anything unless Times Square was on.

If Times Square were on, with that blast of light, then he could establish his coordinates to any place that he particularly wanted to pin point. But none of them are as effective as radar.

I think that there is contained in the present laws all the law necessary to control the navigational means. I was interested in reading in the Federal Communications Commission for the fiscal year ended June 30, 1950, on page 23, article 9, in which the Commission elaborates to some extent what they did during World War II to stop the navigational emissions which could be used for navigation.

Senator MAGNUSON. You heard the discussion as to the inadequacy of the law to control radiation devices. Would it not be your opinion

that something should be done in the law to make a change for deliberate radiation devices?

Mr. BAKER. I think that the law covers the deliberate radiations devices because in the report of the Commission they point out that they stopped transmitters from broadcasting during World War II because they were navigation aids. I want to distinguish between the devices that can be used for navigation and the diffuse radiation.

Senator MAGNUSON. Suppose a saboteur set out to have a deliberate homing device. Do you think the present law covers him?

Mr. BAKER. Yes, sir.

Senator MAGNUSON. If he does not interfere with other radio devices?

Mr. BAKER. That is where the monitoring that the chairman mentioned is important.

Senator MAGNUSON. Suppose he does not interfere?

Mr. BAKER. The monitoring would catch him anyhow because they are supposed to sweep the whole spectrum.

Senator MAGNUSON. Then how would he be handled under the present act?

The CHAIRMAN. He has no license to broadcast.

Mr. BAKER. That is right.

Senator MAGNUSON. Suppose he just has a radiation device?

Mr. BAKER. I am not a lawyer; I don't know; but I assume that if he radiated he is a potential broadcaster.

Senator MAGNUSON. That is why I asked you the question, because I am a lawyer and you are a technician.

Mr. BAKER. I cannot interpret the law. I would assume that the law could read on any unlicensed radiation of intent.

Senator MAGNUSON. My point is, Is there any technical difference insofar as the act is concerned, between a broadcaster and a person who starts out for deliberate radiation? Would that be considered a broadcasting unit?

Mr. BAKER. Yes, sir; I assume it would. But if I may make one more suggestion: If an additional law were necessary, then in making it so inclusive I would like to see it where it eliminates the diffuse radiation devices, the devices that are not intended to be efficient radiators, like broadcast receivers, television receivers, diathermy equipment.

Senator MAGNUSON. The Department of Defense say that they could possibly be used to some extent. Do you disagree with that?

Mr. BAKER. I do.

Senator MAGNUSON. Effectively used?

Mr. BAKER. Unless they were a saboteur. If you have a saboteur, he can make anything usable as a homing device, probably. But the normal operation.

The CHAIRMAN. How would he do that?

Mr. BAKER. He might have an—

The CHAIRMAN. Unless he had a signal of his own.

Mr. BAKER. He would have diathermy equipment, for example. By minor changes, instead of connecting it to the coil that they wrap around your arm to heat your muscles he could take that off and put it on an antenna thrown out the window. It is very ineffective.

The CHAIRMAN. The only way you could locate him is by monitoring?

Mr. BAKER. Yes, sir. It is true that the fellow who did that, it would not be very effective, it would be a short-range device which would be outstandingly inferior to a bombing radar. When you get that close, where a modified diathermy equipment could be used for homing, the bombing radar would be so much more efficient, unless you were only interested in psychological warfare and were not after a particular plant.

The CHAIRMAN. Would you mind going into a little further analysis on that bombing radar? The bombing radar as I understand it is equipment in the enemy plane.

Mr. BAKER. It would be; yes, sir.

The CHAIRMAN. It would be in the enemy plane to start with. How would that be used?

Mr. BAKER. He would use celestial navigation until he was, say, 100 miles from the target. He would have a map showing the terrain of the country in detail. Then he would look into his radar presentation, which would show him the rivers, the cities, the bridges.

The CHAIRMAN. That is the way he would do it?

Mr. BAKER. Yes, sir. So he would pin point, for example, if he wanted to hit Forty-second Street in New York City, he would have a map of the East River, and perhaps of the Harlem River, too, and he would get his bearings from those maps, from the length of the docks going out into the river, from the bridges that crossed the rivers, so that he could pin point almost anything that he wanted to.

The CHAIRMAN. You mean he would have that apparatus in his own plane?

Mr. BAKER. Yes, sir. And you have to assume that an enemy that could build high-flying planes would have the technology to build radar.

Senator MAGNUSON. What about bad weather?

Mr. BAKER. It would not make any difference. If you had high-flying planes you would fly above the weather. You cannot say scientifically the weather has no effect on radar, because it does, but this particular case—

Senator MAGNUSON. It is not as easy when you have bad weather to fix from radar as in clear weather.

Mr. BAKER. No; but the only difference that you have, Senator, is the absorption of the energy if it had to go through a sleet or snow storm. But it would not stop it. If he got that close he might make a pass at it anyhow by coming down in the weather and taking a chance on it.

I am only talking broadly of the tools that the enemy has available to himself, without any help from us.

The CHAIRMAN. How would you suggest that we eliminate the diffusing? Is that your classification?

Mr. BAKER. That is one way that you could do it, Mr. Chairman. But I draw a little sharper line by saying those devices that are designed for radiation purposes, such as transmitters of all kinds. And when you say "radiation purposes" you are talking about communications.

Devices which are not designed for radiation purposes are the devices which the Federal Communications Commission are after because they interfere with neighboring broadcast receivers and television

receivers, like, for instance, these bombardiers that you spoke about in the tube plants.

They are used in the manufacture of all types of tubes, to heat up the entire natural element of the tube during its exhaust cycle.

There is a little coil that slips down over the tube. High frequency enters and is circulated in the coil, which heats up the anode structure within the tube, and then it is exhausted. There is some radiation from those things, but it is not a continuous radiation.

Furthermore, the enemy would have to know that a bombardier in Owensboro, for example, was going to work, rather than one in Boston or Chicago or some place else. In other words, I come back to this business, which is accrued analogy of Times Square versus the diffused light in a city like New York, the street lights and everything else.

Senator MAGNUSON. What about ships lying off the harbors? Could they be used, their radiation, as homing devices?

Mr. BAKER. Yes; if they were continuous. But all they would do, of course, would be to give you a fix from which you could determine your coordinates as to your target. You might have a ship 200 or 300 miles off, but it is so much easier to do it by celestial navigation.

Senator MAGNUSON. Of course, we have no control of ships over 10 miles off.

Mr. BAKER. That is true.

Senator MAGNUSON. So they could be lying 15 miles off and bring a plane in.

Mr. BAKER. They could, but it is so much easier to fly above the weather. Then you are not dependent upon anything but your ability to read a sextant.

Senator MAGNUSON. Submarines could also do that.

Mr. BAKER. Yes, sir. Of course, a submarine would have to get its fix, too.

Senator MAGNUSON. It could be at a designated place, prearranged.

Mr. BAKER. That is right.

The CHAIRMAN. Mr. Baker, I would like to submit for your consideration the staff's amendment to 606 (c). From your testimony I presume that you do not favor any of the provisions that we have inserted in there.

Mr. BAKER. No, sir; Mr. Chairman, I do not.

The CHAIRMAN. I would like to have you consider them. If you desire to do so, I would like to have you file with us a written statement offering your objections to them if there is anything additional that you have over what you are saying now.

From your testimony I take it that you are opposed to the whole program as being unnecessary, inadequate—

Mr. BAKER. I do not like the word "inadequate", Mr. Chairman. There are adequate laws on the books today in 606 (c). I think that is adequate.

Senator MAGNUSON. To handle this situation?

Mr. BAKER. Yes, sir; if properly enforced. If you will do one other thing, which I think is of more vital importance than many of us think, and that is this monitoring. To find out if there are things going on the air which are continuous, which are fixed. You have got to have the radiation device fixed and continuous in order to be an effective navigational aid.

Monitoring is the easy way to do that. It may be expensive but it is the easy way to do it.

The CHAIRMAN. On AM frequencies, where they use a sky wave reaching into long distances, does that beam carry a straight line always, or are there deflections?

Mr. BAKER. The sky wave, Mr. Chairman—I do not want to get too technical—is a portion of a transmission. When there is radiation from an antenna it radiates in all directions.

Part of it goes along the ground. Part of it goes up into the sky, it is the heavy layer, one of the other layers, and comes down, and the reason you get these fadings and this garbled transmission over a considerable distance on AM is that part of your energy is going to the ground, and the other part goes up and then down, and hits this outer phase or partially in phase, and that makes the distortion.

The CHAIRMAN. What I am getting at is whether the AM wave, which must be relied on if you are going for distance—because the FM follows the earth and disappears—if you are following the wave from any distance you have to use the AM wave, the sky wave.

Mr. BAKER. Yes, sir.

The CHAIRMAN. My question is, Is that sky wave dependable, does it bend, is it deflected, or is it accurate?

Mr. BAKER. No, sir; it is not accurate. The accuracy at 1,000 miles may be two or three hundred miles from the target. It may be less. It is very difficult to say.

The CHAIRMAN. It has great variation?

Mr. BAKER. Yes, sir.

The CHAIRMAN. Is there anything else that you would like to add?

Mr. BAKER. I would like, Mr. Chairman, to have you permit Mr. David Smith, vice director of the Radio-Television Manufacturers Association engineering department, to make a short statement.

The CHAIRMAN. Certainly.

Mr. EDWARD WHEELER. Mr. Chairman, in connection with this memorandum on this proposed amendment to section 606 (c), will it be permissible for Dr. Baker to submit in that memorandum alternative proposals?

The CHAIRMAN. Indeed. That is what we want.

(Exhibits 1, 2, and 3 are as follows:)

EXHIBIT 1

USE OF RADIO BROADCAST STATIONS AS BEACONS

A. OBJECTIVE

This report is a short discussion of radio broadcast transmitters as "homing" or guidance means for bombing aircraft. In particular how effectively could they be employed by an enemy to bomb an undefended and an unalerted area surrounded by conveniently located transmitters operating on frequencies from 500 to 1,500 kilocycles. Since broadcast transmitters are used frequently by aircraft for navigation, much data directly applicable was found and is included here in condensed form. References are given at the end.

B. DIRECTION-FINDING SYSTEMS

1. D-F on one station

Before effectiveness can be answered, the possible systems that might be used should be investigated. Consider first a system utilizing only one broadcast station and the knowledge of the coordinates of the station and the desired

target. On any given transmitter only the measurement of the bearing between the aircraft and the station is available to the aircraft. However, it could use this data to steer for the station, the coordinates of which are presumed known. After passing through the cone of silence above the station, it would then know how far and at what compass heading to fly to bomb the desired target. The accuracy is limited. For the cone of silence at high altitudes may be several miles in diameter. Also, the ground speed must be known. Bombing by this method would have quite a high dispersion.

A homing course could be started at very long ranges from a transmitter though the accuracy is poor. As the aircraft approached the station, its line of position (LOP) could be determined more accurately (the order of $\frac{1}{2}^\circ$ to 2°)¹ The maximum range at which a suitable signal might be received depends on many factors, such as the nature of earth's surface, the state of ionization and noise-producing electrification of the atmosphere, frequency, etc.

Energy is propagated by several modes. One of these is the ground or space-propagated wave, that travels along or near the surface of the earth. Assuming a reasonable high power level satisfactory ground wave signal can be received up to 300 to 1,000 miles.² However, the effect of the sky wave propagation is to interfere with the ground wave and cause random fading. This may start at few hundred miles and extend out to long ranges. The sky-wave is stronger at night than during the day and may be received at ranges of several thousand miles.

But a homing system depending on sky waves would have many obstacles due to the seasonal and daily and more rapid variations of the ionosphere and the skip zone phenomena. It appears that a simpler technique would be to use instruments to guide the aircraft to within ranges where the ground wave predominates. Then switch over to direction finding on a broadcast station.

The maximum range at which ground-wave transmission is essentially free from sky-wave interference is 30 miles at 1 megacycle.³ This is a conservative value. For coarse bearing-determination more sky wave interference can be tolerated. Useful signal within ranges of 200 to 400 miles are very likely to be found overland at altitudes of 100 and 300,000 feet, respectively. Oversea maximum range goes up to nearly 1,000 miles.⁴

2. Navigation by fixes on two or more stations

A second system that might be employed would use the bearings taken on two or more stations to determine a "fix" or aircraft's position by a process of triangulation. The position information from the fixes could be used in a number of ways to guide the aircraft to the desired target. Regardless, the effectiveness of any of them will be limited by the inaccuracy of the fixes.

The accuracies possible depend on propagation characteristics of the radio waves, the type of direction-finding scheme, and the geometric arrangement of the stations.

(1) *Errors caused in propagation.*—Radio direction finding depends on the fact that radio waves normally propagate between the transmitter and the receiver along a great-circle route. This is usually but not always the case.

"Simple direction finding suffers from the fact that it is not the direction to the transmitter that is observed but rather the orientation of the wave front received from the transmitter. This may be significantly different in two major cases. The most common is when the signal is predominantly received by sky-wave transmission and is reflected from a sloping layer. This condition is most probable in the case of north-south transmission near sunrise or sunset, and is then called 'night effect.'"⁵

Lateral deviation of the ground wave can occur when the transmitter-receiver path is roughly parallel to a coastline or a mountain ridge or valley. "Bearings that are within 10° or 15° of a coastline are therefore to be distrusted, particularly if the distance to the transmitter is large."⁶

"Either this 'shore effect' or night effect may be responsible for errors of several degrees."⁷

¹ Reference 1, p. 880.

² See figure 1, reference 2, p. 437.

³ Read from figure 3, reference 2, p. 438.

⁴ Reference 2, p. 438.

⁵ Reference 2, p. 428.

⁶ Reference 1, p. 872.

⁷ Reference 2, p. 428.

(2) *System errors.*—Of the several D-F antennas known only the simple loop or the spaced loop are practical for aircraft installation. The simple loop is most convenient, but suffers from polarization errors eliminated by the latter. The measurement is accomplished by rotating the loop about a diameter until a null in the received signal is obtained. Then the plane of the loop is normal to the horizontal component of the propagating direction. The accuracy of manually determining the null is of the order of 1° . An automatic compass based on the Mosely patent had a repeatable accuracy within one-half degree on field strengths of 5 to 20 microvolts per meter.⁸

As for the over-all accuracy obtained with aircraft loop antennas, Terman says, "A properly balanced and calibrated loop will ordinarily give bearings that are accurate to within one-half to 2° on nearby stations. * * * The maximum distance at which satisfactory bearings can be obtained in the daytime is of the order of 50 to 200 miles at frequencies of about 500 kilocycles."⁹ Accuracy decreases at night, with increasing frequency, and near shore lines of mountainous areas. Pierce estimates the average angular error for the loop to be 2° .¹⁰

(3) *Geometric considerations.*—If a 2° error is made in determining the line of position, the error in distance is as shown in figure 1.

The error of a fix is the resultant of the errors made in each bearing measurement. The resultant is influenced by the geometric arrangement of the homing stations and the location of the plane with relation to them. The most favorable arrangement would be when the aircraft is located near the center of three stations located at the vertices of an equilateral triangle. The minimum error, obtained under these conditions, is approximately 0.92 of the average LOP error shown in figure 1 at a distance equal to the length of one side. Departure from this ideal arrangement increases the error. The variation of the relative error of fixes obtained on two and three stations is shown in figure 2.

Take the case of the aircraft located 200 miles from the center of an equilateral triangular arrangement of three stations 100 miles apart. From figure 1 the average error of LOP at the distance equal to the base line, 100 miles, is 3.5 miles. The relative error from figure 2 is 5. Hence the error of the fix is 3.5×5 or 17.5 miles.

3. Comparison with other systems

(a) *Accuracy.*—It appears that D-F on radio broadcasting stations may be convenient, but is not the best means available to the enemy. Pierce¹¹ has compared a number of techniques and the D-F systems below 3 megacycles are the poorest. Figure 3 shows the relative errors for the D-F and the loran (the best) systems.

For the optimum systems, accuracies of 0.1 mile or better are easily attainable at distances less than 800 or 1000 miles. At distances greater than 1,000 miles, the minimum average errors of fix are of the order of 0.3 to 0.5 percent of the distance and the practical average errors over a large area may be as much as 1 percent of the range.

(b) *Countermeasures.*—A loran system can be detected. If it is known that the enemy is using a loran system to guide aircraft to bomb our cities or plants, the system could be rendered ineffective by operation of jamming stations. Likewise if approaching enemy aircraft were detected and suspected of homing on our radio broadcast stations, shutting down of the stations would destroy this means of navigation but also warn the enemy bomber crews that they are detected and to prepare for opposition. Perhaps a better means would be to spoof his D-F system by use of secondary or dummy transmitters.

⁸ Reference 3, p. 140.

⁹ Reference 1, p. 8880.

¹⁰ Reference 2, p. 447, figure 11.

¹¹ Reference 2, p. 449.

C. CONCLUSIONS

- (1) Radio broadcast stations of high power can be picked up and "homed" on at distances up to several thousand miles, though large errors are inherent.
- (2) At close ranges, less than 200 miles, accuracy is enhanced. Errors of one-half to 2° are to be expected. Errors of a fix obtained on 2 or 3 relatively closely spaced stations is of the order of 1 or 2 miles. The accuracy varies greatly with the geometric arrangement of the stations and the relation of the aircraft to them.
- (3) Better means such as LF loran are available.
- (4) Both the loran and the D-F systems can be rendered useless.

D. REFERENCES

1. Terman, Radio Engineers' Handbook, McGraw-Hill, 1943.
2. Marton, Advances in Electronics, Academic Press Inc., 1948.
3. Sandretto, Principles of Aeronautical Engineering, McGraw-Hill, 1942.

ALLEN E. SMOLL.

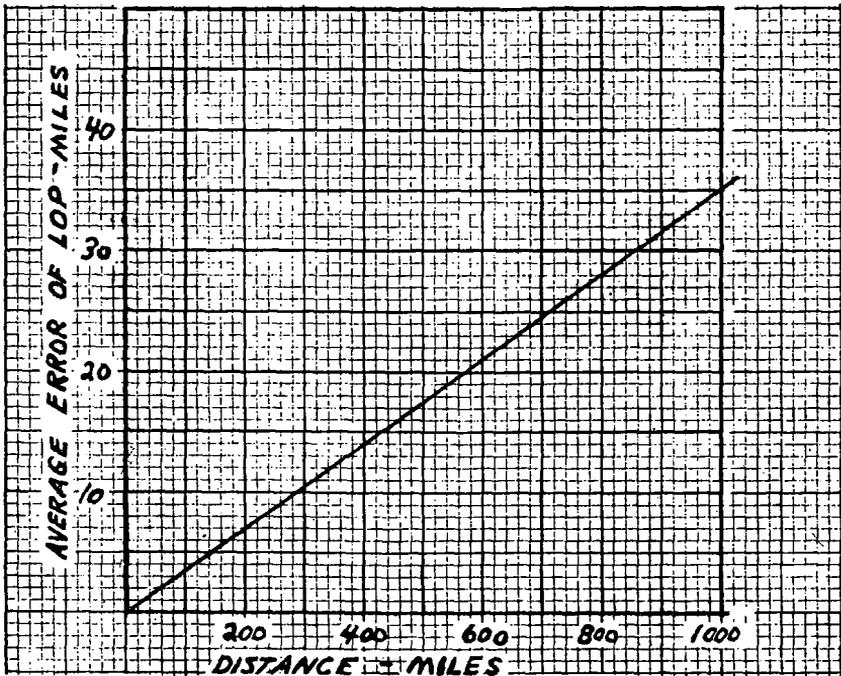


FIGURE 1.—Line of position errors for simple loop direction-finding system.

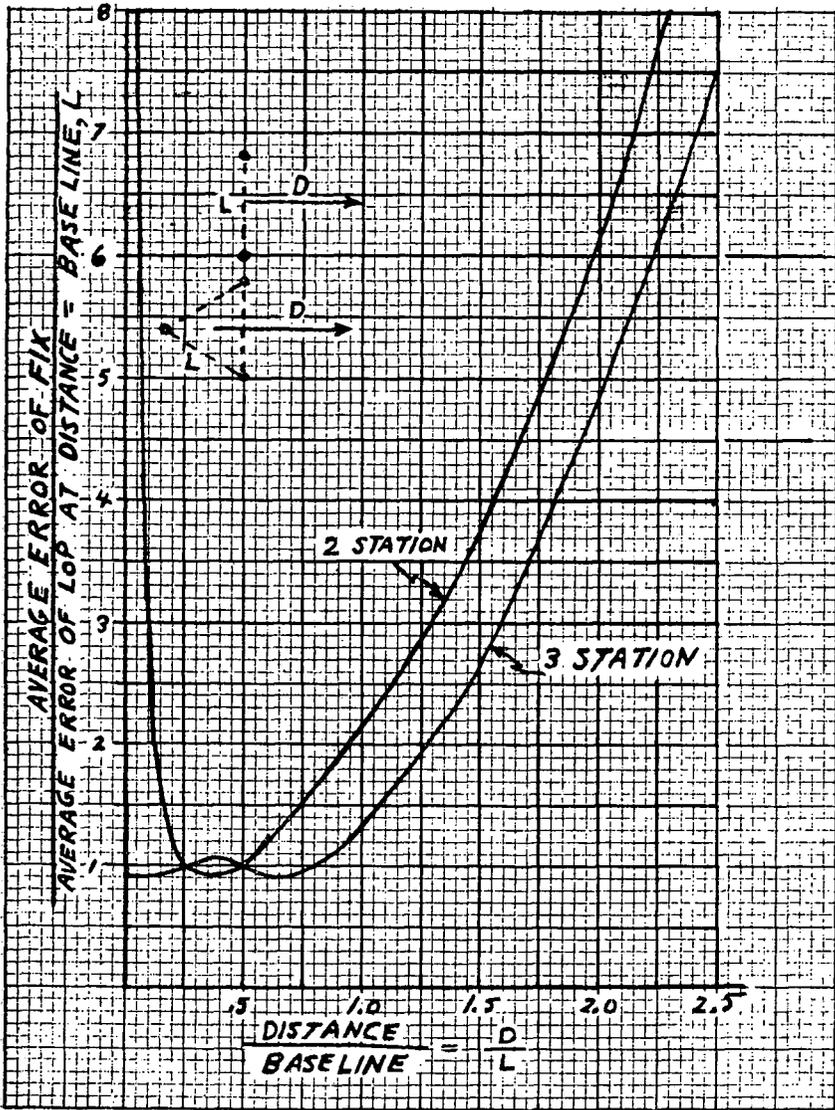


FIGURE 2.—Relative errors of fix of D-F systems.

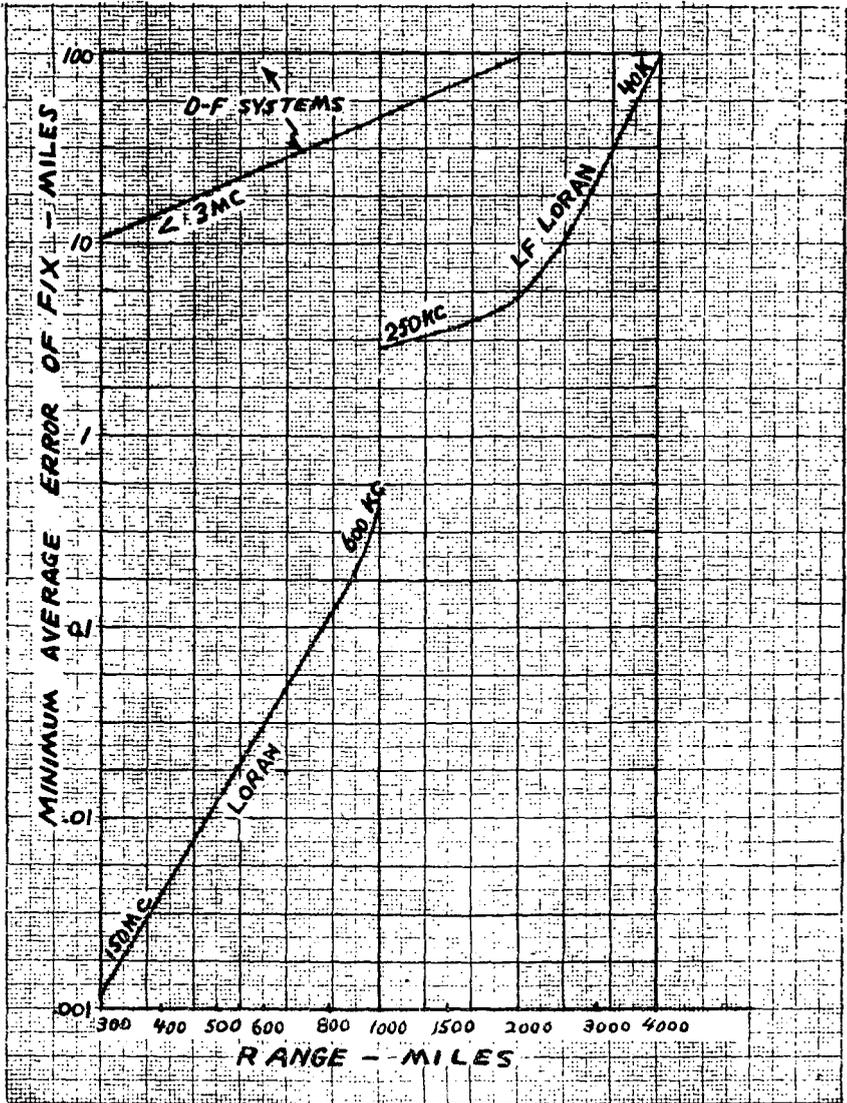


FIGURE 3.—Minimum errors of fix attainable by D-F and loran.

EXHIBIT 2

MEMORANDUM—LISTING OF RADIO SERVICES AND THEIR FREQUENCIES

A. BROADCAST SERVICES

1. Standard broadcast stations: 540 to 1600 kilocycles.
2. FM broadcast stations: 88.1 to 107.9 megacycles.
3. Noncommercial educational FM broadcast stations: 88.1 to 91.9 megacycles.
4. Television broadcast stations: 54 to 72 megacycles, 76 to 88 megacycles, 174 to 216 megacycles, and 480 to 890 megacycles.
5. Experimental television broadcast stations: Same as television broadcast stations.

6. Experimental facsimile broadcast stations: 470 to 480 megacycles, and other broadcast frequencies where need can be shown.

7. Developmental broadcast stations: 9 specific frequencies in band from 1,614 to 23,100 kilocycles, 18 specific frequencies in band from 30.66 to 42.98 megacycles, 72.18 and 72.22 megacycles, 5 specific frequencies in band from 156.525 to 158.175 megacycles, 920 to 940 megacycles, and frequencies above 30,000 megacycles as need can be shown.

8. Remote pick-up broadcast stations: 12 specific frequencies in band from 1,622 to 2,830 kilocycles, 19 specific frequencies in band from 26.15 to 26.47 megacycles, 9 specific frequencies in band from 152.87 to 153.35 megacycles, 166.25 and 170.15 megacycles, and 20 specific frequencies in band from 450.05 to 451.95 megacycles.

9. FM broadcast STL stations: 23 specific frequencies in band from 940.5 to 951.5 megacycles.

10. Standard broadcast STL stations: 29 specific frequencies in band from 925.5 to 939.5 megacycles.

11. Television pick-up stations: 1,990 to 2,110 megacycles, 6,875 to 7,050 megacycles, and 13,025 to 13,200 megacycles.

12. Television STL stations: Same as television pick-up stations, and also 41 specific frequencies in the band of 890.5 to 910.5 megacycles for transmission of aural TV signals only.

13. Television intercity relay stations: Same as television STL stations.

B. EXPERIMENTAL RADIO SERVICES

The various classes of experimental stations are no longer allocated any exclusive frequencies but may obtain authorization by showing of need to operate on any frequency assigned to any other service on a secondary noninterference basis.

C. PUBLIC RADIO COMMUNICATION SERVICES

1. Fixed public service: A large number of specific frequencies ranging from a minimum of the order of 14 kilocycles up to frequencies above 30,000 kilocycles.

2. Fixed public press service: Similar to fixed public service.

3. Agriculture service: Similar to fixed public service.

4. Domestic public land mobile service: 12 specific frequencies in the band from 35.22 to 35.66 megacycles, 12 specific frequencies in the band from 43.22 to 43.66 megacycles, and 20 specific frequencies in the band from 152.51 to 158.67 megacycles.

5. Coastal and marine relay services: 92 specific frequencies in the band from 105 to 500 kilocycles, 178 specific frequencies in the band from 2,274 to 39,580 kilocycles, and 116.35 and 118.35 megacycles.

D. SHIP RADIO SERVICE

Frequency assignments essentially same as for coastal and marine relay stations.

E. AERONAUTICAL RADIO SERVICES

1. Aircraft radio stations: 375, 457, 500, 6,210, and 8,280 kilocycles, and 13 specific frequencies in the band from 121.5 to 125.5 megacycles, and also miscellaneous maritime frequencies and need can be shown.

2. Lighter-than-air craft stations: Same as aircraft stations with additional frequencies of 2,930, 6,615, and 11,910 kilocycles.

3. Air carrier aircraft stations: Same as aircraft radio stations, with additional frequencies of 3,105 and 3,117.5 kilocycles, and 10 additional frequencies in the band from 122.1 to 126.3 megacycles.

4. Airdrome control stations: 278 kilocycles, and 20 specific frequencies in the band from 118.1 to 121.9 megacycles.

5. Aeronautical land stations: 162 specific frequencies ranging from 1674 to 23,369 kilocycles, and 26 specific frequencies in the band from 126.9 to 131.9 megacycles.

6. Aeronautical fixed stations: 74 specific frequencies in the band from 1722 to 23,025 kilocycles, 4 specific frequencies in the band from 72 to 76 megacycles, 952 to 960 megacycles, 1850 to 1990 megacycles, 2100 to 2200 megacycles, 2500 to 2700 megacycles, 6575 to 6875 megacycles, and 12,200 to 12,700 megacycles.

7. Aeronautical mobile utility stations: 121.7 and 121.9 megacycles.

8. Aeronautical navigational aid radio stations: 75 megacycles, the band from 108.1 to 111.9 megacycles, the band from 112.1 to 117.9 megacycles, and the band from 328.6 to 335.4 megacycles.

9. Flight test stations: 3290 kilocycles, 123.1, 123.3, and 123.5 megacycles, and 14 specific frequencies in the band from 217.425 to 219.575 megacycles.

10. Flying school stations: 123.1, 123.3, and 123.5 megacycles.

11. Aeronautical public service stations: May be assigned any frequencies available to ship telegraph and telephone stations on secondary basis subject to no interference.

F. PUBLIC SAFETY RADIO SERVICES

1. Police radio service: 40 specific frequencies in the band from 1610 to 7935 kilocycles, 96 specific frequencies ranging from 37.02 to 46.02 megacycles, 72.02 to 74.58 megacycles, 75.42 to 75.98 megacycles, 45 specific frequencies in the band from 154.65 to 159.21 megacycles, 159.51 to 161.79 megacycles, 454.05 to 455.95 megacycles, 952 to 960 megacycles, 1850 to 1990 megacycles, 2110 to 2200 megacycles, 2450 to 2700 megacycles, 3500 to 3700 megacycles, 6425 to 6875 megacycles, 11,700 to 12,700 megacycles, 16,000 to 18,000 megacycles, and 26,000 to 30,000 megacycles.

2. Fire radio service: 630 kilocycles, 27 specific frequencies in band from 33.42 to 46.50 megacycles, 72.02 to 74.58 megacycles, 75.42 to 75.98 megacycles, 12 specific frequencies in band from 153.77 to 154.43 megacycles, and all higher bands same as allocated to police radio service.

3. Forestry-conservation radio service: 2212, 2226, 2236, and 2244 kilocycles, 37 specific frequencies in band from 30.86 to 46.82 megacycles, 72.02 to 74.58 megacycles, 75.42 to 75.98 megacycles, 6 specific frequencies in band from 156.87 to 159.45 megacycles, 159.51 to 161.79 megacycles, 9 specific frequencies in band from 170.425 to 172.375 megacycles, 450.05 to 455.95 megacycles, and all higher frequency bands allocated to police radio service.

4. Highway maintenance radio service: 20 specific frequencies in band from 33.02 to 47.38 megacycles, 72.02 to 74.58 megacycles, 75.42 to 75.98 megacycles, 4 specific frequencies in band from 156.99 to 157.41 megacycles, 159.51 to 161.79 megacycles, 454.05 to 455.95 megacycles, and all higher bands allocated to police radio service.

5. Special emergency radio service: 2726 and 3190 kilocycles, 13 specific frequencies in band from 33.02 to 47.66 megacycles, 72.02 to 74.58 megacycles, 75.42 to 75.98 megacycles, 157.47 megacycles, 159.51 to 161.79 megacycles, 161.85 megacycles, 161.91 megacycles, 161.97 megacycles, 454.05 to 455.95 megacycles, and all higher frequency bands allocated to police radio service.

6. State guard radio service: 2726 kilocycles, and frequencies in the band 2505 to 3500 kilocycles, where need can be shown.

G. INDUSTRIAL RADIO SERVICES

1. Power radio service: 2292 and 4637.5 kilocycles, 37 specific frequencies in the band 35.06 to 48.54 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, 9 specific frequencies in the band from 153.41 to 158.25 megacycles, 20 specific frequencies in the band from 456.05 to 457.95 megacycles, 952 to 960 megacycles, 1850 to 1990 megacycles, 2110 to 2200 megacycles, 2450 to 2700 megacycles, 3500 to 3700 megacycles, 6425 to 6875 megacycles, 11,700 to 12,700 megacycles, 16,000 to 18,000 megacycles, and 26,000 to 30,000 megacycles.

2. Petroleum radio service: 7 specific frequencies in the band from 1602 to 4637.5 kilocycles, 35 specific frequencies in the band from 25.02 to 49.18 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, 9 specific frequencies in the band from 153.05 to 158.43 megacycles, and all higher frequency bands same as allocated to power radio service.

3. Forest products radio service: 1676 and 1700 kilocycles, 14 specific frequencies in the band from 29.73 to 49.66 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, 9 specific frequencies in the band from 153.05 to 158.43 megacycles, and all higher frequency bands same as allocated to power radio service.

4. Motion-picture radio service: 4 specific frequencies in the band from 1628 to 4637.5 kilocycles, 4 specific frequencies in the band from 49.07 to 49.82 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, 7 specific frequencies in the band from 152.87 to 173.375 megacycles, and all higher frequency bands allocated to the power radio service.

5. Relay press radio service: 80 specific frequencies in the 72.02 to 75.98 megacycles band, 4 specific frequencies in the band from 173.225 to 173.375 megacycles, and all higher frequency bands same as allocated to power radio service.

6. Special industrial radio service: 2292 and 4637.5 kilocycles, 24 specific frequencies in the band from 27.31 to 49.98 megacycles, 80 frequencies in the 72.02 to 75.98 megacycles band, 5 specific frequencies in the band from 152.87 to 154.57 megacycles, and all higher frequency bands same as allocated to the power radio service.

7. Low power industrial radio service: 4 specific frequencies in the band from 27.51 to 42.98 megacycles, and 154.57 megacycles.

H. AMATEUR RADIO SERVICE

1800 to 2000 kilocycles, 2006 to 2050 kilocycles, 3500 to 4000 kilocycles, 7000 to 7300 kilocycles, 14,000 to 14,400 kilocycles, 26.96 to 27.23 megacycles, 28.0 to 29.7 megacycles, 50.0 to 54.0 megacycles, 144 to 148 megacycles, 220 to 225 megacycles, 235 to 240 megacycles, 420 to 450 megacycles, 1215 to 1300 megacycles, 2300 to 2450 megacycles, 3300 to 3500 megacycles, 5650 to 5925 megacycles, 10,000 to 10,500 megacycles, 21,000 to 22,000 megacycles, and any frequencies above 30,000 megacycles.

I. LAND TRANSPORTATION RADIO SERVICES

1. Intercity bus radio service: 16 specific frequencies in the band from 43.70 to 44.30 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, 952 to 960 megacycles, 1850 to 1990 megacycles, 2110 to 2200 megacycles, 2450 to 2700 megacycles, 3500 to 3700 megacycles, 6425 to 6875 megacycles, 11,700 to 12,700 megacycles, 16,000 to 18,000 megacycles, and 26,000 to 30,000 megacycles.

2. Highway truck radio service: 7 specific frequencies in the band from 35.74 to 35.98 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, and all higher frequency bands same as allocated to intercity bus service.

3. Railroad radio service: 80 specific frequencies in the 72.02 to 75.98 megacycle band, 41 specific frequencies in the band from 159.51 to 161.91 megacycles, 8 specific frequencies in the band from 453.05 to 453.75 megacycles, and all higher frequency bands same as allocated to the intercity bus service.

4. Taxicab radio service: 8 specific frequencies in the band from 152.27 to 157.71 megacycles, 10 specific frequencies in the band from 452.05 to 452.95 megacycles, 2450 to 2500 megacycles, 3500 to 3700 megacycles, 6425 to 6575 megacycles, and 11,700 to 12,200 megacycles.

5. Urban transit radio service: 20 specific frequencies in the band from 30.66 to 44.53 megacycles, 80 specific frequencies in the 72.02 to 75.98 megacycles band, 8 specific frequencies in the band from 453.05 to 453.75 megacycles, and all higher frequency bands same as allocated to intercity bus radio service.

J. INDUSTRIAL, SCIENTIFIC, AND MEDICAL SERVICES

1. Medical diathermy equipment: 13,553.22 to 13,566.78 kilocycles, 26,960 to 27,280 kilocycles, 40,660 to 40,700 kilocycles, and 890 to 940 megacycles, 5775 to 5925 megacycles, 10,500 to 10,700 megacycles, and 17,850 to 18,150 megacycles.

2. Industrial heating equipment: Frequency bands same as allocated for medical diathermy equipment.

K. CITIZENS RADIO SERVICE

Four hundred and sixty to four hundred and seventy megacycles.

L. MISCELLANEOUS RADIATION SOURCES

1. Carrier current equipment, used for communications, remote control supervisory control, etc. over power transmission lines and the like, causing incidental radiation at frequencies of about 30 to 300 kilocycles.

2. Standard broadcast receivers, causing incidental radiation at frequencies ranging from about 800 to 2,200 kilocycles.

3. Short wave receivers, causing incidental radiation at frequencies ranging from about 2,200 to 21,500 kilocycles.

4. FM broadcast receivers, causing incidental radiation from about 98 to 118 megacycles.

5. Television broadcast receivers, causing incidental radiation from local oscillators at frequencies of about 75 to 134 megacycles, 195 to 252 megacycles, and including possible radiations from sweep oscillators, at frequency of 15.75 kilocycles and many harmonics thereof.

6. Miscellaneous or incidental radiations from numerous other devices such as motors and generators, ignition systems, fluorescent and neon lights, laboratory equipment such as signal generators and the like, etc., which may occur at practically any frequency in the radio spectrum.

Note.—Information as given in this memorandum is substantially correct, but owing to the fact that it had to be prepared in a couple of hours, it has been impossible to check and verify it in detail. Information given refers almost exclusively to radiations from commercial types of equipment, since corresponding information for Government equipment and frequencies is not readily available and would in many cases be considered classified information subject to security restrictions.

EXHIBIT 3

Type of equipment or service	Maximum field intensity at 100 feet (microvolts per meter)	Intermediate frequency	Radiated frequency	Propagation characteristic	Service	Identifiable	Comments
Domestic receivers for amplitude modulation and provision for short-wave reception.	2.0 or less.....	455 kilocycles.....	990 kilocycles to 16.0 megacycles.....	Subject to fading and static.	Intermittent.	No.....	Oscillator frequency below center frequency.
Domestic receivers for frequency modulation.	15.0 to 6,000 1.....	10.7 megacycles..... do..... 4.3 megacycles..... 2.2 megacycles.....	77.3 to 97.3 megacycles..... 98.7 to 118.7 megacycles..... 18.8 to 22.8 megacycles..... 43.3 to 46.2 megacycles.....	Subject to distortion over long distances.	do.....	No.....	Oscillator frequency above center frequency. Sets on old FM band—few, if any, of which are still in use.
Television receivers.....	5.0 to 7,000 2.....	12.75 megacycles (video).....	4.5, 8.25, 12.75, 48.0, 74.0, 80.0, 90.0, 96.0, 188.0, 194.0, 200.0, 206.0, 212.0, 218.0, 224.0 megacycles.	Subject to line-of-sight transmission.	do.....	No.....	8.25 MC is the sound center frequency corresponding to a picture IF of 12.75 MC. 4.5 MC derives from the beating together of the picture and sound IF components. Frequencies from 68.0 to 224.0 MC represent oscillations from the high frequency oscillator. 4.5 MC = Beat frequency. 22.75 MC = Sound IF. 27.25 MC = Picture IF. 82.5 to 238.5 MC, high frequency oscillator. 4.5 MC = Beat frequency. 32.8 MC = Sound IF. 37.3 MC = Picture IF. 91.35 to 247.55 MC, high frequency oscillator.
	5.0 to 7,000 2.....	27.25 megacycles (video).....	4.5, 22.75, 27.25, 82.5, 88.5, 94.5, 104.5, 110.5, 202.5, 208.5, 214.5, 220.5, 226.5, 232.5, 238.5 megacycles.	do.....	do.....	No.....	4.5 MC = Beat frequency. 113.55, 119.55, 211.55, 217.55, 223.55, 229.55, 235.55, 241.55, 247.55 megacycles.
		37.3 megacycles (video).....	4.5, 32.8, 37.3, 91.55, 97.55, 103.55, 113.55, 119.55, 211.55, 217.55, 223.55, 229.55, 235.55, 241.55, 247.55 megacycles.	do.....	do.....	No.....	4.5 MC = Beat frequency. 32.8 MC = Sound IF. 37.3 MC = Picture IF. 91.35 to 247.55 MC, high frequency oscillator.
		45.75 megacycles (video).....	4.5, 41.25, 45.75, 101.0, 107.0, 113.0, 123.0, 129.0, 221.0, 227.0, 233.0, 239.0, 245.0, 251.0, 257.0 megacycles.	do.....	do.....	No.....	4.5 MC = Beat frequency. 41.25 MC = Sound IF. 45.75 MC = Picture IF. 101.0 to 257.0 MC, high frequency oscillator. This is the RTMA standard. Other frequencies will probably disappear in time.
	5.0 to 7,000 1.....	26.25 megacycles (video).....	4.5, 21.75, 26.25, 81.5, 87.5, 93.5, 103.5, 109.5, 201.5, 207.5, 213.5, 219.5, 225.5, 231.5, 237.5 megacycles.	do.....	do.....	No.....	4.5 MC = Beat frequency. 21.75 MC = Sound IF. 26.25 MC = Picture IF. 81.5 to 237.5 MC, high frequency oscillator.

26-30 megacycles (video)	4.5, 21.8, 26.3, 81.55, 87.55, 93.55, 103.55, 109.55, 201.35, 207.35, 213.55, 219.55, 225.35, 231.35, 237.35 megacycles.	do.	do.	No.	4.5 MC—Beat frequency. 21.8 MC—Sound IF. 26.3 MC—Picture IF. 81.55 to 237.35 MC, high frequency oscillator.
26-40 megacycles (video)	4.5, 21.0, 26.4, 81.65, 87.65, 93.65, 103.65, 109.65, 201.65, 207.65, 213.65, 219.65, 225.65, 231.65, 237.65 megacycles.	do.	do.	No.	4.5 MC—Beat frequency. 21.0 MC—Sound IF. 26.4 MC—Picture IF. 81.65 to 237.65 MC, high frequency oscillator.
26-60 megacycles (video)	4.5, 22.1, 26.6, 81.85, 87.85, 93.85, 103.85, 109.85, 201.85, 207.85, 213.85, 219.85, 225.85, 231.85, 237.85 megacycles.	do.	do.	No.	4.5 MC—Beat frequency. 22.1 MC—Sound IF. 26.6 MC—Picture IF. 81.85 to 237.85 MC, high frequency oscillator.
25.0 to 7,000 ²	4.5, 20.5, 25.0, 80.25, 86.25, 92.25, 102.25, 108.25, 200.25, 206.25, 212.25, 218.25, 224.25, 230.25, 236.25 megacycles.	do.	do.	No.	4.5 MC—Sound IF. 20.5 MC—Picture IF. 25.0 MC—Beat between sound and picture IF's. 80.25 to 236.25 MC, high frequency oscillator.
25.5 megacycles (video)	4.5, 21.0, 25.5, 80.75, 86.75, 92.75, 102.75, 108.75, 200.75, 206.75, 212.75, 218.75, 224.75, 230.75, 236.75 megacycles.	do.	do.	No.	4.5 MC—Sound IF. 21.0 MC—Picture IF. 25.5 MC—Beat frequency. 80.75 to 236.75 MC, high frequency oscillator.
25.75 megacycles (video)	4.5, 21.25, 25.75, 81.0, 87.0, 93.0, 103.0, 109.0, 201.0, 207.0, 213.0, 219.0, 225.0, 231.0, 237.0 megacycles.	do.	do.	No.	4.5 MC—Sound IF. 21.25 MC—Picture IF. 25.75 MC—Beat frequency. 81.0 to 237.0 MC, high frequency oscillator.
26.10 megacycles (video)	4.5, 21.6, 26.1, 81.35, 87.35, 93.35, 103.35, 109.35, 201.35, 207.35, 213.35, 219.35, 225.35, 231.35, 237.35 megacycles.	do.	do.	No.	4.5 MC—Sound IF. 21.6 MC—Picture IF. 26.1 MC—Beat frequency. 81.35 to 237.35 MC, high frequency oscillator.

¹ New standard limits radiation to 50 μ volts per meter at 100 feet.

² New standard limits radiation to 50-150 μ volts per meter at 100 feet.

³ New standard limits radiation to 59-150 μ volts per meter at 100 feet.

STATEMENT OF DAVID B. SMITH, VICE DIRECTOR OF ENGINEERING, RADIO, AND TELEVISION MANUFACTURERS ASSOCIATION

The CHAIRMAN. Will you identify yourself for the record?

Mr. SMITH. Yes, sir.

My name is David B. Smith. I am vice director of engineering, the engineering department of the Radio and Television Manufacturers Association.

Mr. Chairman, I do not have a prepared statement. I would like to say at the outset that I certainly agree that the Department of Defense should be given assistance in protecting the country against enemy action. There is no quarrel with that.

I do share the view that has been expressed this morning that the present bill goes well beyond the reasonable scope that might be required to accomplish that purpose.

You had a very interesting discussion here as to what constituted a radiator. I think if you take as a definition that any device that produces an electromagnetic signal in a particular band specified in the bill, and which can be picked up by some kind of a known receiver, if you take that definition as to whether or not a device is a radiator, then it is fair to say that there is hardly any person in the United States who does not, during the course of his normal daily life, cause radiation to be emitted a great many times each day. You can't get up in the morning and shave yourself with an electric razor or turn on an electric light or use your telephone or your oil heater or your radio or television set or your automobile, or anything, practically, that you can think of, involving electric power, that does not cause radiation within the definition that I have given.

Practically all of those devices, and there are literally millions of them, are not detectable more than a few feet, or perhaps a few hundred feet. There are a relatively few numbers of devices that can produce signals that can be detected at a sufficiently great distance to be of use for the purpose of homing or direction finding.

The CHAIRMAN. Then you would need a description as to the distance as well as the particular part of the electromagnetic spectrum. When you say 100,000 megacycles that is one thing, but the distance that the wave would travel would be something else that would be important.

Would it be possible to write into a bill a dependable description of the distance of radiation?

Mr. SMITH. I think the best way to do that, there are three definitions that I should like to suggest be included. The first and best way to determine whether or not a signal is visible at a distance, in an electromagnetic sense, is to write into the bill that if it cannot be detected at a distance of say a half mile, then this could not be considered an electromagnetic radiator within the meaning of the act.

That would exclude most of the devices we have described this morning.

Secondly, there are a variety of devices which, by their very diversity, could not be used. As Dr. Baker pointed out, they create a camouflage rather than pin-point accuracy. The electrical noise from the automobile of your car, or from the neon signs, or from all the spark discharges, the corona discharges that are associated with all

power lines and what not, by their very diversity make them impossible to be used for homing purposes.

So that is a second group of things that can be excluded.

Thirdly, there are a very large variety of devices that can be used innocently and do not cause radiation but which by minor changes can be made into effective radiating devices. I think it is fair to say that every radio serviceman in the country has a very good oscillator in his shop.

He uses that as a normal part of the servicing of his radio sets. That, as he uses it, does not cause any significant amount of radiation, but it is a very simple matter to hook it up to a bed spring or something like that and make an effective radiator out of it. So it seems to me that there must be an element of intent in this thing if you are going to criminally penalize a person for violating the act.

I would want to be sure that that was in.

The CHAIRMAN. Six, eight, nine or ten months ago we heard an awful lot about oscillators and their effect on navigation. Was that just a passing fancy?

Mr. SMITH. No, sir; that was not. That was a serious problem. And I am glad to say that so far as I know it has been resolved. That was an interference with the CAA normal system and it came about not because of any one receiver but because there were a large number.

No single one of them in effect was causing a great deal of interference. The fact that there were a great many did blanket the thing out at that point. It is perfectly true, as you suggested earlier, that you could detect that area by direction finding equipment of an enemy aircraft, but you could not say just exactly where it was, because there are receivers of that character all over the place, everywhere within the range of that station and well beyond it; there are radio receivers putting out that kind of signal.

It is only because there were so many of them that you did have the interference. But because there were so many of them they could not possibly be used for direction finding purposes.

The CHAIRMAN. The concentration of volume would not give you a dependable direction?

Mr. SMITH. I do not believe it would. As a matter of fact, in reading General Ankenbrandt's statement this morning he specifically states that at this time he does not believe it, either. I believe he said that he feels that for the next 10 years there is no danger from that source.

I would like to suggest that I agree with him on that, and that if 10 years from now we find that there might be danger, that maybe we should take care of it at that time, but not right now.

I want to understand correctly how far this goes. With equipment in our laboratory we can measure the electromagnetic radiation from this spectrum from a fire in your fireplace or a bonfire in the garden. That comes under the terms of this act as currently written. Yet I cannot conceive that we should have legislation going that far because if you were to stop, you would shut down all community life as well as industrial life.

The CHAIRMAN. Getting away from the security phases of this legislation, do I understand that you are opposed to giving the Federal Communications Commission any authority over electromagnetic noises of industrial motors and dynamos and devices and machines for

the purpose of getting clearer signals and eliminating confusion and distortion in radio and television?

Mr. SMITH. I do not believe, sir, that the FCC needs any more authority than they currently have to straighten out the matters of interference with normal peacetime communication.

The CHAIRMAN. There is some contention that they do not have any authority whatever.

Senator MAGNUSON. Over what we call electromagnetic devices.

The CHAIRMAN. Such as dynamos and motors.

Mr. SMITH. That is right, sir, but on the other hand——

The CHAIRMAN. Shouldn't they have that?

Mr. SMITH. I do not think they need it for this reason: While there is certainly at the present time some interference caused in radio by power lines and dynamos and things of that sort, all of those things, as the situations arise, are being taken care of. As a manufacturer of radio and television sets, and one of the fellows who gets complaints when there is interference, I think I can speak with some authority on that point.

The CHAIRMAN. They assume that they do have that authority, but there is some question on the part of some persons that they do not have that authority. Do you not think that ought to be clarified? Is there any harm in giving them that authority?

Mr. SMITH. Again, sir, I think the harm would be the same as it is in this bill, unless you specified some power level. You are getting back to my illustration of the fire in the fireplace. I think perhaps you do not believe me but it is literally true. I have in my laboratory receiving equipment which will detect the radiation from a simple thing like a fire. If you give the FCC or any other branch of the Government the complete power to control all electromagnetic radiation, without specifying a lower limit you have given them control over everything that you do.

I do not think you want to go that far.

The CHAIRMAN. I do not think so, either. I do not think they ought to have control over the operation of all motors. As I understand the testimony of this morning, a motor can be devised, improved, or changed so that it will not be harmful to other broadcasting, and not interfere with other broadcasting. It looks to me like that is a necessary function and that somebody ought to have that authority.

I do not mean that they should say you cannot make a motor, or you cannot use a motor, but I think somebody ought to have the power to say to someone who is broadcasting through a motor and interfering with radio or television that you have to change that.

Senator MAGNUSON. Suppose I built a new plant, or suppose you have a new device in your plant right now that threw out a lot of radiation and interfered with the radio broadcasting or television in that particular area. What do you conceive the authority of the Commission now over you?

Mr. SMITH. The Commission would come around and talk to us about it. In the event that we refused to work with them, and in the event that they could show that we were causing interference with an out-of-State signal, then I believe the Supreme Court has given them the authority to stop us.

Senator MAGNUSON. What about intrastate?

Mr. SMITH. Whether or not as a practical matter we would ever quarrel with that, I do not believe we would.

Senator MAGNUSON. I do not believe anybody ever has, but suppose somebody did get adamant and said I am going to run that motor, that is my business, what could the Communications Commission do to them under the present law?

Mr. SMITH. I think under the present law—understand, sir, that I am not a lawyer—but my understanding of the present law, as interpreted by the various court decisions, is that if there is interference—

Senator MAGNUSON. On interstate signals?

Mr. SMITH. That the Commission does have the authority to stop it. Just how it would work out in the case that you have cited I do not know, frankly. I imagine it would have to be decided by a court. I rather imagine that the Commission would have that authority.

The CHAIRMAN. One thing is certain, the law is not very clear on that point, and the law ought to be clarified.

Mr. SMITH. That is right.

Senator MAGNUSON. When this law was written in 1934, we did not anticipate the growth of these things, scientific and technical growth, which is going to become an ever-increasing problem rather than a diminishing one as new scientific devices are improved.

Most all of them are getting more in the field of radiation rather than getting out of the field of radiation. I think that unless the Commission knows that they do have the authority to do things like that, where they are interfering, that it is going to be an ever-increasing problem for them.

Mr. SMITH. Senator—

Senator MAGNUSON. There has always been cooperation.

Mr. SMITH. Yes, sir. More than that, and I should not speak for the Commission, but the way it has worked out practically, it has boiled down to this: the Commission has in effect said that they have the authority. Then they have said "But we will not exercise it with respect to low-powered devices," these miscellaneous radiators.

That would cover doorbells, telephone, electric razor, neon signs, automobile ignition systems, things of that sort. They say it will cover high-powered radiators like the electronic bombarders in our plants, like the arc welders in our metalworking plants, like the dielectric heaters in our lumber mills.

Senator MAGNUSON. And radar ranges.

Mr. SMITH. Yes, sir. All those that are within the control of the Government. The Commission itself makes a distinction between a low-powered short-range device on the one hand which they say they do not control, and a high-powered device that covers a greater range of distance which they say they do control.

While there have been some grumbings about it I do not think anybody ever challenged their control. The dielectric heater manufacturers, diathermy manufacturers, fellows who make bombarders, all of those people have in effect agreed with the Commission's requirements and they have worked out a working relationship.

Senator MAGNUSON. As I understand it, the Commission has exercised control in those cases.

Mr. SMITH. That is right.

Senator MAGNUSON. Because they consider when it gets to that point of radiation that it becomes in effect similar to a transmitter and, therefore, they have control.

Mr. SMITH. That is right.

Senator MAGNUSON. If there were no interference, on the subject we are here on now, somebody could build a machine that could be in effect a homing device. And if it did not interfere with any wavelength—that could conceivably be done—I do not think the Commission has any control over them at all.

Mr. SMITH. I disagree with you on that, if I may. I think there is a distinction that perhaps has not been too clearly understood.

The Commission, under the act, as I understand it, has the power to control all electromagnetic radiation for other than Government purposes, and also they have the right to license the use of that for certain specific communication purposes.

In other words, in order for a device to be illegal, it does not necessarily have to be a communication device. It can only be licensed to be used for communication purposes if it comes within certain categories as to use, but so long as it radiates a substantial amount of radiation, then it is within their control whether it is operated as a communication system or not.

And they have decided—they have passed what they call their low-power regulation, Mr. Plummer mentioned this this morning, as a matter of fact it is our company with whom they worked it out in the first instance—by which they have said we will not require licenses for devices whose radiation is at an especially low level such as not to cause interference except within a very short range.

Senator MAGNUSON. And you and industry have always assumed that they do have the control when it reaches a point of radiation to that degree.

Mr. SMITH. Yes, sir; when it causes serious difficulties, we have.

The CHAIRMAN. You do not altogether agree with Mr. Sterling in his statement this morning. He thinks that the law ought to be clarified or extended so that they might control electronic devices. I think this is the point in his testimony, at page 3:

Moreover, the Commission believes that the authority it already has over electronic devices, which are not primarily intended to be used for transmitting radio communications, pursuant to the provision of section 301 of the Communications Act, is not adequate for achieving the avowed purposes of the legislation now being considered.

Which means an aid to navigation.

Mr. SMITH. I do not have any idea, of course, what is on Commissioner Sterling's mind and I am quite sure he knows more about the act than I do. But it seems to me that the thing that is essentially missing in the present act is to make the use of radiation for the purpose of giving aid to the enemy.

Right now, as a citizen of the United States, I have a right to build a transmitter, so long as I conform to certain requirements that Congress has set up. There are certain frequency bands, for example, in which the Commission—giving effect to the detail of your law—says as long as you radiate in that band you do not have to have a license and you can radiate as much power as you wish.

So I am a citizen of this country and I say I am going to build a transmitter and I am going to radiate a lot of signal energy in that

particular band. Let us say it is the diathermy band, 27 megacycles. That signal can be heard all the way around the world. As the law now stands I could go ahead and do that, and a bomber from Moscow could home on it, and there would not be any illegal action on my part, on my action, because I am agreeing with all the present regulations of the FCC.

What I think Commissioner Sterling has in mind, and I certainly agree with him, is that the idea of using this radiation for the purpose of setting up an instrumentality which would be of aid to the enemy, that should not be permitted, and the law must be amended to exclude that. I do not think there is any quarrel with that.

Senator MAGNUSON. If we were at war of course the treason laws would apply.

Mr. SMITH. I would assume they would.

Senator MAGNUSON. That would apply to a man doing that, but the trouble is that they only apply after a declaration of war, not a state of emergency, and, of course, they would not apply to that man while he was homing the enemy in until it actually happened. So you would have a tough legal technicality there. There are no treason laws in peacetime.

Mr. SMITH. That ought to be clarified.

The CHAIRMAN. Mr. Sterling discusses the processes of hearings, and so forth, and then he points out:

* * * such a procedure does not lend itself to the types of emergency control contemplated by the present proposal or other necessary security precautions which would be an essential part of any such plan.

It appears, therefore, that the powers of the President under section 606 of the Communications Act and the licensing powers of the Commission under section 301 of the Communications Act are not adequate to cope with the problems which prompted the Department of Defense to sponsor this legislation.

In light of that fact, the Commission is in agreement with the Department of Defense that it would be advisable at this time to spell out, either in an amendment to the existing provisions of section 606 of the Communications Act or in separate legislation such as that provided in the instant proposal, the authority of the President to control and use all such radiation devices potentially useful to an enemy as an aid to navigation.

Are you of the opinion that these devices which are not communication devices primarily are of no aid to the enemy? Mr. Baker, I think, takes that position. Do you take that position?

Mr. SMITH. Dr. Baker and I, I think, are in complete agreement that there are a very, very wide variety of devices which, for one of two reasons, either because they are spread out all over the country and are being used more or less continuously and hence do not identify any point, or alternatively, devices which are of sufficiently low power so that while they are capable of radiating a signal, that signal can be detected only a short distance, perhaps a half mile, those devices should not be covered within the act.

Over and beyond that there are a few devices—diathermy machine that I have given you is one example—which is of sufficiently high power to produce a useful signal and which does not now come within the terms of the Communications Act. Those things certainly should be stopped.

I will not quarrel at all with that. And I will not quarrel that the act should be amended, if you wish to do it that way, so as to include that the Commission has the control, the right to control, where the

purpose of the instrument would be to be used for D-F purposes. But I do not think that you should go the whole hog and arbitrarily say that anything which gives out electromagnetic radiation should be stricken."

Senator MAGNUSON. In other words, the bill goes further.

Mr. SMITH. I think it does.

The CHAIRMAN. I have in my hand part 18, "Rules and Regulations Relating to Industrial and Scientific Medical Services," a Federal Communications Commission regulation. That is not a law. It deals with the things that we are talking about here.

I presume that you are familiar with this regulation; are you?

Mr. SMITH. From a technical man's point of view; yes, sir.

The CHAIRMAN. Do you have any quarrel with those regulations? Do you think they go too far?

Mr. SMITH. No, sir; I do not.

The CHAIRMAN. The only point is, as I understand it, the FCC's contention is that everyone does not agree that they have power to regulate the radiation of industrial, scientific, and medical service devices. It seems to me that there ought not to be anything very wrong about Congress giving them that authority, whether it is essential to national defense or not.

Certainly it is essential to good communications, electromagnetic communications of all kinds.

Mr. SMITH. Mr. Chairman, first of all I think that particular phase, as I understand it, is outside of your defense problem. Looking at it as a peacetime proposition, if there is any quarrel with the proposition that the Federal Communications Commission has the right to control high-powered radiators that are interfering with communications and broadcasting, then I think they should have the right. I personally understand that they do have it.

I do not know of anybody who has quarreled with that right. If such a right is to be given to them, I think that there should be a definite limit put upon the amount of radiation that must obtain in order for the Commission to have control. Otherwise you will have them at least involved with the legal right to come into your bedroom and even make you turn off your electric blanket.

The CHAIRMAN. I would not want them to have that much authority. I do think they ought to have the right to tell folks to correct their devices so that they will not be broadcasting.

Mr. SMITH. That is right, sir. I think the only difference between us is that my understanding is that they do have the right. Apparently they are not quite sure, but they are exercising it.

Senator MAGNUSON. Do you think that there could be a definition made so it would make it clear when that authority should take effect? Could we technically make a definition that way?

Mr. SMITH. It becomes very difficult. We have spent in the Radio Institute of Engineers, of which I am a member, a considerable amount of time over the last 2 years trying to formulate an exact method of measurement by which you could actually measure the amount of power radiated, say, from a television receiver or some other kind of device.

That is an extremely difficult technical problem to do accurately. There is no known way at this time by which you can take a set from the production line or in the factory and actually measure that power

with any kind of accuracy at all. You can go out in a field where you can get some distance away from the receiver and where you are free of all the other sources of noise which are around you.

Our real problem in this thing is frankly trying to pick out one noise in a crowd of noises. That is why it becomes such a difficult technical problem. But I think from a legal point of view that maybe we ought to forget milliwatts and microvolts and things of that sort and specify a distance.

If you can detect radiation from this device at a distance of a thousand yards maybe that is objectionable, or maybe it has to be 2,000 yards. There is no quarrel about that. That is a factual matter, either it interferes or it does not.

The CHAIRMAN. It seems to me that is a very important and pertinent suggestion that you are making.

In other words, the standards that are set up here between the point 0.01 and 1,000 megacycles is one very proper standard, but there ought to be others. There ought to be provisos that provide that they do not have a greater distance than 50 miles or 100 miles.

I think that is going too far, but maybe 10 miles.

Mr. SMITH. If you put in such an item, it would cure my major objection to this bill.

The CHAIRMAN. We thank you, very much.

Mr. Wheeler, do you have anything further to add?

Mr. WHEELER. No, sir; I have nothing further to add.

STATEMENT OF JUSTIN MILLER, PRESIDENT OF THE NATIONAL ASSOCIATION OF BROADCASTERS

The CHAIRMAN. Judge Justin Miller. We are glad to have you here, Judge. You may proceed.

Mr. MILLER. My name is Justin Miller. My address is 1771 N Street NW., Washington, D. C. I am president of the National Association of Broadcasters. The membership of that association is composed of the broadcasting stations licensed by the Federal Communications Commission. It includes approximately 1,379 broadcasting stations, of which 975 are a. m., 379 are f. m., and 43 are television.

First, I wish to assure the committee that the broadcasters of the United States desire that every proper precaution be taken to secure and maintain maximum national security, and to participate—both as broadcasters and as individual citizens—in the national program to that end.

It is obvious that during periods of war or other great national emergencies, the power of the Government must be extended beyond its peacetime activities in order to secure and maintain the maximum national security.

In the field of broadcasting, provision is made for the expansion of such governmental powers by section 606(c) of the Federal Communications Act. This law seemed to be adequate for all purposes of World War II, but if it seems necessary to further expand powers over broadcasting, very slight changes over 606 would accomplish the purpose. This would seem to be the sensible way to accomplish the purpose. In view of the suggestions for amendment proposed here

this morning, my statement from this point on becomes largely an argument in favor of the committee staff's proposal.

The CHAIRMAN. We are very glad to hear that kind of an argument. I would like to hand you this proposal and ask you, if you want to add anything to your testimony with respect to it, after you have had a chance to digest it and study it, we would be very glad to have a further brief from you.

Mr. MILLER. Thank you.

Senator MAGNUSON. I think he covered the whole thing in the next paragraph, where he said:

Senate bill 537 proposes, however, to throw broadcasting into a hodgepodge of diathermy machines, industrial heating instruments used in the manufacture of plywood and plastics, test equipment in radio-service shops, laboratory machinery of various kinds, oscillatory circuits, motors and generators, switches, circuit breakers and other control devices, lamps, fluorescent signs—

and all that.

The CHAIRMAN. I think he probably does. But I want him to feel free to add something to it if he finds something in that amendment that he doesn't approve, or that doesn't go far enough, or that in his opinion should be deleted or added to. We want to have that additional testimony.

Mr. MILLER. I made a note of them as they were read earlier. I want an opportunity to study it further in detail. Let me interpolate a moment on the point that you were discussing a few moments ago. I think Mr. Sterling's suggestions regarding section 606 did relate to the wartime-emergency situation. As to the peacetime situation, and the desirability or necessity of expanding the power of the Commission over devices of this kind in ordinary operation, I think that section 301 does cover the subject so far as peacetime operation is concerned.

The language is very broad:

No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio—

and then it goes on to specify all the different places—

one place in any Territory or possession to another place in any Territory or possession or district—

and then a number of specifications, including—

within any State when the effects of such use extend beyond the borders of such State or when interference is caused by such use or operation with the transmission of such energy, communications, or signals from within said State to any place beyond its borders—

and so forth.

The one possibility here would be that the language of that introductory sentence:

No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio—

might be so narrowly interpreted by a court as to say that radio was not contemplated, or did not contemplate the inclusion of some of these devices.

Perhaps it would be best to go back to sentence 3 and define radio to take care of it, to include it.

Senator MAGNUSON. To include radiation of all types?

Mr. MILLER. Radio. You used "radio" in 301. Now what is radio?

The CHAIRMAN. Do you think that a dynamo is a radio, even though it doesn't broadcast?

Mr. MILLER. I think the use of the radio there refers to what takes place, rather than the instrument. I think a proper definition would be anything that radiates under certain specifications means radio.

Senator MAGNUSON. Use the word radiation there instead of radio and it would be cleared up?

Mr. MILLER. Yes, sir. I looked at section 3 while the discussion was going on. It defines radio communication but does not define radio. If you could add a very simple provision there in section 3 it would take care of that whole problem and save them on that point. That still leaves, of course, the larger question of the wartime control.

I think that would be taken care of by your staff's proposed amendment. Senator, you have already read the paragraph at the bottom of page 2.

The CHAIRMAN. That is a little repetition. Go ahead.

Mr. MILLER. In contrast to my suggestion and to the suggestion for amendment, Senate bill 537 proposes to throw broadcasting into a hodgepodge of diathermy machines. I got this from our engineer just to give you some suggestions; I got a lot more when I got here this morning. I was amazed at the wide scope of it. I want to emphasize at this point what both members of the committee have already said during the course of the examination about the discussion here about present intentions of those who are proposing this bill.

I think this will bear repetition for the record. Present intentions of those who are proposing legislation have nothing to do with what happens when that bill becomes law and goes into effect. The people who are administering it, the people who are giving it judicial interpretation, are very little concerned with what those who proposed it said. They are very much concerned about the congressional intent as expressed by the members of the congressional committee.

Congressional intent as expressed here this morning certainly varied considerably from the expression of intent, no matter how sincere they may have been, on the part of one or two members of those who were proposing. I shall speak again of that a little later. The point is here that the language of this proposed law is very broad and in my opinion very dangerous. Justification can, no doubt, be found, easily, for rigorous control of such nonbroadcasting radiations such as those that I have read, by methods not even contemplated in section 606. No doubt separate legislation is needed for this purpose, although I agree with you it would be better to include it in 606.

If Senate bill 537 were limited in its scope, we, representing the broadcasters, probably wouldn't be here. I am speaking now of the effect on broadcasters.

Just to sharpen the issue on this point, let us assume that an order is issued, requiring that at a given moment all instruments, devices, apparatus, and other things capable of emitting electromagnetic radiation shall cease to transmit or emit such radiation. At that point let me stop to say that General Ankenbrandt's statement as to what that means, what the proposal to build means, and what the bill actually provides, it seems to me are quite different. I shall come to that in a moment because this bill expands the thing in my opinion much more widely than a wartime operation.

Presumably a considerable number of people might be inconvenienced by being deprived of diathermy treatments administered by diathermy machines capable of such emission. As I heard the testimony this morning, I want to qualify my statement because certainly the various kinds of things we have heard about here this morning would suggest that such an order would very seriously disrupt our domestic life far beyond such little inconveniences as I suggest here.

The same order, however, would result in taking off the air all the broadcasting stations operating in the United States. Such an action might be highly disastrous to the safety of the country. The people of the United States have come to rely on broadcasting as a major source of news and information, especially in times of crisis when other means of information fail.

If all broadcasting transmission should suddenly cease, it might cause public panic and hysteria beyond all possibility of measurement. From the Government's point of view, perhaps no distinction should be made between the different kinds of emission of radiation—when I speak of the Government there I am talking about the defense, of course—so far as the effect on navigation may be concerned. My point is that the difference between the two forms of electromagnetic radiation is so great, and their impacts upon the people of the country so different that they cannot be considered in the same breath.

Such a hodgepodging of broadcasting and nonbroadcasting radiations, for regulatory purposes, in one law could produce disastrous complications, and dangerous conflicts of governmental power. This is what concerns the broadcasters about S. 537, and this is the point to which our testimony will be directed. I will analyze, for you, the provisions of the proposed bill and discuss some of the interpretations which can be placed upon them.

Mr. Neal McNaughten, director of engineering for the National Association of Broadcasters, is present to testify concerning engineering phases of the problems presented by S. 537. Mr. McNaughten was, for several years, a member of the Federal Communications Commission staff; he has participated in NARBA conferences, and in many other activities which have made him very familiar with the problems which this bill is intended to solve.

Mr. Ralph W. Hardy, director of Government relations for the National Association of Broadcasters, is present to testify concerning the impact of this bill upon broadcasters and upon the general public, if it should be enacted into law. Mr. Hardy was, for several years, active in the management of a large broadcasting station in a large inland city, and he is well acquainted with the operations of a station in its relation to community life.

My first point is that the bill goes far beyond the granting of war-time or national emergency powers; and constitutes, instead, a complete delegation to the President—by the Congress—of its power to control one of the greatest media of news and information. Perhaps such a delegation may be justified in time of war or national emergency; but how can it be justified whenever the President, in the completely unguided exercise of his discretion "deems it advisable"?

The language of the bill is:

In time of war, national emergency, or whenever the President deems it advisable in the interest of national security * * *

I note that this is a very decided departure from the language of section 606 which speaks in terms of a proclamation by the President. One of the witnesses suggested that when a proclamation has been made the situation contemplated by this bill would not be any different from the present.

But this bill goes much beyond, because it doesn't have that limitation which appears in 606 (c)—

Upon the proclamation by the President that there exists war, a threat of war and so forth. It merely says—

In time of war, national emergency or whenever the President deems it advisable in the interest of the national security.

A very decided difference.

I may call your attention to the letter of transmittal which came along with this bill from the office of the Assistant Secretary of Defense, the second paragraph of which says—

The purpose of the proposed legislation is to provide the necessary Executive authority to control electromagnetic radiation not only during hostilities or proclaimed emergency, but also during times of strained international relationships when a surprise attack on the United States is a possibility.

Consider the implications and possibilities of that proposal. This is the kind of power which a Stalin or a Hitler might exercise. When Congress legislates upon such a subject, it does so, not in the light of Presidents of the past or present, but of a man who might occupy that position in the future and who might be lacking in discretion or in respect for our American traditions.

Or consider the fact that this bill provides also for the transfer of such authority to any one of a large number of officers, departments or agencies, to whom, presumably, would be given the same discretion. Would it be wise to empower any man to descend upon the operator of a broadcasting station "whenever he deems it advisable" and control the use of that station, or authorize its use by such agencies or departments as he may direct?

As a matter of fact, such a delegation of power, other than in time of war or national emergency, would probably be unconstitutional, as a violation of the first amendment. The first amendment forbids Congress to make any law abridging freedom of speech. It does not say that Congress may abridge freedom of speech when an officer, designated by Congress, "deems it advisable in the interest of national security" to do so. This is a curious coincidence. This is the kind of language which representatives of totalitarian government have tried to insert in the Convention on Freedom of Information which is being drafted by the committee of the United Nations.

As was well said, recently, by Carroll Binder, representative of the United States on that committee:

* * * will our efforts evolve into a document which in effect will utilize the prestige of the United Nations to legitimize certain restrictive governmental practices which do not now enjoy international respectability?

And they use just that same language in the interests of national security. Surely it would be just a little incongruous for us to refuse adherence to a Convention on Freedom of Information because that convention recognizes the right of a government to control news-gathering and dissemination whenever it is deemed advisable to do

so, "in the interest of national security," and at the same time, adopt legislation, such as this, which would authorize the President—or anyone whom he designated—to take off the air one or all broadcasting stations in the Nation whenever he deemed it advisable in the interest of national security to do so, or in the alternative, to direct some department, agency, or officer of Government to operate the station.

My second point is that the language of this bill—especially as it applies to peacetime as distinguished from wartime or emergency situations—gives arbitrary and un-American powers to the executive branch of Government; which would put the broadcasters and the people of the country at the mercy of officers of Government without the protections contemplated by our Constitution.

Thus, the bill provides that whenever the President—or any officer to whom he delegates authority—deems it advisable, in the interest of national security, to use or control the broadcasting stations of the country, he may make such regulations and issue such orders as he considers necessary and—if he deems it consistent with national security—shall publish them in the Federal Register.

In contrast to the provisions of this bill, section 606 of the Communications Act requires that before the President can exercise such powers, he must proclaim—

that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States * * *

Certainly, this authorization is broad enough.

But at least it puts the people and the broadcasters on notice. S. 537 requires no proclamation by the President; no publication except in the Federal Register and not even then, if such publication would in his judgment—or in the judgment of any one of a large number of officers to whom power might be delegated—be inconsistent with national security.

When we add to the controls provided for in section 2 (a) of S. 537, the penalties provided by section 4, the essential iniquity of the bill becomes apparent. Section 4 provides felony punishment for anyone who acts in violation of an order or regulation promulgated under section 2, even though, as previously noted, he may be unaware of the issuance of such order or regulation.

Thus, a broadcaster might be guilty under the bill for "knowingly having in his control, custody, possession" the radio transmitter which he uses to operate his station, if a rule were passed which made that improper. Moreover, any citizen might become guilty under the act for having control, custody, or possession of a receiving set.

Here we come to a very important question of criminal law which relates to the method of proscribing and defining criminal conduct. Some of you will remember the Hot Oil case—I don't remember the name of the exact case—but the point involved in those cases involved exactly the same kind of appropriation, the violation of regulations issued by an agency of Government and not published. As a matter of fact it resulted in a decision by the Supreme Court in those cases that the law requiring the Federal Register itself was passed, and therefore the first time we began to get publications of orders and regulations of what kind.

What we are having proposed here is that these regulations and orders may be published if in the discretion of somebody they don't.

conflict with the national interest. Assume that such an order or resolution was made and not published. Some person, a broadcaster, a citizen, might be brought to trial on a criminal case—and with a felony penalty involved—when he did not even know that such a regulation had been made. We will have gone a full cycle on the thing, back to the days of the Hot Oil case, and the regulations in that case. This type of proposed legislation reminds us rather of Emperor Caligula who posted his laws, high, out of the sight of his people and then punished them for violations of which they were not aware. It reminds us of *ex post facto* laws—*forbidden by our Constitution—under which men were punished for acts innocent when committed, but made punishable by laws enacted thereafter.*

My third point is that enactment of this proposed legislation, and exercise of power under it, could result in endless duplication, confusion, and conflict. Under the provisions of the Federal Communications Act, broadcasters are licensed and controlled by the FCC.

This bill would empower the President to multiply the agencies of government which could control them. It provides (sec. 2 (b))—

The President may delegate to Government departments, agencies, and officers—note the wide scope of it; the discussion this morning seemed to mean a delegation to the Defense Department, but it might mean a delegation to anyone—

The President may delegate to Government departments, agencies, and officers such authority, duties, and functions as he considers necessary to accomplish the purposes of this act.

This language is so broad that the President could, if he wished, delegate power (1) to decide when it is deemed “advisable in the interest of national security” to control the use of broadcasting stations and/or authorize their use by Government agencies or departments; (2) to make such regulations and issue such orders as the designated officer considered necessary; (3) to determine whether or not such regulations and orders should be published; and (4) to exercise all the other powers granted by the act. One of the most sweeping proposals for grant of power that I have ever seen in proposed legislation.

In other words, if Congress approves this legislation, it must contemplate the probability, or at least the possibility, that in the near future, any number of unspecified Government departments, agencies, and officers may be using or controlling the use of any or all broadcasting stations in the United States; by delegation of authority from the President, whenever they or any one of them “deems it advisable in the interest of national security.”

It is easy to imagine the confusion and conflict which could result. With the Federal Communications Commission, the Army, the Navy, the FBI, the Office of Civil Defense and others, giving directions as to use, or using, the facilities of broadcasting stations, the station operators in desperation might well prefer to give up their licenses.

The continuing experience of broadcasters is that every Government agency wants time on the air to advertise and sell its program. At present, the broadcasters have some choice as to what they shall use; to establish priorities. We are working at the present time with the representative of the White House on that very problem, to establish priorities which will from week to week insure that the right programs are being given time and emphasis on the air.

Presumably, under such a law as this, each agency and department would soon secure authority to require all stations to broadcast its own releases. Conceivably, some agencies would prefer to take over a few stations and operate them, in order to secure what seemed to them adequate coverage.

The Civil Defense Administration might find it desirable to commandeer all broadcasting facilities from time to time; and, from time to time, the Department of Defense might find it necessary for all stations to be silent. As it would be inconsistent with the national security to publish many of these various regulations and orders, the broadcasters would never know what was coming next, and would be turning somersaults trying to keep up with them and to reconcile one with the other.

My fourth point is that the bill provides inadequately for the compensation of any broadcaster whose property may be controlled by the Government under the provisions of section 2. Section 3 provides that the owner of the thing which is used under the provisions of section 2 shall be entitled to just compensation, but it makes no provision for compensation in case of the control which is also provided for under that section.

Such control might be as completely destructive as would outright confiscation. Presumably, this omission in the bill could be easily corrected—if the bill were not otherwise fatally defective—by adding a provision for just compensation for loss or damage suffered from Government control and specifying some of the elements of loss or damage upon which recovery might be predicated.

I may say at this point, section 606 contains this same inadequacy, the same omission. Provision is made there for compensation in case of use, but no provision is made for compensation in case of control or interference with operation.

In fairness to the broadcasters of the country, whose investments are tied up in radio and television stations and whose livelihood depends upon the operation of those stations in just as real a sense as in the operations of any other business, recognition should be given, explicitly, to loss which may be suffered, not alone from governmental use, but from putting the station off the air altogether, or from controlling it in such manner as to destroy its audience, eliminate its advertisers or break down its good will in the community which it serves. No question is involved here of who "owns the ether" or the "airways" or the "frequencies."

I picked up those quotes from discussions on the bill at the time of the original enactment—606. I say there is no question involved here as to whether it is the Government or the licensee. The broadcaster is carrying on interstate commerce in just as real a sense as the steamboat owner on a navigable stream or a carrier on a highway. He is entitled to the same compensatory consideration for loss, in his business of carrying on such commerce, whether it results from use of his equipment, interference with his legal business methods, or destruction of his good will and custom.

My fifth point is that the enactment of this bill, at least so far as it relates to broadcasting, would require a complete duplication of the monitoring and policing function now performed by the FCC. No useful purpose would be served by such duplication; it would

involve large additional funds, staffs of officers, and harassment both of broadcasters and of the people.

Obviously the monitoring which should be done and should be necessary certainly under wartime conditions, should be done by the body which is already operating in the field, already has its staff equipped for that purpose, and an elaboration or enlargement of that staff for that purpose could take care of it. Especially if the amendment proposed for section 606 were added.

Here, again, we find a very important reason for eliminating broadcasting entirely from this bill, and leaving to the FCC its normal long-time function of licensing, monitoring, and regulating broadcasting.

My sixth point is that the freedom of speech and press is so vital to the integrity of our country that its regulation and control by Government should be minimal in character. Such control should be kept in the legislative branch, which is most aware of the values involved in such freedoms and most responsive to the people.

The Executive—especially when acting under delegated authority—is apt to become callous to these values. This is particularly true in time of war, when the people are most willing to surrender their freedoms. Unfortunately in time of war, when the Government should be most anxious to preserve these freedoms for the people, there are those who are so intent on military operations that they would ride roughshod over the freedoms.

In this bill we have language—as already indicated—which could be used to strip the people of their freedoms and to destroy their rights, even in times of peace. The letter of transmittal which accompanied the draft of the bill, frankly states that:

The purpose of the proposed legislation is to provide the necessary executive authority to control electromagnetic radiations, not only during hostilities or a proclaimed emergency, but also during times of strained international relationships when a surprise attack on the United States is a possibility.

In view of existing world conditions, this could be a long-term, continuing situation of many years' duration.

It is respectfully submitted that the freedoms of the people should not be surrendered or the powers of Congress abrogated on such a showing for so long a time. To do so would be to admit that our American way of life is no longer possible, in the world of today.

My seventh point—closely related to the sixth—is that if the United States is not to become a garrison state, means of communication must remain open to our people; especially in times of crisis. If this is not done, we will lose the understanding of governmental action, the sympathy for oppressed people, the resiliency of mind and spirit which makes us a resourceful people; so competent in time of critical emergency that the garrison countries of the world cannot understand the reasons for our achievements.

Without these characteristics and without the achievements which flow from them, we could have no military superiority. Mr. Ralph Hardy will explain this point more fully from the point of view of the broadcaster in the community. When we talk in terms such as were used here in assuring the committee this morning as to what the intentions of the Defense Department are, that particular kinds of devices are not considered useful today for navigational purposes, or what

they propose to do, or relationships which have been worked out with civil defense and others, of course we are not speaking realistically about what is going on in the field of law administration.

As the chairman well pointed out, General Ankenbrandt won't live forever, there is no telling in whose hands this law may come into for administration a few months from now. All sorts of things can happen when an enterprising man gets busy in the administration of the law to get the result that he wants.

In summary, gentlemen, we have here an example of proposed legislation, drafted very seriously and with great care to accomplish a particular purpose, but without proper regard for its effects, beyond the scope of the draftsman's purpose. Applied to broadcasting, the proposals are startling in their incongruity and unreality. Applied to the control of diathermy machines and machines for drying plywood, they may be more appropriate. On this point I express no opinion other than of caution.

Perhaps I should elaborate to say that the point that I made earlier, concerning one of the fundamentals of proscribing and defining crime, should certainly be very carefully considered when we decide when guilt might be established upon the basis of a regulation, or an order granted by a person acting under emergency circumstances such as this, and under circumstances which might make it undesirable to publish it. We wouldn't want to find ourselves again in the situation which we were in when the Supreme Court spanked the Department of Justice for proceeding in that case and as appeared in the Hot Oil case when some man appeared to be going around with the regulations in his pocket which the person affected had never seen. As applied to broadcasting, this bill should certainly be disapproved.

Thank you.

The CHAIRMAN. We thank you, Judge, for your hard-hitting statement. Whether we agree with you or not, you certainly make your position understandable.

Mr. MILLER. Of course, that is the way you get a complete balancing of all views and arrive at your own conclusions.

The CHAIRMAN. I agree completely with that. Is there anything further that you desire to say.

Mr. MILLER. No, sir. I would like an opportunity to study the proposed amendment to 606.

The CHAIRMAN. Yes; we would like to have you study that proposal and offer any suggestions which may occur to you.

Mr. MILLER. I will do that, thank you.

The CHAIRMAN. I would like you to say, in that connection, what you think about the penalty provisions.

Mr. MILLER. I will do that.

The CHAIRMAN. If you think the penalty provisions are necessary to be added to that, and what provisions should be added.

Mr. MILLER. I will be glad to do that, also. Thank you.

The CHAIRMAN. We have three more witnesses, but we will recess until tomorrow at 10 o'clock, if there is no objection.

(Whereupon, at 1:28 p. m., Wednesday, February 21, 1951, the meeting was adjourned, to reconvene at 10 a. m. Thursday, February 22, 1951.)

EMERGENCY CONTROL OF ELECTROMAGNETIC RADIATING DEVICES

THURSDAY, FEBRUARY 22, 1951

UNITED STATES SENATE,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D. C.

The committee met, pursuant to adjournment, at 10 a. m., in the Committee Hearing Room, United States Capitol, Washington, D. C., Senator Edwin C. Johnson, of Colorado (chairman), presiding.

Present: Senators Johnson, chairman, and Magnuson.

Also present: Nicholas Zupple, professional staff member.

The CHAIRMAN. The hearing will please come to order.

The first witness is Neal McNaughten. Mr. McNaughten, will you come forward?

Mr. McNaughten is director of engineering, National Association of Broadcasters.

STATEMENT OF NEAL McNAUGHTEN, DIRECTOR OF ENGINEERING FOR THE NATIONAL ASSOCIATION OF BROADCASTERS

Mr. McNAUGHTEN. Mr. Chairman, you have copies of my prepared statement. I have made some slight changes in this. The other copies may be followed very closely.

My name is Neal McNaughten. I am director of the department of engineering of the National Association of Broadcasters, on whose behalf I appear at this hearing.

I have had some practical experience in the problems of locating the geographical point of origination of electromagnetic emissions in the range of frequencies ordinarily used for medium- and long-distance communications. This was during World War II, when I was employed by the Federal Communications Commission in work which involved the determination of the geographical location of unidentified electromagnetic emissions.

It is my understanding of section 606 of the Communications Act that only those devices specifically intended for the purpose of carrying out communication through the use of electromagnetic waves are subject to the control which may be exercised under that section. If this interpretation of the act is correct, then one of the more significant differences between section 606 of the Communications Act and S. 537 is that S. 537 would authorize certain control of any or all devices or things using radio-frequency generators, whether or not they are for the intentional radiation of electromagnetic waves into space.

Devices not intended for communication purposes do radiate signals capable of being used for navigational purposes. This probably is best described by Commissioner George Sterling, of the FCC, in an address made in Cleveland, Ohio, on January 25, 1951, before the Institute of Radio Engineers and the Industrial Electronics Organization.

Commissioner Sterling said:

If you do not believe that the radiations from the circuits of a diathermy machine have long-range characteristics, I should like to tell you that in our early investigations during 1944 the National Airport complained of interference from an unknown source and through the use of our high-frequency direction finders the offending machine was found in a hospital in Bennington, Vt. Signals from the machine were picked up by our monitoring stations in San Juan, P. R., Portland, Oreg., and Santa Ana, Calif.

Since, 1944, the date mentioned by Commissioner Sterling, much has been done toward the reduction of illegal radiations from such devices, but thousands of these units, quite capable of radiating signals useful at long distances for rough navigational purposes, are still in use.

Commissioner Sterling's example indicated that long-range direction-finding equipment did locate the town in which the equipment was operated. Since such equipment may be used during a large period of the day, by that I mean the diathermy equipment, even though intermittent in operation, it is conceivable that a direction-finding network operated by a foreign power and similar to the FCC's could duplicate the action—roughly, locate the source of the signal within the United States, then use it for navigational purposes. This example may sound a little farfetched, but when one realizes the relative simplicity with which it could be applied it does not sound so fantastic.

Incidental radiation of the type created by diathermy machines is also created by other devices, such as radio receivers, industrial heating units, test oscillators, phonograph oscillators, and sources of other devices. It is true that a large number of these incidental radiating devices may have only a short signal range not necessarily useful as long-distance navigational aids, or perhaps not useful even at short distances as navigational aids, but nevertheless they would seem to be covered by the control contemplated in this bill, thereby creating a control not contained in section 606 of the Communications Act.

On this basis then, if this bill is passed, the terms with respect to control of electromagnetic emissions are expanded to include those incidental electromagnetic radiations not necessarily intended for communication purposes. The problems of enforcement then become greatly magnified in the event the authority within the bill is exercised.

The Federal Communications Commission, through its field engineering and monitoring division, carries out investigative and surveillance work relating to lawful and unlawful electromagnetic emissions. However, it is my understanding that for budgetary reasons this division is unable to fully cover the areas of investigation and surveillance already within its jurisdiction.

This leads me to the question of whether the funds established in section 6 of S. 537 are intended to augment the services of the FCC or to establish an entirely new investigative or enforcement group, which may or may not duplicate the efforts of the Commission.

According to the FCC annual report for the fiscal year ending June 1950, the Commission conducted approximately 22,000 personal on-the-spot investigations, 12 percent of which were on broadcasting installations. This figure does not include surveillance cases where only monitoring was involved.

According to FCC figures, broadcasting stations number only 1.4 percent of the total transmitters authorized by the Commission. Thus, it would appear that the Commission is well acquainted with the equipment used by broadcasters and that, in turn, the broadcasters are well acquainted with the Commission's jurisdiction. Thirty-six percent of the Commission's investigations were made on United States ships which, again according to the Commission's figures, number about 18,000 or 19,000. At least those are the ships on which there are licensed transmitting installations.

The CHAIRMAN. Short wave?

Mr. McNAUGHTEN. Yes, sir, low frequency and high frequency installations. This, then, means that 50 percent of the Commission's on-the-spot investigative efforts were expended on approximately 23,000 of the 320,000 transmitters or stations. I mention this to point up that enforcement of regulations with respect to broadcasting stations has been exercised by the Commission, whereas insufficient staffing has apparently prohibited the Commission from conducting similar investigations of all transmitter installations.

In these cases the Commission usually issues discrepancy reports. Under this bill, assuming the FCC would become the enforcement agency, the problem then becomes one of conducting investigations and maintaining surveillance on not only the 320,000 licensed installations but of the many more thousands of devices capable of incidental radiation which may or may not be useful as navigational aids. It would seem to me that one of the main jobs of an enforcement group would be to determine whether or not a given electromagnetic emission is or is not useful as a navigational aid.

It is my understanding that the Civil Defense Administration seeks the use of broadcasting facilities during periods when attack is imminent, as well as the period during the actual attack, and the recovery period following the attack. Such use would no doubt be consistent with section 2 of the bill.

I have attended two classified meetings where the subject of maintaining broadcasting operations prior to, during, and after an attack has been discussed. At one of these meetings it was the general consensus of the engineers in attendance that at least one of the plans proposed warranted further study. A further meeting of this group has not been called to discuss the results of the study which was made. For security reasons it is inappropriate for me to talk of this subject except in the broadest of terms.

To my knowledge, this plan would fulfill the needs of the Civil Defense Administration in that they could maintain contact with the populace prior to, during, and after an attack. I sincerely hope that the studies look toward an integrated plan with the stations in Canada, Cuba, Mexico, and the Bahama Islands, since, for instance, many of our large cities are only a few miles from relatively high-power Mexican, Cuban, and Canadian stations.

In many cases this distance is about equal to or less than the error which would be expected in long-range navigational activities. As-

sume for the moment that all stations in the United States were shut down to prevent navigational aid to any foreign country in an attack upon the United States, and the stations in these adjoining countries continued operation or were not included in a controlled-plan operation, the effectiveness of closing down our stations would be very much minimized. Also in this respect, if all stations in the United States were to be shut down, it is conceivable that one or more clandestine stations could go into operation making such subversive operation extremely effectual in view of the cleared frequencies they would have. In this case, a controlled pattern with broadcasting stations in operation would seem to be far more effective in eliminating navigational aids.

I would also like to point out that in early talks concerning defense networks there was discussed a means of using broadcasting stations as a secondary alerting or communication system. This method involved the use of subaudible signals not heard by the listening public. It is my understanding that tests using this type of alerting equipment have proved satisfactory and effectual, thereby providing a means for broadcasting stations to become an integral part of the civil alerting system in this country.

I should also point out that in the past broadcasting stations, through use of their regular broadcasting transmitters and their remote pickup facilities, have assisted materially in disasters involving floods, fires, tornadoes, and hurricanes. This assistance has been rendered in cooperation with State authorities, police and fire departments, Red Cross, and other relief and law-enforcement agencies.

Broadcasters have always cooperated to the fullest in these cases and in many instances maintain special equipment for the purpose. Also, in many cases, auxiliary power supplies are maintained in the event the primary supply of power fails.

If telephone lines are down or not usable, the remote pickup equipment serves as a connection between the point of program origination and the transmitter. In the event of an enemy attack upon many areas of the United States, these stations would be found to be already equipped to continue operation even though the primary power lines may be down and the telephone circuits out of commission.

For the committee's information, I would like to call to your attention at least two examples of the broadcaster's role in the national defense picture. In the State of New Jersey there has been demonstrated the effectiveness of a chain of stations tied together for the common purpose of dissemination of information from the State civil defense center.

This network is comprised of 23 AM and FM stations. Radio relay transmissions are used between stations, thereby eliminating the need of physical wire circuits. Each station already has or is procuring an auxiliary power plant for use if electrical power circuits fail. The Governor of the State and the director of civil defense are the only two people authorized to activate this network.

In the State of New York there exist two integrated networks comprising 118 FM and AM stations. One is the New York metropolitan network which extends east of Albany, and the other the upstate network extending west of Albany. As in the case of the New Jersey network, these networks are organized for the express purpose of disseminating information prepared by the State and municipal civil

defense commissions. To fully appreciate the effectiveness of these networks, it must be realized that all the stations transmit simultaneously the same program as would be prepared by the civil defense agencies. It is my understanding that similar networks are in the process of organization in other States.

I believe you will find, gentlemen, that the broadcasting industry is willing to cooperate in any reasonable plan of operation and can provide the means of quick mass communication not found in any other medium. I believe you will find that section 606 of the Communications Act provides the necessary regulatory power over legally licensed broadcasting stations in times of emergency.

It is my belief that the bill S. 537 is intended to extend this regulatory power over unlicensed, and now unregulated, radiating devices, or even over licensed devices for which there have been insufficient funds to carry out investigative or enforcement actions. Therefore, it is appropriate that the bill be amended to cover these specific cases only and not duplicate section 606 of the Communications Act. Or it may be more appropriate to amend the Communications Act in a manner similar to that proposed by your staff yesterday.

The CHAIRMAN. We thank you for this very learned dissertation on the problem. Does that complete your statement?

Mr. McNAUGHTEN. Yes, sir. Thank you, Mr. Chairman.

STATEMENT OF RALPH W. HARDY, DIRECTOR OF GOVERNMENT RELATIONS FOR THE NATIONAL ASSOCIATION OF BROADCASTERS

The CHAIRMAN. Our next witness is Mr. Ralph W. Hardy. Mr. Hardy is director of Government relations for the National Association of Broadcasters. You may proceed in your own way.

Mr. HARDY. My name is Ralph W. Hardy. I am director of the Department of Government Relations of the National Association of Broadcasters, and I appear at this hearing on behalf of that organization.

I propose to direct my testimony to a consideration of the interests of the public at large, and the functions of the individual broadcasters in maintaining adequate and constant communications facilities during emergency conditions.

The broadcasters of the country are concerned with the operating eventualities possible under S. 537. They have lived through the last great World War and through an extended period of strained international relationships under the provisions of section 606 of the Communications Act of 1934, as amended. They have acquired, as a result of this experience, a considerable degree of confidence in the administrative equities of this section and in the executive restraints exercised in invoking the severe controls over radio and television broadcasting made possible under the conditions outlined in the act.

Of equal importance is the fact that the American public, too, has acquired a confidence in the reliability and accessibility of instantaneous broadcasting services in emergency situations. We have evolved a standard pattern of behavior in the presence of danger and distress. Almost without deviation, the average person, after checking on self-preservation and attention to those close at hand, will go to a

radio set, turn it on, and find out what has happened and get instructions on what to do.

But now a new aspect of regulation and control of broadcasting is before us. It puzzles the broadcasters.

S. 537 was prepared and sent to the Senate by the Department of Defense, presumably to get legislative approval for powers over radio and television broadcasting beyond those set forth in section 606 of the Communications Act.

I say presumably, because if, as we have heard, the only intent of this new piece of legislation was to authorize control or use of electromagnetic radiation devices other than radio and television facilities offering program services to the general public, then such could have been clearly stated in the bill.

Section 606 could have been amended, with little difficulty, to include the other electromagnetic devices. Hence, the genuine concern as to the role of the broadcaster and the interests of the public under a new set of rules which, at best, are vague, broad as all outdoors, and confusing as to administrative coordination and execution.

When I read the lead line in the communications section of the new United States Government Civil Defense Handbook, "The nerve system of civil defense is communication," I was vividly reminded of my own experience during the early phases of the last World War.

The period I have in mind was the tortuous lull right after the disaster at Pearl Harbor. At that time I was serving as coordinator of war activities of radio station KSL in Salt Lake City, a 50,000-watt clear-channel station. Rumors were flying thick and fast that Japanese air raids on the western coast and inland supply centers of our country were imminent.

In our station we had evolved a thorough system of emergency operation. Every member of the staff knew his post and duties. One evening along about 10:15 the special telephone in my home, installed for emergency purposes and connected with our control room at the broadcasting station, rang long and loud.

Our engineer advised me that we had received word that an air raid was expected on the west coast and that we were to stand by for orders from the military. I rushed to the station and did my first task—opened up our public telephone switchboard. By this time the air raid sirens in Salt Lake City were sounding, and our switchboard became a bank of insistent lights.

The first question asked by most of the highly excited callers was, "Are you going to stay on the air?" There were the more pathetic kind, too. Old people, confused and frightened, wanted to know where they could go. An Army officer from nearby Fort Douglas called to find out if we knew what he should do.

The military had ordered all Pacific coast broadcasting stations off the air, and we were soon advised that KSL in Salt Lake City was the only station being heard on the west coast. Then the telephone and telegraphic requests began to come in from civilian and military people on the coast.

"Broadcast this message"—"Broadcast that message"—"Everyone on the coast is listening to you—be careful what you say." During the weeks that followed we received a tremendous volume of mail from people who maintained their morale and sense of calm by listening to

our broadcasts on that eventful evening, which, as you know by history, turned out to be a false alarm. But it taught me a great lesson about the reliance of the people and the civilian defense and military authorities on standard broadcasting stations.

I have taken your time to relate this personal incident because we are moving into the same type of a situation. I have here a copy of the New York Times for Sunday, February 11. On page 4 under the headline, "Aid Raid Instructions," I read that:

When you hear police or fire sirens, do this—at home—go to previously selected shelter. Keep radio on.

In the subsection entitled "After an Attack," I read:

Remain calm. Follow instructions of civil-defense forces. Keep radio on to receive information and instructions. If you are within blast area—remain in your shelter until advised by radio or civil-defense forces that it is safe to leave.

These are the instructions issued by Arthur W. Wallander, Director of Civil Defense. Radio's vital role is amply emphasized in these instructions.

Returning again to the United States Civil Defense Handbook, I read at the bottom of page 85:

Communications plans at the local level should embrace all forms of communication, including telephone, telegraph, facsimile, AM, FM, and TV, radio, teletype, messenger service, and other emergency communications means.

On page 87, under the title "Broadcasting," I read:

Broadcasting stations (including television) should be utilized as an important medium to inform the public of its responsibility in civil defense. For effective civil-defense operations, every person should know what he must do in an emergency.

This will involve a major educational program and require a well-integrated system for the dissemination of information. Through broadcasting stations, timely civil-defense informational and educational material can be quickly presented to a maximum audience with a minimum number of persons required to prepare and disseminate the information.

Programs can be broadcast regarding the location of shelters, advice given on how to prevent the jamming of thoroughfares, and similar educational programs carried on for the benefit of the various levels of civil-defense organizations.

From these instructions, and those just quoted from the New York area, it is readily apparent that broadcasting plays a vital role in the educational or preemergency phase of civil defense as well as in the actual heat of the battle. The public in both instances is conditioned to rely on radio and television for the most important kind of information conceivable under emergency pressures.

Broadcasters are not unaware of the presence of new instruments of war. Guided missiles, radio-guided aircraft, and the whole range of atomic weapons are regularly reviewed in the widely listened-to newscasts. There is no disposition to argue with the military as to the fact that many of these missiles could be "homed" on a target by means of electromagnetic radiation. What does concern the average operator of a broadcasting station is that he has been led to believe that there are other effective ways of rendering his broadcast signal unusable for effective homing without sacrificing his program service to a dependent audience.

Broadcasters who have done round-the-clock stunts in floods, snowstorms, fires, and explosions know something about the behavior of masses of people with and without adequate information and guidance. They sense, perhaps more urgently than some distant regulatory body, the responsibility they have to function with skill and calmness and coordination to avoid the tragic effects of panic and mass bewilderment. They think that these considerations should be weighed carefully against the temptation to do what may appear to be the simple thing in ordering them to go off the air.

Significantly, we have a new device by means of which information can now be given to the public in our larger cities with unparalleled effectiveness. I speak of television, and its phenomenal development in the major markets of our country. I need not enlarge at length before your committee on the remarkable adaptability of television to civil-defense needs. Combining as it does the sound with the picture, it is possible to register information and instruction in an indelible manner.

This Senate committee is undoubtedly aware of the unsettled status of final Nation-wide civil-defense plans respecting the transmission of actual air-raid warnings. Our association is answering a sizable volume of mail each passing week from broadcasters who want to complete their cooperative plans with State and municipal civil defense committees.

Under order from Civil Defense Administrator Caldwell, dated December 15, 1950, the Basic Code of Public Air Raid Warnings to be used by all States and cities in the event of enemy attack includes this instruction:

Regular radio and television broadcasts should not be used to broadcast the public-warning signals at this time. The role of the broadcasting industry in civil defense is currently under study by a committee including representatives of the Federal Communications Commission, the Department of Defense, the Civil Defense Administration, the National Association of Broadcasters, and the major networks.

It has been demonstrated in case after case that air-raid warnings without the added coverage afforded by broadcasting stations are inadequate.

With the broadcaster uninformed as to what his status might possibly be under the various measures suggested in S. 537, and the civil-defense people urgently seeking a disposition of one of their key problems regarding effective communication, we respectfully request your committee to issue an unfavorable report on S. 537. If the evidence submitted to you in this hearing warrants such action, we suggest that steps be taken to amend section 606 of the Communications Act of 1934 to include those electromagnetic radiation devices not presently covered by this established legislation.

The CHAIRMAN. We thank you, Mr. Hardy. I think that the testimony you have offered here this morning will be extremely valuable to our committee.

Mr. HARDY. Senator, may I make one additional comment that is not found in my prepared statement?

The CHAIRMAN. Yes, sir.

Mr. HARDY. You very appropriately drew attention of witnesses who appeared before you yesterday to the problem of monitoring, which I think hasn't been given due consideration. And certainly

speaking on behalf of the broadcasters, I would like to indicate that they have a grave concern about that problem.

If S. 537 were to pass, and these broad controls which have been indicated were to be applied, we conceivably could have the anomalous situation of having our American broadcasting stations controlled, shut down, or otherwise changed, and without the protection of a broad monitoring and police service there is nothing in the world to prevent spurious transmitters from appearing instantaneously in designated geographical locations, which would give absolute and positive homing directing for any bombing target that was chosen in this country.

Certainly the emphasis on the part of an enemy, knowing that we have in consideration plans to change our own broadcasting pattern, would seem to give his people added interest in establishing spurious transmitters to provide the homing device which is required for that type of bombing.

The CHAIRMAN. And if we take off our normal broadcasting devices, it will be a great assistance to him and to the navigator who is using his signal.

Mr. HARDY. I would think so. And I would also like to stress this point: The question of monitoring, in terms of controlling a homing device, isn't just a matter of sweeping the frequencies with a listening set and finding that there is a new signal on the air. The problem that comes after that is locating it and silencing it.

Without substantially greater facilities than we presently have in the FCC, and the military, as I gathered from the testimony given yesterday—at least to date—which has not envisioned a broad policing operation to cover spurious transmitters, then the whole effect of silencing or changing or using can be broken down by the use of what I term spurious transmitters which can be located not necessarily in big cities, but at fixed geographical points, in mountains, canyons, and wherever else, when an attack is imminent.

In other words, they will be turned on only when the homing device is needed, and would be silent thereafter. I say the broadcasters are concerned that in controlling them, as is proposed in this bill, we might, by not making adequate provisions for complete policing and monitoring, upset the whole apple cart in the way that I have mentioned.

The CHAIRMAN. I think that your suggestion should carry great weight. I can see where we would be of great assistance to an enemy by doing the things which have been suggested.

Mr. HARDY. Thank you, Senator.

STATEMENT OF HERBERT G. FRIEDE, REPRESENTING THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS, NEW YORK CITY

The CHAIRMAN. We have a letter from Mr. James E. Jagger, general manager of the International Association of Fire Chiefs. I would like to read into the record this pertinent paragraph of his letter.

Under present world conditions and with the enormous amount of preparation going on in this country with regard to civilian defense, the fire service is one of the most important functions of the entire program. Legislation which would tend to restrict or limit, to say nothing of eliminating, radio communications in the fire service would be absolutely disastrous.

That is an important warning. Fires can do great damage. As a matter of fact, air raids, if they do nothing else, cause fires. I didn't mean to inject that in your testimony.

Mr. Friede is representing the International Association of Fire Chiefs of New York City. You may proceed, Mr. Friede.

Mr. FRIEDE. I have not a prepared report, Mr. Chairman, but I have made some notes from which I would like to talk, if I may.

The CHAIRMAN. Go right ahead in your own way, sir.

Mr. FRIEDE. I am appearing here at the request of the association mentioned by the chairman, and represent our States, counties, and municipalities of the emergency services on S. 537, a bill which has been proposed by the Department of Defense for the purpose of providing greater security and defense of the United States against attack.

The intent of this bill is to deprive an enemy of means for guiding aircraft. The provisions of the bill would authorize the President, in time of war, national emergency, or when he deems it advisable in the interest of the national security, to control the use by any person of any equipment capable of emitting any electromagnetic radiation between 10 kilocycles and 100,000 megacycles. The emergency services—fire, police, forestry, utility, highway groups—wish to assure the committee of their desire to cooperate so that every proper precaution be taken to secure and maintain maximum security as our responsibility is to safeguard life and property of our citizenry during both peace and war.

We are greatly concerned, however, by the broad powers of this legislation and the fact that it does not specifically spell out what is desired. We are equally concerned with the Department of Commerce and the Department of Civil Defense. The emergency services are the first line of civil defense in peace and war on which depends our entire civil economy.

Fire is the greatest potential enemy which can destroy us at any time should it get beyond control of our fire-fighting forces. If we should be so unfortunate as to have an attack, our emergency services are indispensable.

Yet here is a bill that could silence every radio station operating in the emergency service, and the civil-defense organizations, and the majority of our standard broadcast stations within the spread of frequencies 10 kilocycles to 100 megacycles. The constant threat of silencing these services has been the cause of obstructing the adequate development in our State, county, and municipal government of these services.

What would you say to a piece of legislation that could be used to silence the use of radio in the armed services of the Nation? It has every comparable aspect. The millions invested in the services greatly affect our taxpayers, and they are reluctant to develop the service while such adverse publicity on silencing continues.

The new Department of Civil Defense brings radio into greater use, and it is the only economical and dependable method of public warnings and communications. We therefore feel that careful study should be made by the Federal Communications Commission in cooperation with the Department of Defense as to just what is desired and what they desire to accomplish.

As previous testimony of Dr. Baker and others clearly indicates, certain types of electromagnetic radiation is not effective as naviga-

tion aids, and that any enemy would certainly depend upon celestial navigation in lieu of attempting to depend on the inaccurate methods of any other type.

The emergency service operations are intermittent and would not be an effective method to use as a navigation aid. Similar operation is carried on by our armed services in the actual theater of war. When it has been decided as to just what is required, the Federal Communications Commission and the Department of Defense should make a clear-cut statement to the emergency services and civil-defense authorities and to our general public so that they can proceed to properly equip the fire departments, the police departments, and our municipal services without the constant fear of radio silence.

We also feel that adequate powers, with possible minor amendments, now exist under section 606 of the Federal Communications Act. We have considered the committee's draft and find it still leaves a threat of radio silencing in section 606. And we recommend that some additional language be added which would remove from this section the threat of radio silencing, particularly to the emergency services which are so vital to our civil defense, both in peace and war.

Certainly it is not contemplated that our Army, Navy, or the Air Force will dispense with the use of radio. Yet our emergency services, who are not considered under the Federal Communications Commission's rules as quasi-governmental agencies, are subject to all the regulations as promulgated for the entire public radio industry.

Therefore, it can readily be seen that this important service is so concerned by the lack of information on its status.

Mr. Chairman, I would also like to add that the emergency services of our Nation are utilizing in this civil-defense program not only radio of the standard broadcast stations, but other types of radio in organizing adequate civil defense communication systems. As was stated by the previous speaker, communications are the nerve center of this vast mobilization for civil defense.

Here in Washington we have developed and designed a system of public air-raid warnings, using radio not only for the sound but so that we might have voice to assure the public of the status and the conditions which exist over a great vast public-warning system. That system is activated by radio for economical reasons, because that was one of the greatest deterring factors in World War II in our American cities, which prevented them from installing adequate air-raid warning devices—the tremendous cost of installation and then the fact that unless they were activated simultaneously they were of little value by virtue of the lost time in getting to them.

If they were connected by wire facilities, the cost was prohibitive and beyond the scope of the taxpayer to stand the tremendous impact. We now have radio by which we can activate these units simultaneously. We can talk over them. Are all these facilities going to be installed and then found useless when the actual need for them arises?

That is something I think that this committee should give very careful consideration to. We also are tying in our standard broadcast stations to that so that we can go still further beyond those within the hearing of our public warning devices. We are also using the standard broadcast stations for mutual-aid purposes between counties and distant cities.

All these things are important, and I think they should be taken into consideration before an additional piece of legislation is enacted which places the authority and control and the possible silencing of these services in the hands of another group, other than the Federal Communications Commission, the body which you have set up as the regulatory body of our radio services throughout the Nation.

I thank you, Mr. Chairman.

The CHAIRMAN. Your testimony makes a great deal of sense to me. We are very glad to have had you here.

Mr. FRIEDE. Thank you, sir.

The CHAIRMAN. Mr. Horne is Director of the Office of Federal Airways, Civil Aeronautics Administration, Department of Commerce. He has submitted a brief which, without objection, will go into the record.

STATEMENT OF CHARLES F. HORNE, DIRECTOR, OFFICE OF FEDERAL AIRWAYS, CIVIL AERONAUTICS ADMINISTRATION

Mr. HORNE. I am pleased to appear before this committee this morning to give you the views of the Department of Commerce with respect to S. 537, a bill to provide for the greater security of the defense of the United States by the control or use of electromagnetic radiation in such a manner as to avoid providing navigational assistance to an enemy which may be engaged in an attack upon the United States.

The purpose of this legislation is to provide the necessary executive authority to control electromagnetic radiation not only during hostilities or a proclaimed emergency, but also during time of strained international relationships when a surprise attack on the United States is possible.

The bill provides that in time of war, national emergency, or whenever the President deems it advisable, the Federal Government may use or control the use of any instrument, device, or apparatus capable of emitting electromagnetic radiation.

An appropriate Government department would be designated by the President to control such devices. The owners of any devices which would be used by the Government would be provided with just compensation in accordance with the fifth amendment. Persons who would knowingly violate regulations issued under this proposal, or retain control of any such device contrary to regulations, would be subject to a fine of \$10,000 or imprisonment of not more than 5 years or both.

The need for the legislation would appear obvious. The modern concepts of warfare have demonstrated that the control of such devices in the United States, its Territories, and possessions, during periods of critical international relationships, is necessary if their use as navigational aids is to be denied a potential enemy for piloted or pilotless aircraft or missiles directed toward targets in the United States.

Since transmissions from radio stations and other electromagnetic radiation could conceivably provide such navigational aids, action must be taken to control or prevent their use in time of emergency.

Existing statutory authority is inadequate to authorize such controls. At present, the Federal Government has the authority under

the Communications Act of 1934 to exercise control of Government radio stations by the issuance of appropriate Government orders and under section 606 (c) (d) of that act, has general authority to control non-Government radio stations in time of national emergency or war when proclaimed by the President.

There is considerable doubt, however, as to whether the control of radiation other than those intended for use in radio communications can be effectuated under the Communications Act.

Since the question has never been decided by the courts, and the number and variety of such miscellaneous noncommunication devices has increased greatly in the past decade, it is felt necessary that authority such as is herein proposed be enacted, clearly giving the Federal Government emergency control of all devices capable of emitting electromagnetic radiation.

The enactment of this proposal would have no adverse effect on the operations of the Department of Commerce. While there are a number of operations of the Department that would be subject to the controls authorized by the legislation, it is not anticipated that the enactment of this bill would seriously interfere with such operations.

With regard to specific language of this bill, the Department of Commerce has no objection. The language has been made sufficiently specific to reduce the possibility that the objective of this legislation would be in any way mistaken for the control of incidental radiation from noncommunications devices causing radio interference.

The bill would provide the Federal Government with a specific and limited authority which is to be utilized only under certain conditions and is directly related to the national defense.

In our opinion, the issues with regard to this legislation seem clear and the justification fully established. It is therefore the belief of the Department of Commerce that Congress should enact this legislation at an early date.

The CHAIRMAN. Does anyone else desire to testify. If not, we will continue the hearing until some future time. There is to be further testimony on the part of General Ankenbrandt and others in regard to the staff's proposal.

If there are no further witnesses this morning, the hearing will be continued until some later date.

(Whereupon, at 10:58 a. m., the hearing was adjourned subject to the call of the chairman.)

(The following letters were submitted for the record:)

DEPARTMENT OF THE AIR FORCE,
Washington, June 28, 1951.

HON. EDWIN C. JOHNSON,
*Chairman, Committee on Interstate and Foreign Commerce,
United States Senate.*

DEAR MR. CHAIRMAN: I refer to your request for the views of the Department of Defense with respect to the proposed amendment to section 606 (c) of the Communications Act of 1943 for consideration as an alternate draft in lieu of S. 537. The Secretary of Defense has delegated to this Department the responsibility for expressing the views of the Department of Defense.

The purpose of the proposed amendment to section 606 (c) is to provide more adequate Federal control in regard to all stations or devices capable of emitting electromagnetic radiations.

The Department of Defense recommends the enclosed draft of a proposed amendment to section 606 (c) as a substitute for the amendment proposed by the Interstate and Foreign Commerce Committee and as an adequate substitute

for S. 537. These changes would clarify and eliminate the objections voiced in the hearings on S. 537.

It is recommended that consideration be given to inserting a new section to 606 to be entitled "Section 606 (h)." The purpose of the proposed additional subsection would be to provide an adequate penalty clause in connection with a violation of section 606.

The Department of Defense is unable to estimate the fiscal effects of the proposed legislation.

This report has been coordinated among the departments and boards of the Department of Defense in accordance with the procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that there is no objection to the submission of this report.

Sincerely yours,

EUGENE M. ZUCKERT,
Assistant Secretary of the Air Force.

SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, or in the interest of national defense, the President may (1) suspend or amend for such time as he may see fit rules and regulations applicable to any or all stations or devices emitting electromagnetic radiations within the jurisdiction of the United States, as prescribed by the Commission, (2) regulate, prohibit or otherwise control the operation of any such station or of any such device emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles which is suitable for use as a navigational aid beyond 5 miles, and remove from any such station or device any or all apparatus or equipment or (3) authorize, upon just compensation to the owners, the use of any such station or device and its apparatus and equipment by any department or agency of the Government under such regulations as he may prescribe.

SEC. 606. (h) Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing in violation of any regulation or order issued under this section, or who willfully and knowingly omits or fails to do any act, matter or thing required to be done by such regulation or order, or willfully and knowingly causes or suffers such omission or failure, shall, upon conviction thereof, if an individual, be fined not more than \$10,000 or imprisoned not more than 5 years, or both, and if a firm, partnership, association, or corporation be fined not more than \$50,000.

INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION, INC.,
Washington, D. C., February 23, 1951.

Re S. 537, Committee on Interstate and Foreign Commerce.

HON. EDWIN C. JOHNSON,
*Chairman, Senate Interstate and Foreign Commerce Committee,
Senate Office Building, Washington, D. C.*

DEAR SIR: We are forwarding, herewith, a brief which will cover our objection to bill S. 537, on which you conducted hearings February 22 and 21, 1951.

We would appreciate you making this a part of the record, so that same may be given consideration when you next refer to this legislation.

Very truly yours,

H. G. REINSMITH,
*Director, Member, Radio Committee,
Middle Atlantic Section, IMSA.*

INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION, INC.,
New York 18, N. Y.

Re hearings, bill S. 537.

Senator EDWIN C. JOHNSON,

Chairman, the Senate Interstate and Foreign Commerce Committee:

The International Municipal Signal Engineers of the Nation are concerned with their emergency-service radio-operating eventualities possible under S. 537. If this legislation is enacted, it will still further complicate the position of our State, county, and municipal emergency-service radio and its operational status in time of disaster, national emergency, and war.

The fire, police, forestry, highway, and utility radio services, operating under part 10 of the Federal Communications Commission's rules, number thousands of systems. These are growing to the extent that soon every fire department and police department will use radio as an indispensable means of communications.

The bill S. 537, as presented by the Department of Defense, is for the purpose of providing greater security and defense of the United States against attack and to deprive an enemy of the means of guiding aircraft to our shores.

The objective is very commendable, and we are strongly behind anything that will provide greater security, but we feel the objective has not been given sufficient thought on what is to be accomplished. Surely to obtain the desired results as requested by S. 537 you do not wish to sabotage our emergency communications systems. The enemy could hope for nothing better.

The legislation, S. 537, is a duplication of authority as contained in section 606 of the Communications Act of 1934, as amended, and would set up duplicate powers in the hands of another agency—other than that which the Congress has intended should enforce the laws of communications, the Federal Communications Commission. To this we wish to register our opposition.

The Federal Communications Commission has done an excellent job in the past. The State, county, and municipal emergency-service communications people have a high degree of confidence in their engineer staff and the Commissioners of the Federal Communications Commission. This agency, from long experience, has the pulse of what is needed. All that is required is for them to have your assistance in providing them with authority and the appropriation to do a good job. If additional authority is required, it is our recommendation you amend section 606 of the present act.

However, we strongly object to the continued adverse publicity on radio shut-down in time of attack. Such publicity is very harmful, and even the language people have a high degree of confidence in their engineer staff and the Commissioners" is very strong language and is applicable to our emergency fire, police, and other services. Such language does much to prevent the proper development because of indecision and fear of what some regulatory body or enforcement agency may do and disturbs us greatly.

To close down or in any way interfere with the emergency radio services of our fire departments, police departments, forestry fire, highway, and utility services would as surely defeat us as if an enemy had landed on our shores. Fire is the greatest potential enemy we have in peace and war. The emergency services are the first line of defense in case of attack. The need for radio in our emergency services is as great as that of the armed services. Neither of our services can function without adequate dependable communications.

We ask that a clear-cut decision be made on this issue so that we can proceed to assure our citizens that they will not be left helpless in time of disaster, threat of war, national emergency, or war itself—should it come.

We now have been called upon to expand our forces and set up a vast civil-defense network which cannot be accomplished without radio. As long as no clear-cut decision is made regarding those frequencies used by us, the entire program will be sabotaged. Wire facilities will not substitute because they are subject to damage, and the cost of same is prohibitive to our citizens. Also, in many places they are nonexistent.

It may be necessary to place control over the use of certain devices which may radiate or be made to radiate to the extent where they could be used by the enemy. If so, they should be carefully studied and facilities set up to guard against their use. Severe penalties should be included for violations.

The emergency services are law-enforcement agencies and are constantly on guard to assist in the apprehension of any criminal intent. We can assure you of our full assistance and cooperation in any reasonable approach to the specific objective.

Therefore, in conclusion, we recommend that when section 606 of the Federal Communications Act is amended specific language will be inserted to eliminate blanket shut-down of radio stations for communications. We feel at least it should state, "Except those of the emergency services and others necessary for internal security and protection of the citizens of the United States."

Respectfully submitted.

H. G. REINSMITH.

EASTERN ASSOCIATION OF FIRE CHIEFS,
Wayne, Pa., February 26, 1951.

Hon. EDWIN C. JOHNSON,
Chairman, Senate Interstate and Foreign Commerce Committee,
Senate Office Building, Washington 25, D. C.

DEAR SIR: The International Association of Fire Chiefs Association wishes to submit to you and your committee the following brief, which we hope will be placed into the record and given careful consideration when S. 537 is considered by the committee.

Thanking you for your cooperation in this matter, we remain

Very truly yours,

ROI B. WOOLEY,
Chairman, Communications Committee, International Association of Fire Chiefs.

STATEMENT OF THE COMMITTEE ON COMMUNICATIONS, INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

In further reference to the statements made by Mr. Herbert A. Friede at your committee hearings on February 22, 1951, we wish to submit this brief and a further objection to S. 537, and we speak for the fire service of the Nation, which numbers over 1,000,000 active volunteers and 100,000 paid firemen in over 14,000 fire departments throughout the country, operating over 65,000 units of motor fire apparatus, and has the responsibility of protecting the lives and property of the citizens of the Nation against consuming fire, both during peacetime and war time.

It is recognized and admitted that fire would be the most effective weapon in time of enemy attack on our target areas. It is also an accepted fact that fire is the greatest single threat to the Nations' defense production program, now getting into full swing, whether that fire be the result of our own neglect or carelessness or the result of enemy sabotage.

To cope with the increasing present fire dangers and the hazards which an enemy attack will conceivably bring, the fire forces of the country must employ every modern fire control and extinguishing strategy and facility. Not the least of the latter are radio communications and electronic fire detection and alarm transmission devices and systems.

Any factor, however urgent, which will hinder or cripple vital fire service communications—either during peacetime or wartime emergencies—constitutes a clear threat to national economy and security.

More than any other single emergency service, the fire forces of the Nation must occupy front-line positions in the event of air attack upon our homeland. In this respect it, more than any other emergency service, must operate in conjunction with the Armed Forces in such eventuality.

The fire service recognizes the fact that in time of war, or other great national emergency, the power of the Government must be extended beyond normal peacetime activities in the interests of national security. The service has in the past cooperated wholeheartedly with the Government, including Armed Forces, Civilian Defense, and the Federal Communications Commission, in the interests of furthering the Nations' security.

The fire service does not question the wisdom or necessity of proper supervisory control over all communications systems or devices which might give comfort to our enemies or jeopardize our national security. In this connection it operates under and abides by the rules and regulations of the Federal Communications Commission which has recognized the vital importance of adequate fire service radio communications by allocating a number of frequencies for fire service radio systems.

However, we believe that the proposed bill S. 537, as it is worded and as we interpret it, is ill advised at this time and that it goes far beyond the regulatory limitations which, from the evidence submitted at this hearing, are necessary to safeguard the Nation from enemy air attack.

At the hearing on February 21, 1951, Gen. Francis L. Ankenkamp broadly indicated that the emergency services, fire and police, would not be interfered with; that it was not the intent of the Armed Forces to enforce shutdown of emergency radio services. However, as was pointed out, that is the general's opinion and the bill, if passed, might be in effect long after the general's opinion was forgotten. It is conceivable also that the President, to whom the bill gives the broadest power to discontinue all radio communications of whatever kind,

might not concur with the Air Force or other authority in making an exception of the fire service in enforcing the restrictions.

We believe the bill was drawn without thorough study of the functions of and need of fire service radio and kindred radio fire safety facilities. Such study would have disclosed that presently the fire service is using radio and appliances based upon radio to alert the public and civil defense, as well as fire-fighting forces, in emergencies. It would have shown that electronic eye devices are protecting manufacturing plants and other installations vital to the war defense effort—protecting them against not only fire but enemy sabotage. It would have shown that today, and tomorrow, radio must be counted upon in the fire service to help counterbalance the loss of valuable manpower to the Armed Forces, and the unreliability of over-age fire apparatus and equipment.

The Director of Civil Defense has approved this bill, with certain reservations, we are told. These reservations do not include immunity for emergency service radio. If we are to judge from the experience learned in World War II, as evidenced by the civil-defense orders and directives issued from Washington, the provisions of this bill, quite conceivably, will be adopted by the present Office of Civil Defense to form the basis of regulations concerning the alerting of emergency services and citizens. Should this be the case, whenever an area—target or otherwise—having civil defense organization staged a practice drill or alert, that area would be much more at the mercy of a normal (or saboteur-inspired) fire than it is at present. Destruction of critical installations such as munitions plants, food-processing plants and warehouses, and even Government properties, would most certainly increase.

From the evidence previously submitted at this hearing, it would appear that even if adopted this bill could not be enforced with any degree of equity for those whom it would deprive of safety and livelihood. There is no clear definition at present as to what constitutes an "electromagnetic radiation" device or system, or which of these would or could furnish "navigational aid" to an enemy.

From an engineering viewpoint there appears confusion over how such systems and devices could be effectively and fairly monitored as well as to how and when, and through what channels, orders for the discontinuance of emergency radio would emanate.

Further, the language of the bill, especially as it applies to peacetime as distinguished from wartime or other emergency situations, gives arbitrary powers to the executive branch of the Government. This would not only put temporarily out of business all commercial and other broadcasting systems and stations which are expected to cooperate with the fire service in defense against conflagration and other disasters, but would eliminate all opportunity for utilization of such public broadcasting in coordination with fire service radio operations in time of emergency.

It would appear to the committee on communications of the International Association of Fire Chiefs that there already exists a proper authority to regulate the use of radio communications in time of war and war preparedness, in the form of the Federal Communications Commission.

Section 606 of the Communications Act leaves to the Commission the functions of licensing, monitoring, and regulating broadcasting. It would appear to this committee, speaking for the Nation's fire service, that the addition of certain modifications or amendments to section 606 would provide the additional safeguards desired by the Defense Department of the Government, and at the same time, by not depriving the fire service of this highly essential communications facility, insure an even more effective degree of safety against fire for the Nation.

In the light of the foregoing, we believe that the bill S. 537 should be disapproved, and amendments to section 606 of the Communications Act amended to include severe penalties to any person who may wrongfully use the radio spectrum for any purpose harmful to the best interest of the United States. That the words "shut down" should be excluded from the language of the amendment and, in lieu thereof, definite safeguards established by the Federal Communications Commission to properly police our radio facilities. In this way we will remove the ever-present fear of our citizens that they may lose a much-needed communication system as a result of the whims of some vested interests.

We all realize the lack of dependence that can be placed upon electromagnetic radiation unless the attempt to use same is deliberate. Here is where severe penalties and good police work will do the job more effectively than blanket or partial shut-downs, which is following the line of least resistance.

Technically, we know that the enemy will use celestial navigation and radar to reach the targets, as these are the most positive and effective methods. Therefore, we should not lose sight of this fact and start chasing butterflies but begin to set up every precaution to defeat the purpose. The wide use of radio in our police and fire services will do much to assist the Federal Communications Commission in preventing the use of these channels by saboteurs or enemy agents, who otherwise may be free to make use of these idle channels.

Assuring you and the Federal Communications Commission of our full cooperation in any measure to safeguard our Nation, we hope you and your committee will consider our presentation most carefully.

DEPARTMENT OF THE ARMY,
OFFICE OF THE SECRETARY OF THE ARMY.
Washington, D. C.

HON. EDWIN C. JOHNSON,
*Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.*

DEAR SENATOR JOHNSON: Reference is made to your letter of January 18, 1951, requesting a report by the Panama Canal on bill S. 537, to provide for the greater security and defense of the United States against attack, and for other purposes.

Your letter has been referred to the Governor of the Panama Canal from whose comment the following is quoted:

"The proposed legislation, which would be known as the Electromagnetic Radiation Control Act, would authorize governmental control or use of any electromagnetic-radiation instrument, device, or apparatus, as a security and defense measure, in time of war, national emergency, or whenever the President deems it advisable in the interest of national security.

"The purpose of the proposed legislation, as stated by the Department of Defense in recommending the draft, clearly indicates that the inclusion of the Canal Zone within the geographical application of the legislation is desirable. Section 5 (a) of the draft of bill defines the term 'United States' to include 'possessions of the United States, and all other areas under the control of the United States.' Such definition adequately covers the Canal Zone.

"No special enforcement difficulties are apparent, and no treaty considerations appear to be involved, in reference to the application of such legislation to the Canal Zone, including application to transiting vessels. There are no private electromagnetic-radiation facilities in the Canal Zone other than on vessels and aircraft and in connection with amateur radio activities. All other radio transmission and similar activities in the Canal Zone are operated by the United States Government agencies, principally the Armed Forces."

I concur in the views expressed by the Governor of the Panama Canal.

Sincerely yours,

FRANK PACE, Jr., *Secretary of the Army.*

FEDERAL COMMUNICATIONS COMMISSION,
Washington, D. C., February 28, 1951.

HON. EDWIN C. JOHNSON,
*Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.*

DEAR SENATOR JOHNSON: During the course of hearing on S. 527 on Wednesday, February 21, 1951, you submitted for consideration of the interested parties a redraft of the bill which had been prepared by the staff of your committee. By the terms of this redraft the proposed legislation, authorizing the President to control or use devices emitting electromagnetic radiations capable of being utilized by an enemy for navigational purposes, would be recast in the form of an amendment to section 606 (c) of the Communications Act of 1934. At the same time, you requested that the Commission inform your committee whether, if the proposed legislation was redrafted as an amendment to section 606, it might not be also necessary to adopt an additional amendment to section 606 expressly spelling out criminal sanctions for violation of any orders issued pursuant to exercise of Presidential authority under that section. And finally, you requested the Commission to consider the possibility of adopting an additional amendment, similar to that suggested by the witnesses appearing on behalf

of the Radio and Television Manufacturers Association, which would establish some distance limitation on the types of devices which would be subject to the President's control and use under the proposal.

The Commission has given careful consideration to these matters and believes that it is not only possible to accomplish the desired objectives of S. 537 through an amendment to section 606 of the Communications Act, but also that the revision suggested by your staff would accomplish such objectives. However, we also believe that there is some merit in the proposition advanced by the Radio and Television Manufacturers Association that since no practical navigational use can be made of devices whose incidental and sporadic radiations are not capable of being detected in any usable strength beyond a limited geographical radius, it might be advantageous to allay any fears that any control over such devices is contemplated by expressly limiting the devices, other than stations for radio communications, which the President would be authorized to close, control, or use, to those which are suitable for use as a navigational aid beyond some fixed distance. Furthermore, we believe that any fear of possible abuse of the new authority which would be given to the President can be further diminished by striking the words "capable of" from the proposed new language to be added to the section so that it would refer to devices actually emitting radiations rather than devices capable of such emissions. The Commission, therefore, would suggest that section 606 (c) of the Communications Act could be amended, as set forth below, to accomplish the salutary objectives of the proposed legislation (proposed new language italicized):

"SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States the President, *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or *devices which emit electromagnetic radiations* within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or *any device which emits electromagnetic radiations between 10 kilocycles and 100,000 megacycles which is suitable for use as a navigational aid beyond* — miles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or *device* and/or its apparatus and equipment, by any department of the government under such regulations as he may prescribe upon just compensation to the owners."

We have not suggested any specific distance limitation since it is believed that this is a matter concerning which the Department of Defense is better able to furnish your committee with appropriate information.

It must be emphasized that while the Commission does not object to spelling out a geographical limitation upon the type of devices which could be controlled by the President under section 606 (c), insofar as they might be of navigational aid to an enemy of the United States, no such fixed distance limitation can be placed upon the types of devices which, as the result of their capacity for the "transmission of energy by radio" may cause interference to established, communications facilities and which are, as a result, subject to ordinary Commission regulation pursuant to the provisions of section 301 of the Communications Act. It is clear that devices capable of emitting electromagnetic radiations which are too sporadic and intermittent to be used effectively as a navigational aid or which are not useful as such an aid because of their mobile character or limited range may, nevertheless, cause substantial interference to other established communications facilities. It is imperative, therefore, that no restriction on the President's power to control such devices under section 606, insofar as they may be of navigational aid to an enemy, be interpreted as imposing any similar restrictions upon the Commission's authority over such devices under its licensing powers pursuant to section 301. And since these licensing powers are subject to the general procedural safeguards of the Communications Act and the Administrative Procedure Act, it is clear that any necessity for such a restriction with respect to section 606 does not apply to section 301.

With respect to your inquiry relating to the advisability of adopting an additional amendment to section 606 imposing criminal sanctions for the violation of any order issued pursuant to the exercise of the Presidential authority under this section, the Commission is of the opinion that such an amendment should be adopted since there exists a question as to whether there is any criminal sanc-

tion for willful or knowing violation of orders issued pursuant to the existing authority of the President under section 606; addition of the proposed new authority over electronic devices, not primarily intended for communications purposes, makes it desirable that sanctions for violations of orders and other authority exercised under section 606 be expressly spelled out in that section.

None of the specific subsections of section 606 contain, in themselves, any criminal sanction or penalty, nor is there any one criminal provision expressly applicable to section 606 as a whole. It is therefore necessary to look to the general criminal provisions of the Communications Act which are found in sections 501 and 502, in order to determine whether and to what extent these general provisions are applicable to the exercise of the President's authority under section 606. Section 501 makes it a felony, punishable by a fine up to \$10,000, or imprisonment up to 2 years, for any person to willfully and knowingly do anything "in this act prohibited or declared to be unlawful" or to fail to do anything "in this act required to be done" or to cause or suffer "such omission or failure." It is to be noted, however, that none of the provisions of section 606, in and of themselves, require anybody to do anything, or to refrain from doing anything; instead they authorize the President, or his delegate, to take certain types of action. Thus, for example, if the President ordered a radio station to be closed, or if, pursuant to the proposed new language, the President's delegate ordered the operators of certain types of electronic equipment to refrain from operating such equipment during the hours in which an air raid is in progress, it could be argued that persons refusing to comply with such orders are doing nothing prohibited by or declared unlawful "in this act" or refusing to do things "in this act required to be done." Thus, it is possible that violations of orders made pursuant to the exercise of the President's authority under section 606 would be held not to be in violation of section 501 of the Communications Act.

The other criminal provision of the Communications Act, section 502, would appear to be even more doubtful of application. This section makes it a misdemeanor, punishable by a fine of \$500 for each day of offense for any person who willfully or knowingly violates any "rule or regulation, restriction or condition made or imposed by the Commission under the authority of this act * * * or made or imposed by any international or wire communications treaty or convention * * *". The difficulty with this provision is that, except for violations of treaty regulations, not relevant to the present discussion, it is restricted to violations of rules and regulations "made or imposed by the Commission under the authority of this act." In view of the strict construction of any criminal sanction in any statute, it is possible that any order or rule issued pursuant to the exercise of the President's authority under section 606 of the act may not be considered to be one "made or imposed by the Commission under the authority of this act." For even if the rule or order were formally issued by the Commission, operating pursuant to the direction or authority of the President, it may be considered incongruous to hold that violation of a rule, regulation, restriction, or condition prescribed by the Commission under delegation of authority from the President would be a criminal offense where it would not be a criminal offense to violate the same kind of rule, regulation, restriction, or condition if issued by the President himself or by any other Presidential delegate.

It is recommended, therefore, that a new subsection should be written into section 606 incorporating an express criminal sanction for any violation of any of its provisions. Proposed language to accomplish this objective is set forth below.

"(h) Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing prohibited or declared to be unlawful pursuant to the exercise of the President's powers and authority under this section or who willfully and knowingly omits or fails to do any act, matter, or thing which he is required to do pursuant to exercise of the President's powers and authority under this section or who willfully and knowingly causes or suffers such omission or failure shall, upon conviction thereof, be punished for such offense by a fine of not more than —, or by imprisonment for a term of not more than — years, or both."

The Commission appreciates this opportunity to comment further on S. 537 and will, of course, be available to afford you or your committee's staff such additional assistance as you may desire.

By direction of the Commission.

PAUL A. WALKER, *Acting Chairman.*

NATIONAL ASSOCIATION OF BROADCASTERS,
Washington, D. C., February 28, 1951.

Hon. EDWIN C. JOHNSON,
Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: This is in response to your request for my comments on the proposed amendment of section 606 (c) of the Communications Act, as drafted by the staff of your committee.

I stated at the hearing on S. 537 that on initial impression, the staff proposal seemed very similar to that which we would suggest. I believe that with slight modifications, it fully effectuates the purposes of the Department of Defense and provides the necessary executive authority to control electromagnetic radiations.

You will note that section 606 (c) seemingly gives the President the extraordinary powers to control radio communications, without the necessity of a proclamation, "in order to preserve the neutrality of the United States." In the case of war, however, or a threat of war, a state of public peril or disaster, or other national emergency, a proclamation by the President is required. Since this is the situation presenting the least danger to the public, it leads me to suggest an amendment so as to make it clear that a proclamation of the threat to the neutrality is required before an exercise of the executive powers of the section is authorized. This removes what may be regarded as an ambiguity in the section without changing its intent.

A second suggestion for modification in the staff's proposal pertains to the clause providing for just compensation to the owners of the instrumentalities which are controlled or used. I propose adding a phrase at the end of section 606 (c) which spells out explicitly the proposition that the owner of a station or an electromagnetic radiating device shall be entitled to receive just compensation when his instrumentality is controlled, used, or closed. The legislative history would indicate that this was the true intent of the section, and, although "closing" is a method of "controls," for which just compensation is provided, I suggest that the provision be specifically included.

The loss resulting to the broadcaster from the closing of his station would be as great, if not greater, than the loss resulting from other methods of governmental control or use. The broadcaster's livelihood depends not only on his physical equipment, but more importantly on the circulation he is able to establish by his skill in programming. If he is put off the air, his investment in his tangible property is unproductive, and he also suffers loss of good will, audience circulation, and sponsor support, all of which have been difficult to establish, and, consequently, are dependent on continuous, uninterrupted broadcast service to maintain. Therefore, I believe that, in all fairness to the broadcasters, this compensation provision should be amended, as I have indicated, in order to be more explicit.

With the above modifications in the staff's draft, my suggestion for an amendment to section 606 (c) is as follows:

"Sec. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a threat to the neutrality of the United States, or a state of public peril or disaster or other national emergency, ~~or in order to preserve the neutrality of the United States~~, the President *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the government under such regulations as he may prescribe upon just compensation to the owners for such use and/or loss resulting from such closing or control."

In order to take care of the penalty provision which was discussed at the hearing, a very simple amendment of section 502 of the Communications Act would accomplish this result. By striking from that section the three words "by the Commission" at line 2, any violation of section 606 (c) falls within its terms.

To assure the applicability of section 301 of the act to persons other than licensed operators of broadcast stations, an amendment to section 3 of the Communications Act would suffice. This could be accomplished by including within

that section a definition of "radio" to cover those incidental electromagnetic radiations of devices not intended primarily for communication. Section 3 defines "radio communication" and "transmission of energy by radio," but it contains no definition of "radio" as such.

The National Association of Broadcasters appreciated the opportunity of being heard by the committee, and I thank you for the privilege of making suggestions on the staff's proposal.

If we can be of any assistance to you or your committee, please do not hesitate to call upon us.

Sincerely yours,

JUSTIN MILLER.

WHEELER AND WHEELER,
Washington, D. C., March 6, 1951.

HON. EDWIN C. JOHNSON, *Chairman*,
Senate Interstate and Foreign Commerce Committee,
United States Senate, Washington, D. C.

DEAR SENATOR: In accordance with your request, I am transmitting herewith two alternative drafts of amendment of section 606 (c) of the Communications Act of 1934, as amended. While both alternatives are intended to achieve the same basic purpose of granting the President ample, but not necessary broad, emergency powers, amendment No. 1 seems to us to be better designed and drafted to achieve that purpose. We would not, however, object to amendment No. 2, which follows the pattern of that drafted by the committee's staff at the hearings on S. 537 held February 21, 1951.

Amendment No. 1 of section 606 (c) does not alter existing emergency powers with respect to radio stations. We share the belief of the Federal Communications Commission "that this authority (sec. 606 (c)) is clearly broad enough to authorize the President to initiate such action as he may deem necessary to prevent the use of radio stations licensed by the Commission or operated by any department or agency of the Federal Government, in any manner in which it would aid the enemy in an air attack upon the United States" (hearings, p. 8). The problem, as stated both by the Commission and by the Air Force through General Ankenbrandt, is to give the President, in time of emergency, control of any electromagnetic radiation device useful to the enemy as a navigational aid. This is done in amendment No. 1 by the simple and direct expedient of expanding the emergency Presidential powers of section 606 (c) to include powers over such devices. The language is designed to grant to the President all power required, while protecting the public and the industrial and economic life of our country against unnecessary and possibly arbitrary action.

As pointed out by Dr. Baker, there are certain requirements requisite to enemy use of an electromagnetic emission as a direction finding device, including the following:

- (a) The geographical position of the emitting source must be known and fixed.
- (b) The radiating source must be identifiable.
- (c) The strength of the received signal must be great enough to override static and noise originating in the receiver circuits.
- (d) The radiated signal must be of a frequency giving rise to a minimum of directional propagation errors, and within a range where efficient receivers can be constructed.
- (e) The radiation must be steady and more or less continuous in nature.

These qualifications eliminate as possible aids to navigation any device in general use by the public in which low-power radiation is an incidental characteristic. As stated by Dr. Baker, any plane or missile attempting to home on a device in general use by the public would be so confused as to which of the devices to use that homing would be impossible. In our amendment No. 1 we have, however, recognized the possibility that a device in general use might be turned into a radiator of sufficient power to be usable as a navigational aid, and provided that such a device shall, when used or intended for use as a navigational aid, be subject to the control provisions of the act.

Purposeful transmissions for navigation, as Dr. Baker's testimony showed, employ power in the range of 1 to 25 kilowatts and their ranges are in the order of 50 to 200 miles. Any plane or missile which might use an electromagnetic radiation as a navigation aid would be traveling at such a very high speed that unless the radiations were of sufficient strength at a considerable distance, the

enemy plane or missile could not operate its direction-finding equipment fast enough to obtain definite fixes. The power radiated incidentally by devices not fundamentally intended as radiators usually is in the order of a fraction of a watt, and would not be usable as a navigational aid beyond a distance of 5 miles. Accordingly, we have excluded from the control provisions of amendment No. 1 devices which do not emit radiations suitable as a navigational aid beyond 5 miles.

As indicated previously, no electromagnetic radiating device is usable as a navigational aid if its geographical position is not known and fixed and its radiation steady and more or less continuous in nature. Therefore, we have also specifically eliminated devices of this category from the coverage of section 606 (c). I wish again to emphasize, however, that we have provided that such devices when in fact used or intended for use as a navigational aid in an attack upon the United States are subject to control.

Dr. Baker's testimony disclosed that the following devices are useless as navigational aids:

1. All receivers because of low power, diffuse location and intermittent usage.
2. Medical or therapeutic equipment because of unknown location and intermittent use.
3. All mobile equipment, ground and air, because of variable location.
4. High frequency furnaces because of unknown location.
5. Radio frequency control gear because of unknown location.
6. Carrier current devices where it is impossible to define the source of the signal.
7. Narrow beam relay transmissions, unless the radiated beam is used and the radiations can be located geographically. These transmitters do not identify themselves over the air.

We believe that by amendment No. 1 we have specifically eliminated the foregoing devices from the control provisions of section 606 (c) while granting to the Executive such power as he may require to control devices usable as navigational aids by an enemy in an attack upon the United States.

Amendment No. 2, while intended to achieve the same purpose as amendment No. 1, follows the framework of the amendment proposed by the committee's staff.

A proviso clause is added to the staff's proposal to limit the Presidential power over devices to those suitable as navigational aids. The reasons for the limitation are those explained in our discussion of amendment No. 1.

As pointed out in the testimony of the RTMA witnesses, a bombing mission in an attack upon the United States would set its initial course and fly at a very high altitude above the weather. It would use celestial navigation or radiation from abroad to guide its course toward its target in this country. As it approached the target, because of the superiority of radar for pin-pointing a target, an enemy plane would not use electromagnetic emissions emanating from this country as a navigational aid nor would electromagnetic emissions be used for the guidance of missiles directed against the United States.

In view of these facts, Congress should go slowly in granting to the Executive the sweeping powers set forth in S. 537 or contained in 606 (c) as first proposed to be amended. Control over at least one daily act of every citizen should not be voted unless there is a defense requirement commensurate with such far-reaching power over all of us. We believe the testimony fails to reveal such a defense requirement. Should the committee find such a requirement exists, it should eliminate from the bill all devices not usable as navigational aids. Where there is neither established nor imaginable defense need, we believe it wholly unwise to grant power to the Executive to control the activities of most of us in our daily lives. Either amendment suggested grants the President all powers which the testimony reveals that he needs or might need by the widest stretch of imagination. The limitations upon the executive power are the minimum needed for the protection of our ordinary pursuits against unnecessary invasion.

Very truly yours,

RADIO-TELEVISION MANUFACTURERS ASSOCIATION,
By B. K. WHEELER,
Wheeler & Wheeler, Special Counsel.

SUGGESTED AMENDMENT NO. 1

SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President, *if he deems it necessary in the interest of national security or defense*, (1) may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations within the jurisdiction of the United States as prescribed by the Commission, (2) may cause the closing of any station for radio communication and the removal therefrom of its apparatus and equipment, (3) may authorize the use or control of any such station and/or its apparatus and equipment by any department of the Government under such regulation as he may prescribe, upon just compensation to the owners, and (4) may, with respect to all devices capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, control, limit, or forbid their operation upon specific findings that such devices are capable of use as navigational aid in the course of an attack upon the United States: *Provided*, that such devices (1) are not manufactured for general use by the public in which low power radiation is an incidental characteristic, (2) do not emit radiations suitable as a navigational aid at a distance beyond five miles, and (3) are not, by reason of their intermittency of operation or lack of identity with a fixed point source, or otherwise, inherently unsuitable for use as a navigational aid, unless such devices are in fact used or intended for use as a navigational aid in an attack upon the United States.

SUGGESTED AMENDMENT NO. 2

SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President, *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the Government under such regulations as he may prescribe upon just compensation to the owners, provided, however, that such stations or devices shall not include devices radiation from which is, not suitable as a navigational aid at a distance beyond five miles.

X

PROVIDING FOR THE GREATER SECURITY AND DEFENSE OF THE UNITED STATES AGAINST ATTACK

JULY 17 (legislative day, JUNE 27), 1951.—Ordered to be printed

Mr. JOHNSON of Colorado, from the Committee on Interstate and Foreign Commerce, submitted the following

REPORT

[To accompany S. 537]

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (S. 537) to provide for the greater security and defense of the United States against attack, and for other purposes, having considered the same, report favorably thereon with amendments and recommend that the bill as amended do pass.

PURPOSE OF BILL

The purpose of the bill, as amended, is to grant authority to the President to control and use various types of electromagnetic equipment which emit radiations that can be used as navigational aids by enemy aircraft in an attack upon this country. Specifically, the proposed legislation amends section 606 (c) of the Communications Act to include all devices emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles which are suitable for use as navigational aids beyond 5 miles.

GENERAL STATEMENT

Current concepts of warfare demonstrate the necessity to control electromagnetic radiations in the United States, its Territories and possessions, for the purpose of denying their use to a potential enemy as a navigational aid for piloted or pilotless aircraft or missiles directed at targets in the United States. Under the provisions of section 606 (c) of the Communications Act of 1934, as amended, the President has power, under certain emergency conditions, to close, use, or control the radio stations and its apparatus and equipment. The data submitted to this committee by the Defense Department has revealed that various types of electronic equipment not primarily intended for

communications purposes, may emit radiations which can be used for guiding enemy aircraft in an attack on this country and that it may be necessary to take emergency action to limit or control the operator of such device as part of any program to protect this country from such air raids.

The original bill, S. 537, was introduced January 17, 1951, at the request of the Department of Defense with an urgent plea for speedy action. An executive hearing was held on January 24, at which time the Department of Defense presented classified testimony. Full open hearings were held on February 22 and 23, 1951, when members of the industry and appropriate Government agencies testified at length. The data developed by the committee prior to and at the hearings revealed a sharp and violent difference between the industry and the Department of Defense concerning the far-reaching effect of the provisions as set forth in the original bill, S. 537. The Radio-Television Manufacturers Association very forcefully demonstrated that many types of devices not suitable for navigational aids would be covered by the broad language of S. 537, such as an electric razor, neon signs, and oil heaters. This view was expressed by most of the witnesses who appeared before the committee. It was pointed up very clearly in the letter dated February 19, 1951 (text of letter below), submitted to the committee by the Federal Power Commission, commenting on the original bill, S. 537.

In addition, the original bill, S. 537, would expand the President's authority to authorize him to exercise his powers "whenever he deems it advisable in the national interest." The industry took strong exception to that provision as going far beyond the granting of war-time or national emergency powers. If enacted, it would permit the President, or any officer to whom he delegates the authority, to use or control any or all the broadcasting stations or electromagnetic devices in the country if he deemed it consistent with national security, regardless of whether there was a war, or a proclaimed national emergency.

Under section 606 (c) of the Communications Act, the President may exercise his power under any one of five situations.

1. Under a proclaimed state of war;
2. Under a proclaimed threat of war;
3. Under a proclaimed state of public peril or disaster;
4. Under a proclaimed national emergency;
5. In order to preserve the neutrality of the United States.

In view of the fact that the President had proclaimed the existence of a national emergency to exist in his proclamation of December 16, 1950, the question of legislating an additional situation becomes largely theoretical at this time. The committee feels that it is not necessary to include such a provision because of the issuance of the proclamation of the President. He can exercise his powers, immediately if he so directs, under section 606 (c) as amended, and authorize the appropriate agencies to make the necessary plans for the future.

During the open hearing on February 22, 1951, a proposed amendment to section 606 (c) in lieu of S. 537 was prepared by the staff of the committee and submitted for consideration. All the interested parties including the Department of Defense were requested to comment upon the adequacy of the proposed amendment. The committee held up action on the legislation until it received the comments

from the Department of Defense on June 27, 1951. The additional comments of the Department of Defense, Radio-Television Manufacturers Association, National Association of Radio and Television Broadcasters, and the Federal Communications Commission all favor the amending of section 606 (c) as a more satisfactory approach. The committee feels that the general objectives set forth in S. 537 can be satisfactorily accomplished by amending section 606 (c) as proposed in the amended bill.

In order to be consistent and clarify any ambiguity that may exist concerning the situations under which the President may exercise his authority of 606 (c), the language "if he deems it necessary in the interest of national security or defense" now found in section 606 (d) relating to the President's power over wire communications is adopted. It is not believed that the addition of this language will in any way derogate from the President's existing or proposed powers with respect to electromagnetic devices or equipment. It is felt however, that the addition of this language may be useful in helping to allay possible fears on the part of the industry that the powers being given to the President under provisions of section 606 (c) might be utilized in some improper manner.

The committee was impressed by the testimony of the industry concerning the establishment of some distance limitation on the types of devices which would be subject to Presidential control or use under the bill. The committee feels that this limitation is necessary in order to eliminate devices that have no practical navigational use and whose incidental sporadic radiations cannot be detected in any usable strength beyond a limited geographical radius. The Department of Defense recommended that the authority and control of section 606 (c) be limited to the devices capable of emitting electromagnetic devices which are suitable for use as a navigational aid beyond 5 miles. The committee adopted this limitation.

The committee wishes to emphasize that its approval of the proposed legislation is in no way concerned with or intended to provide authority for censorship of radio and wire communications, the establishment of priorities among users of electromagnetic equipment or the requisition of such equipment by the Government. Moreover, the committee desires to make it clear that the proposed legislation in no way indicates approval of a general policy of Government control or ownership of communications facilities or electromagnetic radiations devices coming within the purview of this bill. This legislation is necessary, however, to enable the President in particular instances immediately to control and use certain electromagnetic devices when emergency needs demand such immediate action. There is no law which now gives the President such power. The committee wishes to state further that the proposed legislation does not indicate doubt as to the willingness of the various companies and individuals who own and operate electromagnetic devices to cooperate with the Government. However, the difficulty of predicting the need and necessity of swift action in emergency purposes make it essential that authority be granted to the Executive for the taking of immediate and appropriate measures without having to negotiate the transaction and procure the assent of the individuals or companies involved.

As in the case of radio, the owner of the devices used or controlled will be entitled to just compensation according to the provisions of section 606 (c) dealing with compensation.

The new proposed subsection (h) to section 606 incorporates a specific criminal sanction for violation of any of its provisions.

All the Government agencies and members of the industry are generally in favor of the general objectives of the bill as amended. The reports from the principal agencies and members of the industry affected by this bill are set forth below.

FEDERAL COMMUNICATIONS COMMISSION,
Washington, D. C., February 19, 1951.

HON. EDWIN C. JOHNSON,
Chairman, Senate Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: The Commission is in receipt of your letter of January 18, 1951, requesting us to comment on S. 537, a bill introduced by you at the request of the Department of Defense which would "provide for the greater security and defense of the United States against attack." An examination of the bill reveals that it would authorize the President in time of war, national emergency, or when he deems it advisable in the interest of national security, to control the use by any person of any article of equipment capable of emitting any electromagnetic radiation between 10 kilocycles and 100,000 megacycles or to direct specified departments or agencies in the Federal Government to use such equipment.

The proposal makes clear that any such control or use of electronic equipment by the President or his delegate which it authorizes may be exercised only "to the extent that the President deems it necessary to minimize or prevent navigational aid to any foreign country in an attack on the United States." It is not concerned with or intended to provide authority for censorship of radio and wire communications, the establishment of priorities among users of electronic equipment, or the general requisitioning of such equipment by the Government. The bill gives the President discretion to determine the proper agency or persons to carry out the program envisaged by the proposed legislation, provides for just compensation to persons whose equipment is used by the Government in connection with the program; and provides for criminal penalties for knowing violations of the bill's provisions or any regulations established pursuant to its terms.

As the letter from the Secretary of Defense accompanying the submission of the instant proposal explains the instant legislation has been sponsored by the Department of Defense because of its belief that the present statutory authority given to the President by section 606 (c) of the Communications Act may not be sufficiently broad to cover the use and control of all types of electronic devices which they believe may be of aid to enemy aircraft in an attack upon the United States. As you are aware, section 606 (c) of the act presently authorizes the President in times of war or national emergency, such as that proclaimed by him to exist on December 16, 1950, to set aside the rules and regulations of the Commission pertaining to radio stations, to close any "station for radio communications" and to order the removal of its apparatus and equipment, or to authorize any department of the Government to use or control any such station or equipment. We believe that this authority is clearly broad enough to authorize the President to initiate such action as he may deem necessary to prevent the use of radio stations, licensed by the Commission or operated by any department or agency by the Federal Government, in any manner in which would aid the enemy in an air attack upon the United States. But since section 606 (c) of the Communications Act is phrased in terms of the use, closure or control of "any station for radio communication" there is, as the Department of Defense has suggested, some doubt whether this section is applicable to all of the various types of electronic devices, particularly equipment not primarily intended for radio communications purposes which, in operation, may cause radiation of potential use by enemy airplanes.

Moreover, it is believed that such authority as the Commission may already have over electronic devices not primarily intended to be used as a means for transmitting radio communications, pursuant to the provisions of section 301 of the Communications Act is not adequate for achieving the purposes of the instant legislation. For section 301 is couched in terms of the Commission's licensing powers under title III of the act. And this licensing authority which expressly affords all licensees a right to be heard before they can be required to cease or

modify their normal operation, and to appeal from any Commission determination made after hearing, clearly does not lend itself to the types of emergency control contemplated by the present proposal or to the necessary security precautions which would be an essential part of any such plan.

The Department of Defense has affirmatively stated its belief that various types of electronic equipment, not primarily intended for communications purposes, may emit radiations which could be useful for guiding enemy aircraft in an attack on this country, and that it may be necessary to take emergency action to limit or control the operators of such devices as part of any program to protect this country from such air raids. In light of these representations, the Commission is in agreement with the Department of Defense that it would be advisable at this time to spell out, either in an amendment to the existing provisions of section 606 of the Communications Act or in separate legislation such as that provided in the instant proposal, the authority of the President to control and use all such radiation devices potentially useful to an enemy, so that necessary planning and preparatory activities can be undertaken immediately without any question as to the authority for such action.

The Commission appreciates this opportunity to comment on this bill and will be pleased to provide any additional information concerning the problems involved in this legislation which it has available or to afford the committee with such other assistance in connection with this matter as you may desire. The Bureau of the Budget has advised us that it has no objection to the submission of these comments.

By direction of the Commission.

PAUL A. WALKER, *Acting Chairman.*

ASSISTANT SECRETARY OF DEFENSE,
Washington, D. C., January 23, 1951.

Hon. EDWIN C. JOHNSON,
*Chairman, Committee on Interstate and Foreign Commerce,
United States Senate.*

MY DEAR MR. CHAIRMAN: I want to thank you, on behalf of the Department of Defense, for your promptness in introducing the draft of proposed legislation to provide for the greater security and defense of the United States against attack, and for other purposes (S. 537).

I want to thank you, also, for the willingness expressed in your letter of January 18 to hear the witnesses of the Department of Defense in both open and executive session.

As I mentioned in my letter of January 16 transmitting the proposed legislation to you, the Department of the Air Force has been designated as the representative of the Department of Defense for this legislation. Under our legislative procedures, we normally designate the military department having the predominant interest in a given bill as the action agent of the Department of Defense as a whole, for purposes of representing the Department of Defense in connection with congressional hearings on the bill. The proposed Electromagnetic Radiation Control Act is a bill which was originally drafted by the Air Force, in pursuance of its responsibility for the air defense of the United States. The bill, as submitted to you, has been approved by the Department of Defense and the Bureau of the Budget.

In view of the Air Force's great interest in speedy action on this bill, and in view of the willingness to hold hearings at an early date, as expressed in your recent letter, I am taking the liberty of calling your letter to the personal attention of the Secretary of the Air Force, the Honorable Thomas K. Finletter, in order that he may get in touch with you for a further discussion of this matter.

Sincerely,

MARX LEVA.

ASSISTANT SECRETARY OF DEFENSE,
Washington, D. C., January 16, 1951.

Hon. EDWIN C. JOHNSON,
*Chairman, Senate Committee on Interstate and Foreign Commerce,
Washington, D. C.*

DEAR MR. CHAIRMAN: There is forwarded herewith a draft of proposed legislation, to provide for the greater security and defense of the United States against attack, and for other purposes. This proposal is a part of the Department of

Defense legislative program for 1951, and has been approved by the Bureau of the Budget. The Department of Defense recommends that it be enacted by the Congress at an early date.

Purpose of the legislation.—The purpose of the proposed legislation is to provide the necessary Executive authority to control electromagnetic radiation, not only during hostilities or a proclaimed emergency, but also during time of strained international relationships when a surprise attack on the United States is a possibility.

Current concepts of warfare and recent experience demonstrate the necessity to control electromagnetic radiation in the United States, its Territories and possessions, during periods of critical international relationships, for the purpose of denying their use to a potential enemy for navigation of piloted or pilotless aircraft or missiles directed toward targets in the United States. The authority of this proposed legislation must be provided now in order that further planning and preparations may be completed so that Air Defense plans may be implemented without delay in the event of an air attack. It is requested that further justification for the urgent necessity of this legislation be given to you in secret session.

Legislative references.—Some executive authority is provided by section 606 (c) of the Communications Act of 1934, as amended. However, it is believed that that authority is inadequate for the purpose stated above.

Cost and budget data.—Section 3 provides for just compensation to the owner for use by a department or agency of the United States of any instrument, device, apparatus, or thing. It is impossible to estimate the extent of such compensation and the resulting cost to the Government.

Department of Defense action agency.—The Department of the Air Force has been designated as the representative of the Department of Defense for this legislation.

In accordance with a long-established custom, the Department of Defense submitted to the Senate Committee on Armed Services a proposal identical with this proposal for consideration by the Eighty-first Congress. We have been informed that that earlier proposal was referred by the Committee on Armed Services to your committee. In view of the referral of that earlier proposal to your committee and in view of the urgency of this proposal, we are forwarding this proposal directly to your committee for consideration.

Sincerely yours,

MARX LEVA.

THE SECRETARY OF COMMERCE,
February 21, 1951.

HON. EDWIN C. JOHNSON,

Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR MR. CHAIRMAN: This letter is in further reply to your request of January 18, 1951, for our comments concerning S. 537, a bill to provide for the greater security and defense of the United States against attack, and for other purposes.

This bill would provide executive authority to control or use electromagnetic radiation whenever such control or use is deemed necessary to prevent or minimize navigational aid to any foreign country in an attack upon the United States.

Although the terms of the bill are broad enough to include not only radio transmission devices but also such other equipment as electrodiathermy machines, radio receiving sets of the superheterodyne or superregenerative type, television receiving sets of the superheterodyne type, automobiles, and electric shavers, legislation of this nature would appear to be a necessary concomitant to a program for assuring the national security, and we therefore recommend its enactment.

We have been informed by the Bureau of the Budget that there is no objection to this report.

If we can be of further assistance, please call on us.

Sincerely yours,

PHILIP B. FLEMING,
Acting Secretary of Commerce.

FEDERAL POWER COMMISSION,
Washington, February 19, 1951.

HON. EDWIN C. JOHNSON,
Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: This is in reply to your letter of January 18, 1951, requesting my comments on S. 537, a bill to provide for the greater security and defense of the United States against attack, and for other purposes.

This bill would not affect or involve any of the direct functions of the Commission, but it might have considerable effect upon the electric utilities, both public and private. The bill intends to set up controls over all electromagnetic radiation between 10,000,000 and 100,000,000 kilocycles. This range is all inclusive as it covers all wave lengths from 18 miles down to one-tenth of an inch.

The electric utilities use such electromagnetic radiation for a wide variety of purposes. Perhaps the most common is for communication between key points of their systems, including the transmission of messages between supervisors and repair trucks. It is also used for telemetering, relay operation, line testing, fault location and the remote control of switches, lighting circuits, power plants, hot-water heaters, etc.

Limitation of any of the communication and related uses of the so-called carrier current might seriously affect electric utility system operation because communications, the remote control of electrical equipment, and automatic reports on its condition, are basic to all power transmission operations.

Electromagnetic radiations within the ranges indicated are set up accidentally in the ordinary course of operation by many types of electrical equipment used by the power companies, such as the radiation from transmission lines produced by corona discharge or defective contact or by leakage over defective insulators, and transformer or switch bushings, etc. Electric utilities are doing all that they can to control this type of radiation since they result in loss of power, but it is practically impossible to prevent.

The Bureau of the Budget has no objection to the submission of this report.

Sincerely yours,

THOMAS C. BUCHANAN, *Acting Chairman.*

FEDERAL CIVIL DEFENSE ADMINISTRATION,
Washington, D. C., February 21, 1951.

HON. EDWIN C. JOHNSON,
Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: This letter is in reply to your request of February 15 for comments on S. 537, relating to the control of electromagnetic radiation in such manner as to prevent navigational aid in any attack on the United States.

We have been somewhat concerned with the broad terms of the bill, inasmuch as our civil defense functions might be hindered by the administration of the law if the bill is passed.

However, we have reviewed with General Ankenbrandt, Director of Communications, Department of the Air Force, our civil defense obligations in some detail. We have been assured through such discussions that our functions will not be impaired through the administration of the law in the event the bill is enacted into law.

In view of this, we are pleased to recommend the approval of the bill. The Bureau of the Budget has advised that there is no objection to the submission of this report.

Sincerely,

MILLARD CALDWELL.

NATIONAL ASSOCIATION OF BROADCASTERS,
Washington, D. C., February 23, 1951.

HON. EDWIN C. JOHNSON,
Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: This is in response to your request for my comments on the proposed amendment of section 606 (c) of the Communications Act, as drafted by the staff of your committee.

I stated at the hearing on S. 537 that on initial impression, the staff proposal seemed very similar to that which we would suggest. I believe that with slight modifications, it fully effectuates the purposes of the Department of Defense and provides the necessary Executive authority to control electromagnetic radiations.

You will note that section 606 (c) seemingly gives the President the extraordinary powers to control radio communications, without the necessity of a proclamation, "in order to preserve the neutrality of the United States." In the case of war, however, or a threat of war, a state of public peril or disaster, or other national emergency, a proclamation by the President is required. Since this is the situation presenting the least danger to the public, it leads me to suggest an amendment so as to make it clear that a proclamation of the threat to the neutrality is required before an exercise of the Executive powers of the section is authorized. This removes what may be regarded as an ambiguity in the section without changing its intent.

A second suggestion for modification in the staff's proposal pertains to the clause providing for just compensation to the owners of the instrumentalities which are controlled or used. I propose adding a phrase at the end of section 606 (c) which spells out explicitly the proposition that the owner of a station or an electromagnetic radiating device shall be entitled to receive just compensation when his instrumentality is controlled, used, or closed. The legislative history would indicate that this was the true intent of the section, and although "closing" is a method of "control," for which just compensation is provided, I suggest that the provision be specifically included.

The loss resulting to the broadcaster from the closing of his station would be as great, if not greater, than the loss resulting from other methods of governmental control or use. The broadcaster's livelihood depends not only on his physical equipment, but more importantly on the circulation he is able to establish by his skill in programing. If he is put off the air, his investment in his tangible property is unproductive, and he also suffers loss of good will, audience circulation, and sponsor support, all of which have been difficult to establish, and consequently, are dependent on continuous, uninterrupted broadcast service to maintain. Therefore, I believe that, in all fairness to the broadcasters, this compensation provision should be amended, as I have indicated, in order to be more explicit.

With the above modifications in the staff's draft, my suggestion for an amendment to section 606 (c) is as follows:

"SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a threat to the neutrality of the United States, or a state of public peril or disaster or other national emergency, [or in order to preserve the neutrality of the United States] the President *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the Government under such regulations as he may prescribe upon just compensation to the owners *for such use and/or loss resulting from such closing or control.*"

In order to take care of the penalty provision which was discussed at the hearing, a very simple amendment of section 502 of the Communications Act would accomplish this result. By striking from that section the three words "by the Commission" at line 2, any violation of section 606 (c) falls within its terms.

To assure the applicability of section 301 of the act to persons other than licensed operators of broadcast stations, an amendment to section 3 of the Communications Act would suffice. This could be accomplished by including within that section a definition of radio to cover those incidental electromagnetic radiations of devices not intended primarily for communication. Section 3 defines "radio communication" and "transmission of energy by radio," but it contains no definition of "radio" as such.

The National Association of Broadcasters appreciated the opportunity of being heard by the committee, and I thank you for the privilege of making suggestions on the staff's proposal.

If we can be of any assistance to you or your committee, please do not hesitate to call upon us.

Sincerely yours,

JUSTIN MILLER.

FEDERAL COMMUNICATIONS COMMISSION,
Washington, D. C., February 28, 1951.

Hon. EDWIN C. JOHNSON,
Chairman, Committee on Interstate and Foreign Commerce,
United States Senate, Washington, D. C.

DEAR SENATOR JOHNSON: During the course of hearing on S. 537 on Wednesday, February 21, 1951, you submitted for consideration of the interested parties a redraft of the bill which had been prepared by the staff of your committee. By the terms of this redraft, the proposed legislation, authorizing the President to control or use devices emitting electromagnetic radiations capable of being utilized by an enemy for navigational purposes would be recast in the form of an amendment to section 606 (c) of the Communications Act of 1934. At the same time, you requested that the Commission inform your committee whether, if the proposed legislation was redrafted as an amendment to section 606, it might not be also necessary to adopt an additional amendment to section 606 expressly spelling out criminal sanctions for violation of any orders issued pursuant to exercise of Presidential authority under that section. And finally you requested the Commission to consider the possibility of adopting an additional amendment, similar to that suggested by the witnesses appearing on behalf of the Radio and Television Manufacturers Association, which would establish some distance limitation on the types of devices which would be subject to the President's control and use under the proposal.

The Commission has given careful consideration to these matters and believes that it is not only possible to accomplish the desired objectives of S. 537 through an amendment to section 606 of the Communications Act, but also that the revision suggested by your staff would accomplish such objectives. However, we also believe that there is some merit in the proposition advanced by the Radio and Television Manufacturers Association that since no practical navigational use can be made of devices whose incidental and sporadic radiations are not capable of being detected in any usable strength beyond a limited geographical radius, it might be advantageous to allay any fears that any control over such devices is contemplated by expressly limiting the devices, other than stations for radio communications, which the President would be authorized to close, control or use, to those which are suitable for use as a navigational aid beyond some fixed distance. Furthermore, we believe that any fear of possible abuse of the new authority which would be given to the President can be further diminished by striking the words "capable of" from the proposed new language to be added to the section so that it would refer to devices actually emitting radiations rather than devices capable of such emissions. The Commission, therefore, would suggest that section 606 (c) of the Communications Act could be amended, as set forth below, to accomplish the salutary objectives of the proposed legislation:

"Sec. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States the President, *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices which emit electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or any device which emits electromagnetic radiations between 10 kilocycles and 100,000 megacycles which is suitable for use as a navigational aid beyond — miles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the government under such regulations as he may prescribe upon just compensation to the owners." [Proposed new language in italics.]

We have not suggested any specific distance limitation since it is believed that this is a matter concerning which the Department of Defense is better able to furnish your committee with appropriate information.

It must be emphasized that while the Commission does not object to spelling out a geographical limitation upon the type of devices which could be controlled by the President under section 606 (c), insofar as they might be of navigational aid to an enemy of the United States, no such fixed distance limitation can be placed upon the types of devices which, as the result of their capacity for the "transmission of energy by radio" may cause interference to established communications facilities and which are, as a result, subject to ordinary Commission regulation pursuant to the provisions of section 301 of the Communications Act. It is clear that devices capable of emitting electromagnetic radiations which are

too sporadic and intermittent to be used effectively as a navigational aid or which are not useful as such an aid because of their mobile character or limited range may, nevertheless, cause substantial interference to other established communications facilities. It is imperative, therefore, that no restriction on the President's power to control such devices under section 606, insofar as they may be of navigational aid to an enemy, be interpreted as imposing any similar restrictions upon the Commission's authority over such devices under its licensing powers pursuant to section 301. And since these licensing powers are subject to the general procedural safeguards of the Communications Act and the Administrative Procedure Act, it is clear that any necessity for such a restriction with respect to section 606 does not apply to section 301.

With respect to your inquiry relating to the advisability of adopting an additional amendment to section 606 imposing criminal sanctions for the violations of any order issued pursuant to the exercise of the Presidential authority under this section, the Commission is of the opinion that such an amendment should be adopted since there exists a question as to whether there is any criminal sanction for willful or knowing violation of orders issued pursuant to the existing authority of the President under section 606; addition of the proposed new authority over electronic devices, not primarily intended for communications purposes, makes it desirable that sanctions for violations of orders and other authority exercised under section 606 be expressly spelled out in that section.

None of the specific subsections of section 606 contain, in themselves, any criminal sanction or penalty, nor is there any one criminal provision expressly applicable to section 606 as a whole. It is therefore necessary to look to the general criminal provisions of the Communications Act which are found in sections 501 and 502, in order to determine whether and to what extent these general provisions are applicable to the exercise of the President's authority under section 606. Section 501 makes it a felony, punishable by a fine up to \$10,000, or imprisonment up to 2 years, for any person to willfully and knowingly do anything "in this act prohibited or declared to be unlawful" or to fail to do anything "in this act required to be done" or to cause or suffer "such omission or failure." It is to be noted, however, that none of the provisions of section 606, in and of themselves, require anybody to do anything, or to refrain from doing anything; instead they authorize the President, or his delegate, to take certain types of action. Thus, for example, if the President ordered a radio station to be closed, or if, pursuant to the proposed new language, the President's delegate ordered the operators of certain types of electronic equipment to refrain from operating such equipment during the hours in which an air raid is in progress, it could be argued that persons refusing to comply with such orders are doing nothing prohibited by or declared unlawful "in this act" or refusing to do things "in this act required to be done." Thus, it is possible that violations of orders made pursuant to the exercise of the President's authority under section 606 would be held not to be in violation of section 501 of the Communications Act.

The other criminal provision of the Communications Act, section 502, would appear to be even more doubtful of application. This section makes it a misdemeanor, punishable by a fine of \$500 for each day of offense for any person who willfully or knowingly violates any "rule or regulation, restriction or condition made or imposed by the Commission under the authority of this act * * * or made or imposed by any international or wire communications treaty or convention. * * *" The difficulty with this provision is that, except for violations of treaty regulations, not relevant to the present discussion, it is restricted to violations of rules and regulations "made or imposed by the Commission under the authority of this act." In view of the strict construction of any criminal sanction in any statute, it is possible that any order or rule issued pursuant to the exercise of the President's authority under section 606 of the act may not be considered to be one "made or imposed by the Commission under the authority of this act." For even if the rule or order were formally issued by the Commission, operating pursuant to the direction or authority of the President, it may be considered incongruous to hold that violation of a rule, regulation, restriction or condition prescribed by the Commission under delegation of authority from the President would be a criminal offense where it would not be a criminal offense to violate the same kind of rule, regulation, restriction or condition if issued by the President himself or by any other Presidential delegate.

It is recommended, therefore, that a new subsection should be written into section 606 incorporating an express criminal sanction for any violation of any of its provisions. Proposed language to accomplish this objective is set forth below.

"(h) Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing prohibited or declared to be unlawful pursuant to the exercise of the President's powers and authority under this section or who willfully and knowingly omits or fails to do any act, matter, or thing which he is required to do pursuant to exercise of the President's powers and authority under this section or who willfully and knowingly causes or suffers such omission or failure shall, upon conviction thereof, be punished for such offense by a fine of not more than — or by imprisonment for a term of not more than — years, or both."

The Commission appreciates this opportunity to comment further on S. 537 and will, of course, be available to afford you or your committee's staff such additional assistance as you may desire.

By direction of the Commission.

PAUL A. WALKER, *Acting Chairman.*

WHEELER & WHEELER,
Washington, D. C., March 6, 1951.

Hon. EDWIN C. JOHNSON,
*Chairman, Senate Interstate and Foreign Commerce Committee,
United States Senate, Washington, D. C.*

DEAR SENATOR: In accordance with your request, I am transmitting herewith two alternative drafts of amendment of section 606 (c) of the Communications Act of 1934, as amended. While both alternatives are intended to achieve the same basic purpose of granting the President ample, but not necessary broad, emergency powers, amendment No. 1 seems to us to be better designed and drafted to achieve that purpose. We would not, however, object to amendment No. 2, which follows the pattern of that drafted by the committee's staff at the hearings on S. 537 held February 21, 1951.

Amendment No. 1 of section 606 (c) does not alter existing emergency powers with respect to radio stations. We share the belief of the Federal Communications Commission "that this authority (sec. 606 (c)) is clearly broad enough to authorize the President to initiate such action as he may deem necessary to prevent the use of radio stations licensed by the Commission or operated by any department or agency of the Federal Government, in any manner in which it would aid the enemy in an air attack upon the United States" (hearings, p. 8). The problem, as stated both by the Commission and by the Air Force through General Ankenbrandt, is to give the President, in time of emergency, control of any electromagnetic radiation device useful to the enemy as a navigational aid. This is done in amendment No. 1 by the simple and direct expedient of expanding the emergency Presidential powers of section 606 (c) to include powers over such devices. The language is designed to grant to the President all power required, while protecting the public and the industrial and economic life of our country against unnecessary and possibly arbitrary action.

As pointed out by Dr. Baker, there are certain requirements requisite to enemy use of an electromagnetic emission as a direction-finding device, including the following:

- (a) The geographical position of the emitting source must be known and fixed.
- (b) The radiating source must be identifiable.
- (c) The strength of the received signal must be great enough to override static and noise originating in the receiver circuits.
- (d) The radiated signal must be of a frequency giving rise to a minimum of directional propagation errors, and within a range where efficient receivers can be constructed.
- (e) The radiation must be steady and more or less continuous in nature.

These qualifications eliminate as possible aids to navigation any device in general use by the public in which low-power radiation is an incidental characteristic. As stated by Dr. Baker, any plane or missile attempting to home on a device in general use by the public would be so confused as to which of the devices to use that homing would be impossible. In our amendment No. 1 we have, however, recognized the possibility that a device in general use might be turned into a radiator of sufficient power to be usable as a navigational aid, and provided that such a device shall, when used or intended for use as a navigational aid, be subject to the control provisions of the act.

Purposeful transmissions for navigation, as Dr. Baker's testimony showed, employ power in the range of 1 to 25 kilowatts and their ranges are in the order

of 50 to 200 miles. Any plane or missile which might use an electromagnetic radiation as a navigation aid would be traveling at such a very high speed that unless the radiations were of sufficient strength at a considerable distance, the enemy plane or missile could not operate its direction-finding equipment fast enough to obtain definite fixes. The power radiated incidentally by devices not fundamentally intended as radiators usually is in the order of a fraction of a watt, and would not be usable as a navigational aid beyond a distance of 5 miles. Accordingly, we have excluded from the control provisions of amendment No. 1 devices which do not emit radiations suitable as a navigational aid beyond 5 miles.

As indicated previously, no electromagnetic radiating device is usable as a navigational aid if its geographical position is not known and fixed and its radiation steady and more or less continuous in nature. Therefore, we have also specifically eliminated devices of this category from the coverage of section 606 (c). I wish again to emphasize, however, that we have provided that such devices when in fact used or intended for use as a navigational aid in an attack upon the United States are subject to control.

Dr. Baker's testimony disclosed that the following devices are useless as navigational aids:

1. All receivers because of low power, diffuse location, and intermittent usage.
2. Medical or therapeutic equipment because of unknown location and intermittent use.
3. All mobile equipment, ground and air, because of variable location.
4. High-frequency furnaces because of unknown location.
5. Radio frequency control gear because of unknown location.
6. Carrier current devices where it is impossible to define the source of the signal.
7. Narrow beam relay transmissions, unless the radiated beam is used and the radiations can be located geographically. These transmitters do not identify themselves over the air.

We believe that by amendment No. 1, we have specifically eliminated the foregoing devices from the control provisions of section 606 (c) while granting to the Executive such power as he may require to control devices usable as navigational aids by an enemy in an attack upon the United States.

Amendment No. 2, while intended to achieve the same purpose as amendment No. 1, follows the framework of the amendment proposed by the committee's staff.

A proviso clause is added to the staff's proposal to limit the Presidential power over devices to those suitable as navigational aids. The reasons for the limitation are those explained in our discussion of amendment No. 1.

As pointed out in the testimony of the RTMA witnesses, a bombing mission in an attack upon the United States would set its initial course and fly at a very high altitude above the weather. It would use celestial navigation or radiation from abroad to guide its course toward its target in this country. As it approached the target, because of the superiority of radar for pin-pointing a target, an enemy plane would not use electromagnetic emissions emanating from this country as a navigational aid nor would electromagnetic emissions be used for the guidance of missiles directed against the United States.

In view of these facts, Congress should go slowly in granting to the Executive the sweeping powers set forth in S. 537 or contained in 606 (c) as first proposed to be amended. Control over at least one daily act of every citizen should not be voted unless there is a defense requirement commensurate with such far-reaching power over all of us. We believe the testimony fails to reveal such a defense requirement. Should the committee find such a requirement exists, it should eliminate from the bill all devices not usable as navigational aids. Where there is neither established nor imaginable defense need, we believe it wholly unwise to grant power to the Executive to control the activities of most of us in our daily lives. Either amendment suggested grants the President all powers which the testimony reveals that he needs or might need by the widest stretch of imagination. The limitations upon the Executive power are the minimum needed for the protection of our ordinary pursuits against unnecessary invasion.

Very truly yours,

RADIO-TELEVISION MANUFACTURERS ASSOCIATION,
By B. K. WHEELER,
Wheeler & Wheeler, Special Counsel.

SUGGESTED AMENDMENT NO. 1—COMMUNICATIONS ACT OF 1934

SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President, *if he deems it necessary in the interest of national security or defense*, (1) may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations within the jurisdiction of the United States as prescribed by the Commission, (2) may cause the closing of any station for radio communication and the removal therefrom of its apparatus and equipment, (3) may authorize the use or control of any such station and/or its apparatus and equipment by any department of the Government under such regulation as he may prescribe, upon just compensation to the owners, and (4) may, with respect to all devices capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, control, limit, or forbid their operation upon specific findings that such devices are capable of use as a navigational aid in the course of an attack upon the United States: *Provided*, That such devices (1) are not manufactured for general use by the public in which low power radiation is an incidental characteristic, (2) do not emit radiations suitable as a navigational aid at a distance beyond five miles, and (3) are not, by reason of their intermittency of operation or lack of identity with a fixed point source, or otherwise, inherently unsuitable for use as a navigational aid, unless such devices are in fact used or intended for use as a navigational aid in an attack upon the United States.

RADIO-TELEVISION MANUFACTURERS ASSOCIATION.

SUGGESTED AMENDMENT NO. 2—COMMUNICATIONS ACT OF 1934

SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President, *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and cause the closing of any station for radio communication, or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the Government under such regulations as he may prescribe upon just compensation to the owners, provided, however, that such stations or devices shall not include devices radiation from which is not suitable as a navigational aid at a distance beyond five miles.

RADIO-TELEVISION MANUFACTURERS ASSOCIATION.

DEPARTMENT OF THE AIR FORCE,
Washington, June 27, 1951.

HON. EDWIN C. JOHNSON,
Chairman, Committee on Interstate and Foreign Commerce,
United States Senate.

DEAR MR. CHAIRMAN: I refer to your request for the views of the Department of Defense with respect to the proposed amendment to section 606 (c) of the Communications Act of 1934 for consideration as an alternate draft in lieu of S. 537. The Secretary of Defense has delegated to this Department the responsibility for expressing the views of the Department of Defense.

The purpose of the proposed amendment to section 606 (c) is to provide more adequate Federal control in regard to all stations or devices capable of emitting electromagnetic radiations.

The Department of Defense recommends the enclosed draft of a proposed amendment to section 606 (c) as a substitute for the amendment proposed by the Interstate and Foreign Commerce Committee and as an adequate substitute for S. 537. These changes would clarify and eliminate the objections voiced in the hearings on S. 537.

It is recommended that consideration be given to inserting a new section to 606 to be entitled "Section 606 (h)." The purpose of the proposed additional subsection would be to provide an adequate penalty clause in connection with a violation of section 606.

The Department of Defense is unable to estimate the fiscal effects of the proposed legislation.

This report has been coordinated among the departments and boards of the Department of Defense in accordance with the procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that there is no objection to the submission of this report.

Sincerely yours,

EUGENE M. ZUCKERT,
Assistant Secretary of the Air Force.

(Received by Interstate and Foreign Commerce Committee, June 28 1951.)

SEC. 606. (c) Upon proclamation by the President that there exists war or a threat of war or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, or in the interest of national defense, the President may (1) suspend or amend for such time as he may see fit rules and regulations applicable to any or all stations or devices emitting electromagnetic radiations within the jurisdiction of the United States, as prescribed by the Commission, (2) regulate, prohibit or otherwise control the operation of any such station or of any such device emitting electromagnetic radiations between 10 kcs and 100,000 mcs which is suitable for use as a navigation aid beyond 5 miles, and remove from any such station or device any or all apparatus or equipment, or (3) authorize, upon just compensation to the owners, the use of any such station or device and its apparatus and equipment by any department or agency of the Government under such regulations as he may prescribe.

SEC. 606. (h) Any person who willfully and knowingly does or causes or suffers to be done any act, matter or thing in violation of any regulation or order issued under this section, or who willfully and knowingly omits or fails to do any act, matter or thing required to be done by such regulation or order, or willfully and knowingly causes or suffers such omission or failure, shall, upon conviction thereof, if an individual, be fined not more than \$10,000 or imprisoned not more than 5 years, or both, and if a firm, partnership, association, or corporation be fined not more than \$50,000.

CHANGES IN EXISTING LAW

In compliance with subsection (4) of rule XXIX of the Standing Rules of the Senate, changes in existing law made by the bill, as reported, are shown as follows (new matter is printed in italics, existing law in which no change is proposed is shown in roman):

THE COMMUNICATIONS ACT OF 1934

SEC. 606 * * *

(c) Upon proclamation by the President that there exists war or a threat of war, or a state of public peril or disaster or other national emergency, or in order to preserve the neutrality of the United States, the President, *if he deems it necessary in the interest of national security or defense*, may suspend or amend, for such time as he may see fit, the rules and regulations applicable to any or all stations or devices capable of emitting electromagnetic radiations within the jurisdiction of the United States as prescribed by the Commission, and may cause the closing of any station for radio communication, *or any device capable of emitting electromagnetic radiations between 10 kilocycles and 100,000 megacycles, which is suitable for use as a navigational aid beyond 5 miles*, and the removal therefrom of its apparatus and equipment, or he may authorize the use or control of any such station or device and/or its apparatus and equipment, by any department of the government under such regulations as he may prescribe upon just compensation to the owners.

(h) *Any person who willfully and knowingly does or causes or suffers to be done any act, matter or thing prohibited or declared to be unlawful pursuant to the exercise of the President's powers and authority under this section or who willfully and knowingly omits or fails to do any act, matter or thing which he is required to do pursuant to exercise of the President's powers and authority under this section or who willfully and knowingly causes or suffers such omission or failure shall, upon conviction thereof, be punished for such offense by a fine of not more than \$1,000 or by imprisonment for a term of not more than 1 year, or both, and if a firm, partnership, association, or corporation be fined not more than \$5,000.*