2 CHANNELS

Any transmission of intelligence by means of radio involves the use of a specific frequency of radio energy, known as the carrier frequency, plus other adjacent frequencies (sidebands), which become involved when the carrier is modulated. The group of frequencies used by a given transmitter is called a channel, and the amount of information it is possible to transmit through a given channel depends on the width of that channel, that is, the total number of frequencies available within the channel. Since there is an ever-increasing demand for "space" within the usable radio frequency spectrum by the many different radio communications services, each service must be content with the minimum channel width and minimum number of channels compatible with the needs of the service. Television is relatively demanding both as to channel width and number of channels. Its 6 megacycle (6,000,000 cycles per second) channel is, for example, 200 times as large as the channel used in the United States for standard (AM) radio broadcasting.

In countries which do not have competitive television systems, the problem of allocation is much simpler since a relatively few strategically located stations can blanket the population with one, or even several, program services. When television was first authorized in the United States it was assigned to a small group of 6 megacycle channels within the very-high-frequency (VHF) portion of the radio frequency spectrum. After some changes, the number of channels stabilized at 12, and no more room could be found for additional channels in the VHF band. The FCC sought to solve this problem by adding 70 channels in the next higher band, the ultra-high-frequency (UHF). A Federal law requires, since 1964, that all new TV sets must be equipped to receive UHF channels.

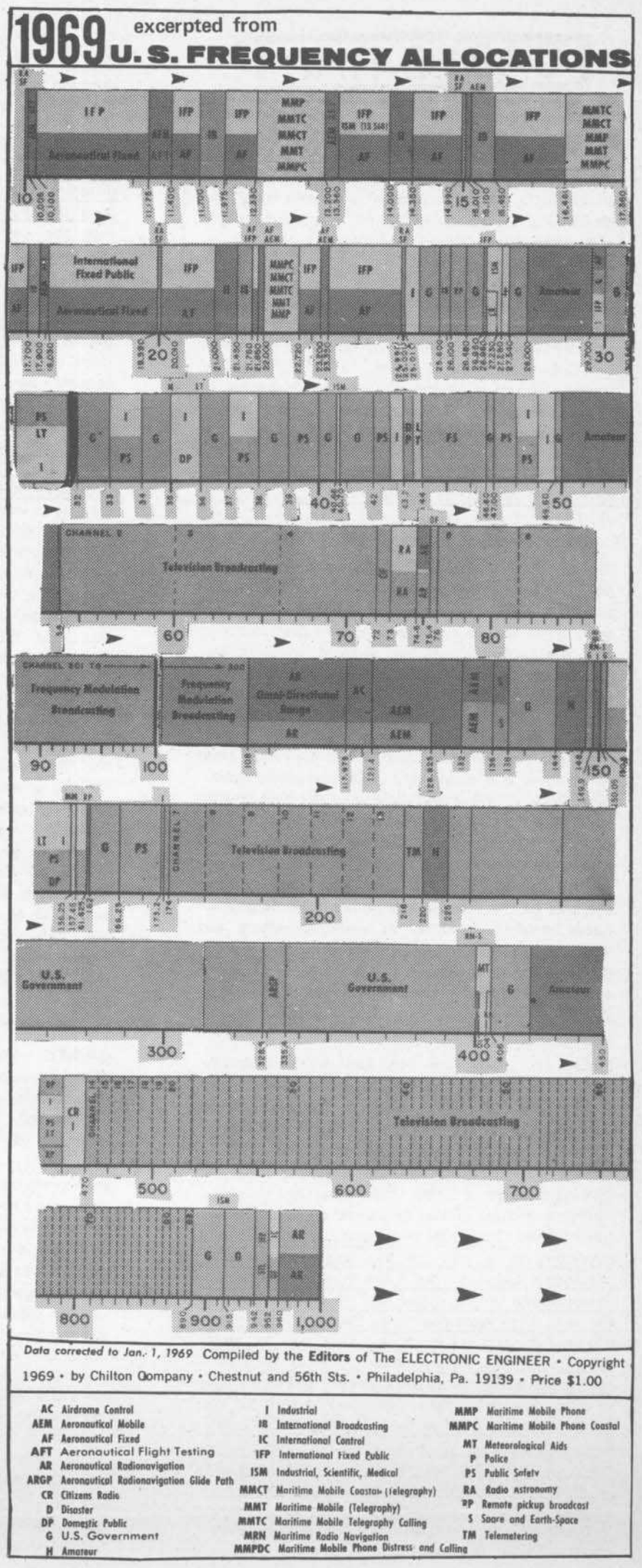
Though all 82 TV channels are the same size, 6 megacycles, their position in the frequency spectrum profoundly affects their relative usefulness. It is characteristic of radio waves that the higher they are in frequency, the shorter the distance that can be propagated with a given amount of power. While low and medium frequency waves tend to follow the curvature of the earth beyond the horizon, as one moves up the spectrum into the VHF and then the UHF regions the waves tend more and more to behave like light, that is, to travel in straight lines to the horizon. Furthermore, the higher the frequency of a transmission channel, the more easily its signals can be blocked off by objects in their path such as buildings, trees, mountains, or even rainfall. In terms of the usefulness of the television channels, this means that the higher the channel number the less desirable the channel from the point of view of obtaining maximum geological coverage. The UHF channels, because they represent such a jump in frequency from the highest of the VHF channels, are markedly inferior to the VHF channels in their ability to provide reliable distant reception and to cope with obstructions in the path of the signals between transmitter and receiver. UHF stations cannot compete on even terms with VHF stations. (*Americana Encyclopedia* vol. 26)

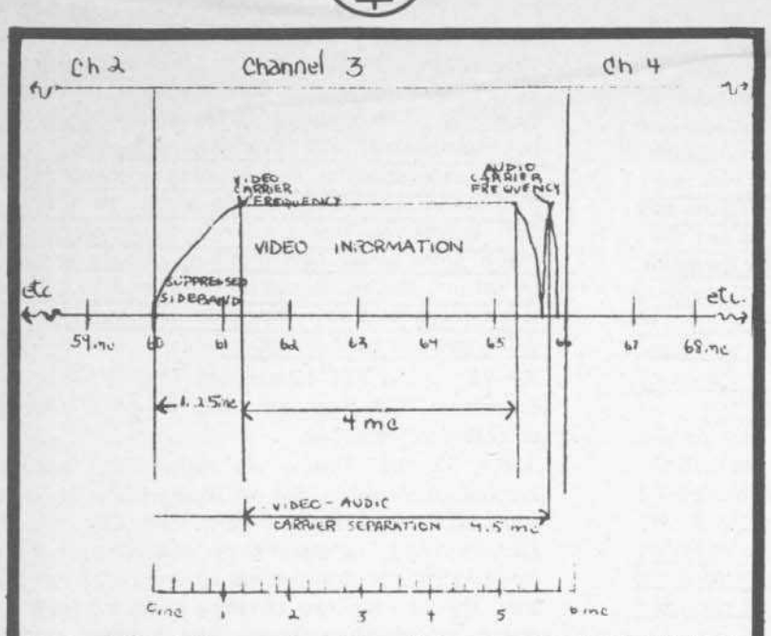
UNITED STATES TV CHANNEL ALLOCATIONS

Channel #	Band	Location within band
2-4	VHF (30-300mc)	54-72mc
5-6	VHF (30-300mc)	76-88mc
7-13	VHF (30-300mc)	174-216mc
14-83	UHF (300-3,000mc)	470-890mc

(American Encyclopedia, vol. 26)
Single television channel = 6 megacycles

Channel	Frequency Range	
Sub 1	6-12mc	Six channels can be carved out of the electromagnetic spectrum below channel 2. These channels are not used for over-the-air broadcasting because they have inferior carrying qualities, but they can be carried on the cable with no significant signal loss of strength or clarity. *(Nation,* 5/18/70, Smith)
Sub 2	12-18	
Sub 3	24-30	
Sub 4	30-36	
Sub 5	36-42	
Sub 6	42-48	
Sub 7	48-54	
Ch. 2	54-60	
Ch. 3	60-66	
Ch. 4	66-72	
Unused	72-76	Normal VHF "Low Band"
Ch. 5	76-82	
Ch. 6	82-88	
FM Radio	88-108	
Air Navigation	108-120	must be vacant on cable to avoid interference with aircraft navigation
A	120-126	
B	126-132	
C	132-138	
D	138-144	For technical reasons, this range is avoided by over-the-air broadcasting, but can be used without difficulty by the cable. *(Nation,* 5/18/70, Smith)
E	144-150	
F	150-156	
G	156-162	
H	162-168	
I	168-174	
Ch. 7	174-180	
Ch. 8	180-186	
Ch. 9	186-192	
Ch. 10	192-198	Normal VHF "High Band"
Ch. 11	198-204	
Ch. 12	204-210	
Ch. 13	210-216	
J	216-222	
K	222-228	
L	228-234	
M	234-240	Extended VHF Band
N	240-246	
O	246-252	
P	252-258	
14-83	470-890	Normal UHF Band





This drawing symbolizes a portion of the radio frequency spectrum in which some of the VHF channels fall. The standards indicated for channel 3 apply to all United States television broadcasting, whether UHF or VHF. Note that although the sideband to the left of the video carrier frequency is suppressed, room must nevertheless be left for vestigial energy, (the video carrier frequency being located 1.25 mc from the lower end of the channel). As can be seen from the lower scale, of the six megacycles available, only four are devoted to actual video information. Modulation of the carrier produces sidebands on each side of the carrier but in TV the sideband to the left is suppressed and only the right hand sideband is used (which is possible because the two sidebands are simply images of each other in opposite phase). Near the upper limit of the channel, separated slightly from the upper limit of the picture information, is a second carrier frequency for the sound component of the signal. (Not drawn to scale. Americana Encyclopedia, vol. 26.)

o o o o o o o o o o o o

FEDERAL COMMUNICATIONS COMMISSION REPORT

ISSUE: CATV PROGRAMMING ORIGINATION

MEMORANDUM OPINION AND ORDER

Adopted: June 24, 1970; Released July 1, 1970

1. We have before us a number of petitions for reconsideration of our First Report and Order herein, released October 27, 1969. . . In that decision . . . we dealt with certain aspects of community antenna television (CATV) service. **We determined that the public interest would be served by program origination (cablecasting) over CATV systems, and accordingly adopted a requirement for such cablecasting after January 1, 1971 by systems with 3,500 or more subscribers, leaving to further proceedings the question of whether the requirement should be made applicable to smaller systems.** We also authorized advertising on cablecasts, limited to the beginning and end of each program, and to such "natural breaks or intermissions" within programs as are beyond the control of the CATV operator. . .

2. The joint petition for reconsideration of Cablecom-General, Inc., Communications Properties, Inc., Pennsylvania Community Antenna Television Association, Inc., Service Electric Company and Texas CATV Association, Inc. supports the Commission's objective promoting multi-purpose CATV operation combining the carriage of broadcast signals, program origination and common carrier services. However, it urges that a compulsory origination requirement, limitations upon advertising and the possibility of a dual Federal-State regulatory system are undesirable. With respect to the origination, or "cablecasting" requirement, it is urged that to compel cablecasting by systems not adequately prepared to undertake it will not advance the Commission's aims, but rather will retard their realization. . . The petition urges that there is no valid basis for assuming that CATV systems not now originating programs do not have a valid reason for failing to do so; uncertainties over copyright legislation and state public utility regulation as well as economic problems related to capital requirements are referred to as obstacles to effective cablecasting. . .

3. We have carefully considered these contentions, but are not persuaded that either the public or the CATV industry would be better served by deleting the cablecasting requirement. As the petitioner's state, there is no disagreement about the value and importance of cablecasting. **Since many systems are now originating, the general feasibility of origination is no longer in doubt, and we believe that we adopted a reasonable cut-off point in limiting the applicability of our rule to systems with at least 3,500 subscribers.** The first Report and Order covers this issue in detail, 2/ including available data on costs, and the initial rule adopted in that document is very broad, permitting great flexibility in cablecasting operations. **We have been given no data tending to demonstrate that systems with 3,400 subscribers cannot cablecast without impairing their financial stability, raising rates or reducing the quality of service. We recognize that there are some uncertainties, but these uncertainties have not prevented the inauguration of cablecasting by many systems.** 3/ Innovative arrangements are also possible, such as agreements with educational institutions under which a channel is made available for the use of the school which, with its own studio and other facilities, will produce educational, cultural and other programming. The CATV of course would be expected to see to it that local political and other affairs are covered on that or a different channel, but the costs of origination to it would be sharply reduced. We do not see, therefore, why a reasonable requirement for cablecasting should produce less quality origination than would otherwise be produced. 4/ **The rule adopted is minimal in the light of the potentials of cablecasting and, on our own motion, we are postponing the date when origination must commence to April 1, 1971 to afford additional preparation time.**

4. Indeed, we recognize that there is a question of whether we should not go beyond the minimal rule and specify a minimum number of hours for local live origination (as against presenting primarily film). **We adhere to the judgment . . . namely, that it is appropriate to afford a period of free experimentation and innovation by cable operators.** However, there is one development which does require consideration. It has come to our attention that some cable operators simply lease their origination channel to a local radio station, which in turn presents its disc jockey shows over this channel for virtually the entire broadcast day. **While the cable operator is perfectly free to enter into arrangements with local broadcast stations during the period of experimentation. . ., the main purpose is to provide an outlet for local expression.** As we stated in the First Report, the very existence of "available facilities for local production and presentation of programs. . ." is a most important contribution to the public interest, since it means that the mayor, the local political candidates, those willing to discuss controversial issues, etc. have a means of access to the television viewer. However, if the channel is unavailable for such presentation because it is leased out to a local broadcast facility for television presentation of its shows, the above purpose is frustrated. **We therefore . . . make clear that the CATV may not enter into any arrangement which inhibits or prevents the substantial use of the cable facilities for local programming designed to inform the public on issues of public importance. . .**

5. Several parties 5/ urge that the Commission, in encouraging cablecasting has embarked upon a new course with respect to CATV, which was previously limited to the role of a supplement to broadcast television service. They say that CATV, still founded upon the carriage of broadcast signals, but now encouraged to originate programs independently, will be a greater threat to the public's continued reception of "free" programs than either previous CATV operations or subscription television broadcasting. . . The adoption of rules similar to those preventing siphoning television programs from free television broadcasting to subscription television broadcasting will serve to insure that cablecasting does not merely force the public to pay for what it now receives free. They are additionally warranted here because of CATV's inability to serve the same audience reached by a television broadcast station, and they serve the same purpose of protecting those who do not wish or cannot afford to pay for television. Finally, we believe that as is the case with subscription television, advertising should not be permitted where the public pays directly for the programs. . . However, **we do not believe that cablecasting unaccompanied by per-program, or per-channel charges, presents a substantial threat of siphoning, or that such cablecasting, which we wish to stimulate, should be restricted to one channel or limited to sponsorship by local advertisers in small communities. . .**

7. We note also other requests by several parties that we deal with CATV on a more comprehensive basis at this time, covering such issues as licensing, whether origination by the CATV operator should be permitted on more than one channel, regulation of common carrier operations, reporting requirements, and technical standards. We are not persuaded that all of these questions need be resolved before we proceed with the basic determinations made in the First Report and Order of October 27, 1969. CATV originations are still in their infancy, and, so far as we know, common carrier operations are still in the future. These various issues are not being forgotton. . .

Federal Communications Commission, 1919 M Street, N.W.; Washington, D.C.