PYRAMID COMMUNICATIONS

So, You Want to use your SVR Vehicular Repeater VHF In-Band?

Everything you always wanted to know about In-Band VHF vehicular repeaters but were afraid to ask....

Using Vehicular Repeaters in the same RF band as the mobile is possible, but certain precautions must be observed. Since the mobile will be transmitting (at high power) at the same time the SVR is trying to receive from the portable, the possibility of interference exists. The two factors that matter most are antenna spacing and frequency spacing.

Frequency Spacing: Obviously, the SVR cannot operate on any of the frequencies as the mobile TX or RX channels. The SVR will require its own license and frequency, preferably as far away from the mobile's transmitter as possible. When licensing a frequency for the SVR to operate on, there are frequency spacing requirements that must be observed. Pyramid Communications offers two filter combinations. Use the BRF-1601 Notch Filter for as close as 5 MHz separation between mobile TX/RX and SVR. Use the narrower BRF-1602 Notch Filter for frequencies as close as 2 MHz separation.

Antenna Spacing: Even if the SVR frequency is far removed from the mobile frequencies, the mobile transmitter can desensitize the SVR receiver if the antennas are placed too close together. The SVR antenna should be a low gain antenna such as a quarter wave, or better still, a low profile narrow band antenna such as the Laird Phantom series TRA1500. Not only is it a smaller target and narrow band, but because it is a canister type antenna (about the size of a soup can) you have more mounting options such as behind the grill of the vehicle. If the vehicle provides limited horizontal mounting surfaces (such as a pickup truck) try using a glass mount antenna for the SVR or mount a bracket off of the hood of the vehicle. Satisfactory results have been obtained using a rubber duck antenna right off the back of the SVR or mounting an antenna inside the vehicle on the rear dash.

Filters. Even with proper antenna placement and frequency planning interference can occur between the mobile and the SVR. Pyramid has developed a series of RF filters to prevent or reduce in-band interference:

Bandpass Filter: The BPF-1604 is a high selectivity pre-selector filter that prevents the mobile's transmitter from overloading the SVR receiver's front end. The filter is tuned to the SVR's simplex frequency and rejects everything except a narrow band of frequencies centered around the SVR frequency.

Notch Filter: Transmitters are designed to broadcast on a specific frequency, but no matter how good the design of that transmitter, it produces RF energy across a broad band of frequencies. The FCC sets limits on how much "off-frequency" energy a transmitter can produce, but even within the limits, it may be enough to cause interference in a receiver located close by, such as the SVR. No amount of bandpass filtering on the SVR will reduce this interference since it is right on the SVR receive frequency. The BRF-1601 or BRF-1602 notch filter is tuned to the SVR's receive frequency but installed on the mobile's antenna cable. The notch filter further attenuates the noise produced by the mobile that occurs on the SVR receive frequency. This is also why frequency spacing is so critical. None of the mobile's frequencies, transmit or receive, can be within 5 MHz using the BRF-1601 or 2 MHz using the BRF-1602. If a mobile transmit frequency is too close, the filter will consume too much of the transmitter power, damaging the filter and possibly the transmitter. If a receive frequency is too close, the mobile's receiver sensitivity will be degraded.

Pyramid Communications
30161-A Avenida de las Banderas, Rancho Santa Margarita, CA 92688
Voice: (714) 901-5462 - Fax: (714) 901-5472 - www.pyramidcomm.com