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CHAPTER 15

Radio Frequency Interference

Slide 2

Interference & Suppression

Front-End Overload, Cross-Modulation

•What is meant by receiver overload? **Interference caused by strong signals from a nearby transmitter**

•What is one way to tell if radio frequency interference to a receiver is caused by front-end overload? **If the interference is about the same no matter what frequency is used for the transmitter**

•If a neighbour reports television interference whenever you transmit, no matter what band you use, what is probably the cause of the interference? **Receiver overload**

•What type of filter should be connected to a TV receiver as the first step in trying to prevent RF overload from an amateur HF station transmission? **High-pass**

•When the signal from a transmitter overloads the audio stages of a broadcast receiver, the transmitted signal: **can appear wherever the receiver is tuned.**

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Front-End Overload, Cross-Modulation

Con't

•Cross-modulation of a broadcast receiver by a nearby transmitter would be noticed in the receiver as: **the undesired signal in the background of the desired signal**

•What is cross-modulation interference? **Modulation from an unwanted signal is heard in addition to the desired signal**

•What is the term used to refer to the condition where the signals from a very strong station are superimposed on other signals being received? **Cross-modulation interference**

•What is the result of cross-modulation? **The modulation of an unwanted signal is heard on the desired signal**

•If a television receiver suffers from cross-modulation when a nearby amateur transmitter is operating at 14 MHz, which of the following cures might be effective? **A high pass filter attached to the antenna input of the television**

•How can cross-modulation be reduced? **By installing a suitable filter at the receiver**

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Audio Rectification etc.

What sound is heard from a public address system if audio rectification of a nearby single-sideband phone transmission occurs? **Distorted speech from the transmitter's signals**

What sound is heard from a public address system if audio rectification of a nearby CW transmission occurs? **On-and-off humming or clicking**

How can you minimize the possibility of audio rectification of your transmitter's signals? **By ensuring that all station equipment is properly grounded**

An amateur transmitter is being heard across the entire dial of a broadcast receiver. The receiver is most probably suffering from: **cross-modulation or audio rectification in the receiver**

Cross-modulation is usually caused by: **rectification of strong signals**

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Audio Rectification etc.

Con't

What devices would you install to reduce or eliminate audio-frequency interference to home entertainment systems?
Bypass capacitors

Stereo speaker leads often act as antennas to pick up RF signals. What is one method you can use to minimize this effect? **Shorten the leads**

Stereo amplifiers often have long leads which pick up transmitted signals because they act as:

receiving antennas

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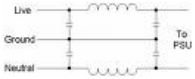
Audio Rectification etc.

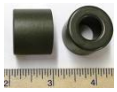
Con't

What device can be used to minimize the effect of RF pickup by audio wires connected to stereo speakers, intercom amplifiers, telephones, etc.? **Ferrite core**

One method of preventing RF from entering a stereo set through the speaker leads is to wrap each of the speaker leads around a: **ferrite core**

What should be done if a properly operating amateur station is the cause of interference to a nearby telephone? Ask the telephone company to install **RFI filters**





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Intermodulation & Key Clicks

If someone tells you that signals from your hand-held transceiver are interfering with other signals on a frequency near yours, what may be the cause? **Your hand-held may be transmitting spurious emissions**

If your transmitter sends signals outside the band where it is transmitting, what is this called? **Spurious emissions**

What problem may occur if your transmitter is operated without the cover and other shielding in place? **It may transmit spurious emissions**

A parasitic oscillation: **is an unwanted signal developed in a transmitter**

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Intermodulation & Key Clicks

Con't

Parasitic oscillations in the RF power amplifier stage of a transmitter may be found: **at high or low frequencies**

Transmitter RF amplifiers can generate parasitic oscillations: **on either side of the transmitter frequency**

In Morse code transmission, local RF interference (key-clicks) is produced by: **the making and breaking of the circuit at the Morse key**

Key-clicks, heard from a Morse code transmitter at a distant receiver, are the result of: **too sharp rise and decay times of the carrier**

How can you prevent key-clicks? **By using a key-click filter**

In a Morse code transmission, local RF interference (key-clicks) is produced by: **Sparking at the key contacts**

Key-clicks can be suppressed by: **inserting a choke and a capacitor at the key**

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Harmonics, Splatter etc.

If a neighbour reports television interference on one or two channels only when you transmit on 15 metres, what is probably the cause of the interference? **Harmonic radiation from your transmitter**

What is meant by harmonic radiation? **Unwanted signals at frequencies which are multiples of the fundamental (chosen) frequency**

Why is harmonic radiation from an amateur station not wanted? **It may cause interference to other stations and may result in out-of-band signals**

What type of interference may come from a multi-band antenna connected to a poorly tuned transmitter? **Harmonic radiation**

If you are told your station was heard on 21,375 kHz, but at the time you were operating on 7,125 kHz, what is one reason this could happen? **Your transmitter was radiating harmonic signals**

Your amateur radio transmitter appears to be creating interference to the television on channel 3 (60-66 MHz) when you are transmitting on the 15 metre band. Other channels are not affected. The most likely cause is: **harmonic radiation from the transmitter**

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Harmonics, Splatter etc.

Con't

One possible cause of TV interference by harmonics from an SSB transmitter is from "flat topping" - driving the final amplifier into non-linear operation. The most appropriate remedy for this is: **reduce microphone gain**

In a transmitter, excessive harmonics are produced by: **overdriven stages**

An interfering signal from a transmitter is found to have a frequency of 57 MHz (TV Channel 2 is 54 - 60 MHz). This signal could be the: **transmission of the second harmonic of a 10 metre transmission**

Harmonics may be produced in the RF power amplifier of a transmitter if: **excessive drive signal is applied to it**

What causes splatter interference? **Over-modulation of a transmitter**

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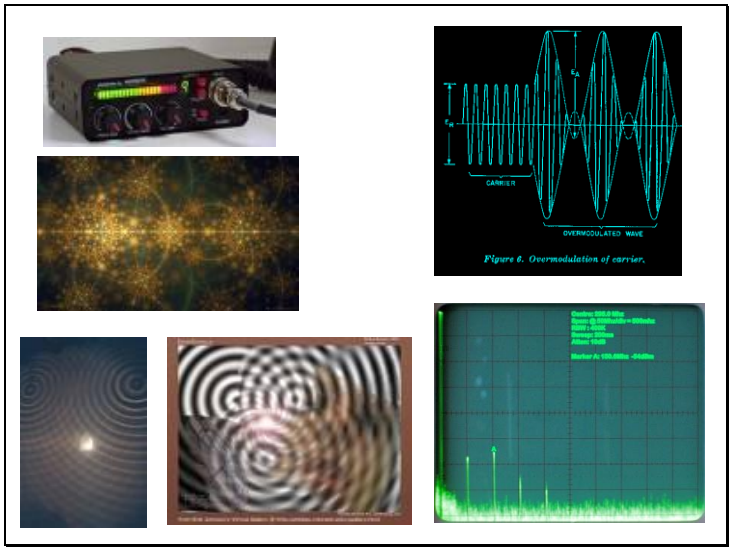
CARRIER
OVERMODULATED WAVE
Figure 6. Overmodulation of carrier.

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Use of Filters, etc.

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What type of filter might be connected to an amateur HF transmitter to cut down on harmonic radiation? **A low pass filter**

In order to reduce the harmonic output of a high frequency (HF) transmitter, which of the following filters should be installed at the transmitter? **Low pass**

To reduce harmonic output from a transmitter, you would put a ____ in the transmission line as close to the transmitter as possible: **A low pass filter**

Why do modern HF transmitters have a built-in low pass filter in their RF output circuits? **To reduce harmonic radiation**

What should be the impedance of a low pass filter as compared to the impedance of the transmission line into which it is inserted? **About the same**

A low pass filter suitable for a high frequency transmitter would:
attenuate frequencies above 30 MHz

A high pass filter would normally be fitted: **at the antenna terminals of the TV receiver**

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Use of Filters, etc.

- When considering filters remember

  High pass filters go on the receiver end

  Low pass filters go on the transmitter

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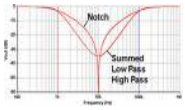
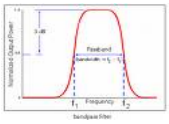
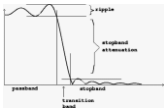
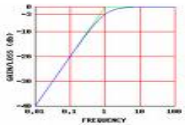
Use of Filters, etc.

Con't

What circuit blocks RF energy above and below a certain limit? **A band pass filter**

A band pass filter will: **allow only certain frequencies through**

A band reject filter will: **pass frequencies each side of a band**