

NEWS OF THE INDUSTRY

Broadcast prosperity; JETEC personnel; survey notes on servicemen; fundamental research; railroad radio; meeting scheduled; Washington, FCC, business news

FCC Places F-M in 88-106 Megacycle Band

ON JUNE 27, 1945 the Federal Communications Commission issued report 83095 announcing their adoption of alternative No. 3, with certain modifications, for the much-discussed band between 42 and 108 megacycles. The unexpectedly early decision was made because of the WPB announcement that the manufacture of a-m, f-m, and television transmitters and receivers might commence at an earlier date than was originally indicated. The channel allocations are as follows:

Freq. Band	Final Proposed Allocation
42—44 mc	Nongovernment fixed and mobile
44—50 mc	Television—Channel No. 1
50—54 mc	Amateur
54—60 mc	Television—Channel No. 2
60—66 mc	Television—Channel No. 3
66—72 mc	Television—Channel No. 4
72—76 mc	Nongovernment fixed and mobile
76—82 mc	Television—Channel No. 5
82—88 mc	Television—Channel No. 6
88—92 mc	Noncommercial educational f-m
92—106 mc	F-m
106—108 mc	Facsimile

This allocation is essentially the allocation proposed as alternative No. 3 of the earlier report, except that the nongovernment fixed and mobile services have been moved from 104-108 mc to 72-76 mc, and f-m and television have been adjusted accordingly. The advantage of this change is that it makes possible immediately the use of all 13 television channels below 300 mc. Under alternative No. 3, as originally proposed, the entire 6-mc television channel between 72 and 78 mc could not be used until the aviation markers centering on 75 mc were moved.

The nongovernment fixed and mobile services are not under the same disability. They can use the entire band between 72 and 76 mc at once with the exception of approximately 0.5 mc in the vicinity of 75 mc to protect the aviation markers. This shift of the nongovernment fixed and mobile services from 104-108 mc to 72-76 mc also results in a possible increase in the number of channels available to these services, since a 40-kc channel is adequate in

the 72-76 mc portion of the spectrum, whereas a 50-kc channel was proposed in the 104-108 mc region.

The FCC will move with all possible speed to revise present regulations and standards of good engineering practice for the operation of f-m, television and facsimile broadcasting in the new allocations. As soon as these revised rules and standards are adopted by the Commission, the industry will have all the information it needs from a regulatory standpoint to proceed with the planning and design of new receiving sets and transmitters.

When manpower and materials again become available and conditions permit the resumption of normal licensing practices, the Commission will make an appropriate announcement and will provide a period of not less than 60 days for the filing and processing of new applications prior to taking any action on the 420 f-m and 119 television applications now in its pending files. In the meantime, the Commission's staff will go through these ap-

plications and call for whatever further information may be required due to the change in bands. In the majority of cases there will be no material difference in the distances to the 50 microvolt per meter contour in either band.

Chairman Paul A. Porter recommended that f-m receiver manufacturers build sets to cover the entire band from 88 to 108 mc. This will make possible the expansion of f-m in the event facsimile is ultimately located in the 400-mc region and vacates the band 106-108 mc. Also, he took the opportunity to point out if the public is to enjoy the full capabilities of f-m, manufacturers must build receivers which will reject undesired signals and noise up to one half the strength of the desired program.

Alternatives

The other two alternatives for the disputed 44-108 mc region, along with a tabulation of all remaining allocations for that region of the radio spectrum above 25 mc, are given in the July 1945 issue of **ELECTRONICS**.

In the FCC hearings there was unanimity that alternative No. 2 (68-86 mc for f-m) was completely unfeasible.

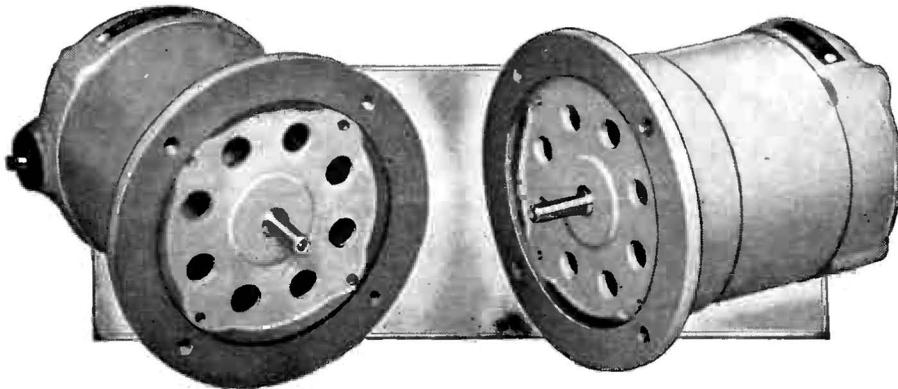
The primary objection to alternative No. 1 was the amount of sky-wave interference which will result among f-m stations if f-m is placed in the 50-68 mc region. For



Building fund activities of IRE bring together in meeting these familiar figures of the industry—around the table, in rotation: Keith Henney, **ELECTRONICS**; Melville Eastham, General Radio; T. M. Odarenko, Federal Telephone & Radio; R. R. Batcher, Caldwell-Clements; Roger Wise, *Sylvania*; D. E. Noble, Galvin; W. R. G. Baker, GE; L. C. F. Horle, consultant; Ben Gross, Gross Distributors; Walter C. Evans, Westinghouse; Haraden Pratt, Mackay; L. G. Pacent, Pacent Engineering; (and against the wall) E. W. Ritter, Corning Glass; J. C. Trostle and A. L. Aderton, building fund campaign directors; H. C. Forbes, Colonial Radio; D. J. Phelps, General Instrument; L. F. Miles, Maxon; E. J. Staubitz, Blaw-Knox; and David Kahn, Radio & Television

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example, interference among 50-kw f-m stations at 58 mc from sporadic E transmissions alone, assuming a 10:1 ratio of desired to undesired signal and full occupancy of the channel, might be expected for 140 to 480 hours per year at the 50-microvolt contour from stations 900 and 1000 miles distant, respectively. At 84 mc, in contrast, interference under these conditions would be anticipated for only 6.5 to 25.5 hours per year. It should be noted that the 140-480 hours per year of anticipated interference would not be spread out evenly throughout the entire year, but would be concentrated in two or three summer months.

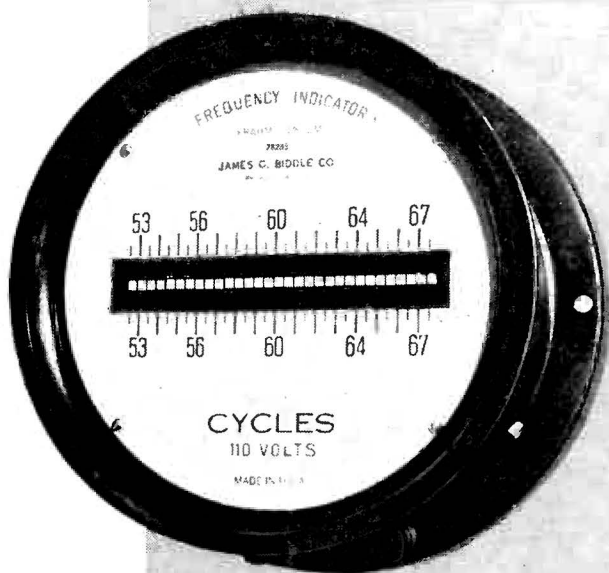
In addition, interference from F_2 transmission at 53 mc may be anticipated for as many as 470 hours per sunspot cycle, concentrated in a period of three years in the case of a sunspot cycle the same as the last one, or interference may exist for as much as 2,650 hours per sunspot cycle if the next sunspot cycle is as severe as the highest on record. These figures assume only two stations on a channel; more than two would double or treble the number of hours during which F_2 interference would be expected at 53 mc.

Practical Conditions

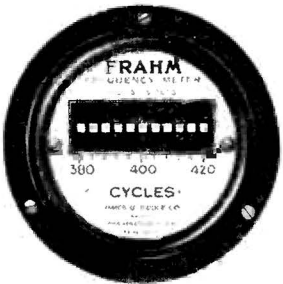
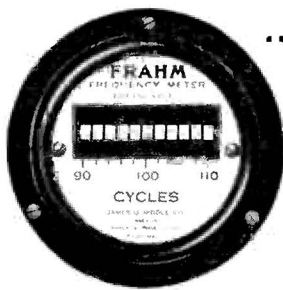
These interference figures mean, for example, that a listener tuned to a station which is carrying the program of his choice may suddenly find either that the program to which he has been listening is being interfered with by a station hundreds or even thousands of miles away, or else that control of his receiver has been seized altogether by a distant station, completely obliterating the desired programs despite anything he does to the tuning controls.

It has been argued that the bulk of the interference anticipated will be found in outlying rural areas which rely upon low-intensity signals for their radio reception and that if these areas be excluded, f-m service will be more than 99-percent perfect. The Commission, however, is under a statutory duty to make available to *all* the people of the United States an efficient nationwide radio service. The Commission's duty is not fulfilled if its

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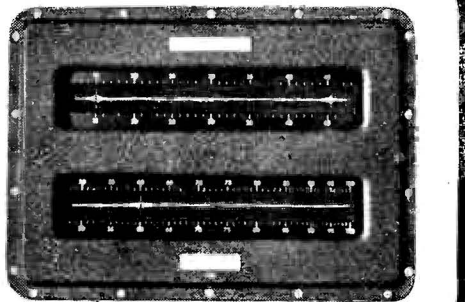
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provision for f-m service is such as to make it impossible for rural areas to enjoy satisfactory service.

Various objections to assigning the higher frequencies to f-m have been raised. For example, it has been alleged that tropospheric interference may be worse in the vicinity of 100 mc than in the 50-mc region. The Commission in its report of May 25, 1945, specifically pointed out that there would be some difference in tropospheric propagation, but this difference would be only slight and that tropospheric interference at the higher frequencies could be eliminated by slightly increasing the geographical separation between stations.

Cost

The point has also been made that equipment for use in the vicinity of 100 mc will cost more than equipment for use in the vicinity of 50 mc. This will no doubt be true at least temporarily, but competition should reduce the differential substantially, and the Commission believes the benefit to the public resulting from an interference-free service will more than outweigh the slight increase in initial cost for service in the 100-mc region.

Much emphasis was placed at one time on the presumed hardship which would result to the approximately 400,000 persons who had purchased f-m receivers before the war. Most of these receivers are combination a-m/f-m and the a-m part of the receiver will continue to be used. There is now substantial



At the right a photographer takes directly from the cathode-ray screen a record of the characteristic curve of an electron tube being tested at the left. Equipment, developed by engineers of Sylvania Electric Products Inc., speeds to designers in a matter of minutes vital information which would require many man-hours if done by conventional methods

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agreement that the 42-50 mc band for which these receivers were made is wholly inadequate and unsuited to f-m reception. Accordingly, no one today argues that postwar f-m should be degraded to the point necessary to accommodate these receivers. However, interim operation in the present band from 42 to 44 mc is being provided until such time as equipment for the higher frequencies is freely available to the public and until owners of existing receivers have had equal opportunity to adapt or convert them to the new band. In this connection, a converter was demonstrated to the Commission which would make existing f-m receivers capable of tuning to the higher frequencies and which should retail for approximately \$10.00.

Bretton Woods & Good Business

HEADED BY Ralph E. Flanders of Jones and Lamson Machine Co., a so-called Business and Industry Committee for Bretton Woods is supporting those agreements as a basis for postwar prosperity through international trade. One of a special series of reports issued by the committee deals with the effect of Bretton Woods on the electronics industry. Copies can be obtained from the committee headquarters in the Roosevelt Hotel, New York 17, N. Y.

Electronics in a Saxophone Factory

VACUUM TUBE APPLICATIONS involving a number of different factory operations at the plant of C. G. Conn Ltd. were recently described by director of engineering research E. L. Kent at a Cedar Rapids, Iowa, section meeting of IRE.

Summarized, the uses included: a smoke alarm control system which used a phototube to reduce the bias on a blocking oscillator and allow a tone to be heard which rose in pitch as the smoke intensified; a dynamic balancing unit for gyro rotors which utilized an electronic wattmeter with a reference signal from a phototube applied to one section while the vibration signal entered the other input terminals; a device for measuring speed of