FEDERAL COMMUNICATIONS COMMISSION

FCC 65-130
63396
Information Bulletin - B
February 19, 1965

WASHINGTON 25, D. C. 20554

POTENTIAL INTERFERENCE TO TELEVISION RECEPTION FROM THE OPERATION OF FM BROADCAST STATIONS ON CERTAIN FREQUENCIES

FM Broadcast stations are assigned and operate on frequencies from 88.1 to 107.9 Mc/s. The second harmonic of all these frequencies (twice the fundamental frequency) falls within the high VHF TV band, Channels 7 through 13. Thus, radiation of any FM signal on the second harmonic of the assigned fundamental can be a source of interference to reception of TV Channels 7 through 13, since the FM harmonic signal acts like an undesired signal on the same channel. In view of the large number of FM and TV stations already in operation and the potential of many additional stations in the next few years, the possibility of such a second harmonic relationship in the same community or in different communities may exist anywhere in the United States.

The severity and extent of this type of interference will depend on the distance between the stations involved, the relative strengths of the two signals, the exact relationship of the FM harmonic to the TV station's picture and aural carriers, the orientation of the receiving antennas and other factors. The potential interference is greatest where the FM signal is strong in relation to the TV signal such as would occur where the desired TV signal comes from a distant station whereas the FM station is locally situated with respect to the TV viewers.

The potential interference to TV reception from FM stations is of two types. One is that caused by the direct second harmonic radiation of the FM signal falling within the TV receiver bandpass. It usually can be corrected by the installation of suitable filters at the station. Our rules require rather severe second harmonic suppression on the part of FM stations. This type of interference rarely occurs when the two stations are in the same city or nearby cities since the ratio of the TV signal strength to the FM signal strength is large enough to permit satisfactory TV service. It is most likely to occur where the TV station is at a great distance and the FM station is nearby.

The second type of potential interference is attributable to the generation of the second harmonic signals within the individual TV receivers in some part of the booster or RF amplifier caused by overloading of the TV receiver due to the very strong fundamental signal from the local FM station. Here the interference occurs mostly near the site of the FM station and is most severe when the TV signal comes from a

distant station. This type of interference cannot be cured at the FM station and should not be blamed on the FM station licensee. It is basically a TV receiver design problem, since the receiver does not have sufficient selectivity to reject an FM signal which is far removed from the TV signal frequency. The overloading type of interference may be eliminated or at least alleviated by the insertion of filters or "wave-traps" designed to eliminate the FM stations's fundamental carrier frequency. Sometimes re-orientation of the TV receiving antenna may be necessary. The problem becomes more difficult as the TV signal becomes weaker (the desired station is farther removed) and the closer the TV viewer is to the local FM station. It is particularly troublesome where the TV viewer is using a highly directive antenna, with or without a booster, and the FM station is on a line between the viewer and the distant TV station.

Since the first type of potential interference (direct second harmonic radiation from the FM station) lends itself to correction at the station and the second type (overloading) is a matter of receiver design which in most cases can be remedied only at the TV receiver, these types of interference have not been taken into account in the allocation of FM stations, either under the previous rules or under the present Table of Assignments. Shifting an FM assignment to a city at a greater distance from a TV station may actually worsen the situation at a later date since the TV signal will be weaker than before. There have been a number of instances where all cases of interference of the types described could not be eliminated either by further reduction of the second harmonic of the FM station or by the installation of traps at the TV receivers. In some of these cases changes were made in the frequency assignment of the FM station if a simple solution agreeable to all the parties concerned could be found. However, with the rapid growth of FM and the increase in the number of FM stations there may not be a possibility of such frequency shifts in all instances.

Occasionally TV viewers have jumped to the conclusion that the FM station was at fault when interference occurred at the same time the FM station began operation. In almost all such cases, the fault has not been with the FM station but rather with the TV receivers, and the efforts of the viewers to watch TV signals beyond their normal service range. It becomes necessary therefore for all concerned with this problem, including the TV receiver manufacturers, station licensees, and the viewing public to take whatever measures are needed to insure that both of these important broadcast services can exist without adverse effect on each other. FM station licensees should make sure that the harmonic radiation is as low as the state of the art will permit. They should also carefully select their sites as far removed removed from built-up residential areas as possible. TV receiver manufacturers should consider either including FM traps in all their sets or at least making such traps available to customers in areas of possible interference. Finally, the viewing public should cooperate to the extent that they re-orient their antennas or install the necessary wave-traps where it is recommended by the FM station licensee or a competent TV service man.

- FCC -

Adopted: February 17, 1965