Spurious Responses in Radio Receivers

Spurious responses peculiar to super heterodyne receivers only are image frequency signals, signals if intermediate frequency, harmonics of intermediate frequency generated by the second detector and strong signals of twice the intermediate frequency. General spurious responses are cross talk and cross modulation, external cross modulation and noises.

For a receiver using local oscillator frequency above the signal frequency, the image frequency signal is one having frequency above the signal frequency by twice the intermediate frequency. Such an image signal, if permitted to reach the mixer input beats with the local oscillator voltage to produce difference frequency voltage of frequency just equal to the intermediate frequency. The image signal will then get the same treatment by the receiver as does the desired signal to which the receiver is tuned. Hence the image signal produces its own modulation frequency voltage in the output of the receiver in addition to the desired output.

Remedies for image signal responses are providing discrimination of the order of fifty to sixty decibels against the image signal relative to the desired signal .by use of two or more radio frequency tuned circuits preceding the mixer. This suggests the use of one or more stages of radio frequency amplifier preceding the mixer. Further the same signal frequency, the image signal discrimination per tuned circuit increases as the value of intermediate frequency increases. According the intermediate frequency should be chosen as high as possible consistent with the requirement of adjacent channel selectivity. In extreme difficult situations wave traps may be used between the antenna and the mixer input to trap any particular image signal of extremely large strength.

Signals of intermediate frequency if able to reach the mixer input will readily pass through the rest of the receiver and will be heard in the output. Response to such signals of intermediate frequency may be eliminated by many means like by using for the receiver an intermediate frequency, that is away from the frequency of a strong local station, by using one or more stages of radio frequency amplification to provide discrimination to this intermediate frequency signal and by using a wave trap to eliminate a particularly strong intermediate frequency signal.

Harmonics of intermediate frequency are produced by the second detector. If one of these harmonics gets coupled back to the radio frequency stage in appreciable magnitude and further if the receiver is tuned to a signal frequency of twice or thrice the intermediate frequency then an audio beat note will be produced by the heterodyne action. This trouble can be eliminated by using in the second detector output suitable radio frequency filter which completely by passes the radio frequency components and by arranging the layout and wiring of the receiver in such a way as to produce a minimum coupling between the second detector stage and the radio frequency stage.

About the Author

Tymon Hytem has worked in the electronics feild for the past 15 years. He enjoys helping people decide on electronic gadgets from telephones to XM Radio and choosing the perfect XM Satellite Radio system for their needs.

Source: http://www.articletrader.com