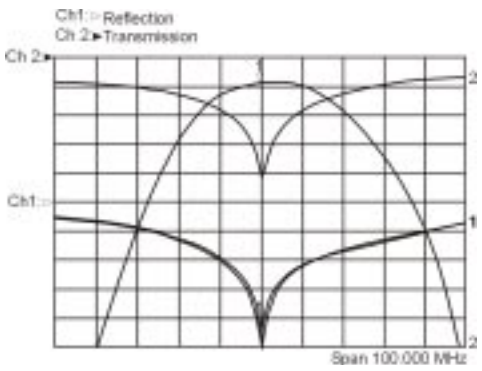
ISOLATORS

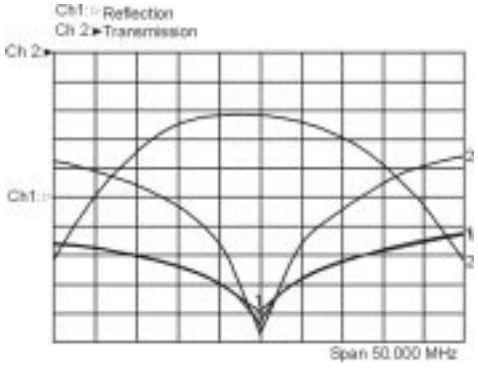
The base component of an isolator is known as a circulator, named simply by the fact that the R.F. signal moves in a circular direction inside the device. The combination of a circulator and a load termination creates an isolator. An isolator functions like a flow valve. The isolator conducts an R.F. signal in a forward direction from a transmitter output to an antenna feed line with low loss, much like an open valve. An R.F. signal that is reflected from the antenna system “sees” a high loss path (closed valve) toward the transmitter, but a low loss path (open valve) toward the load terminations where this power is dissipated as heat.

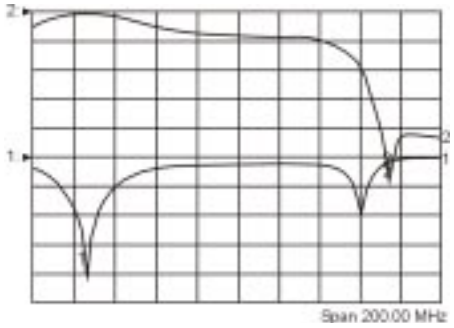
There are three basic uses for an isolator. First, an isolator will provide a transmitter with a good 50 ohm impedance match. Some transmitters are designed to protect against reflected power due to impedance mismatch and will not transmit when keyed.

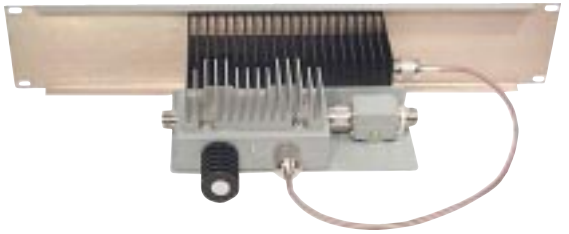
Second, isolators protect the transmitter from reflected power, which may be caused by an impedance mismatch in the antenna or a complete failure of the antenna system.

Finally, isolators are used in reducing or eliminating signals known as intermodulation (I.M.). Intermodulation products are generated when signals from neighboring antennas are coupled together. When this happens, these coupled signals are transmitted which produces interference in the desired signal.









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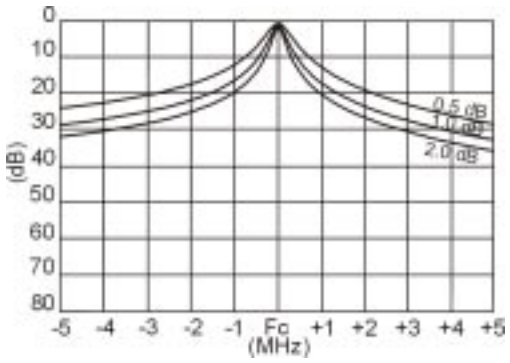
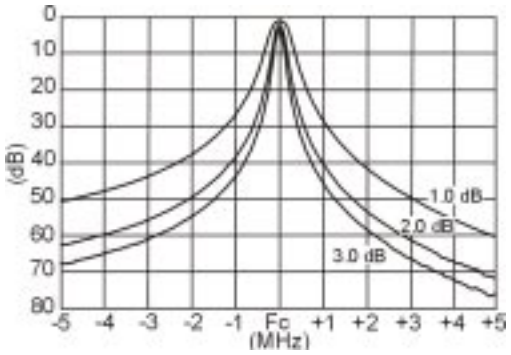
CAVITY RESONATORS

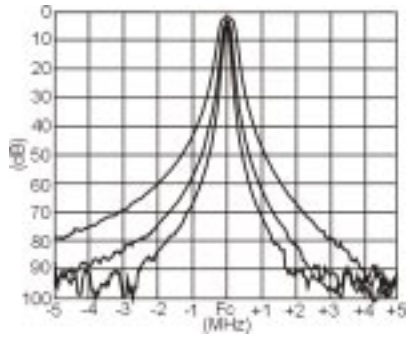
Band pass cavities are designed to allow a specific frequency or group of frequencies (pass band) to pass through the device while providing rejection against all other frequencies.

Required information for selecting the correct model:

- Power level
- Exact frequency(ies) to pass
- Loss setting or desired rejection at +/- (x) from center
- If single unit, does customer require rack bars or panels







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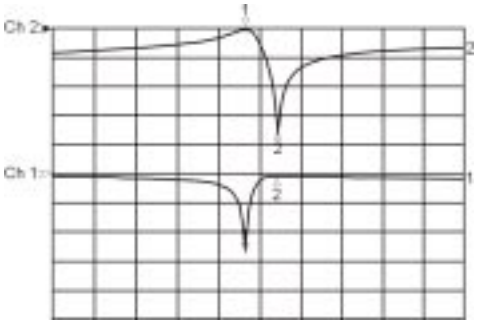
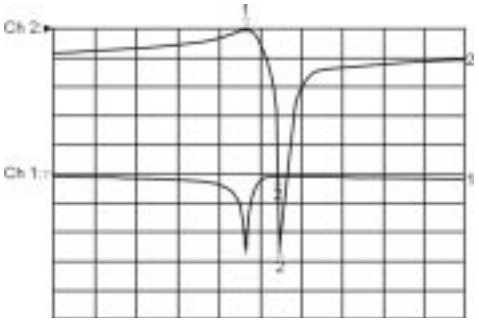
CAVITY RESONATORS

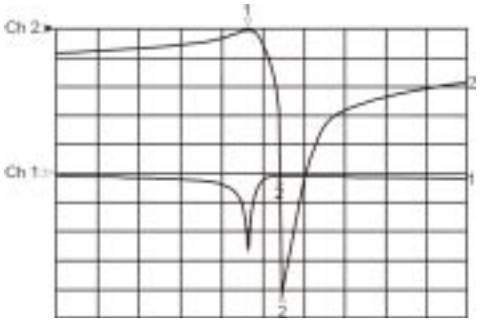
Pass notch cavities are designed to allow a specific frequency or group of frequencies (pass band) to pass through the device while providing high rejection against a specific frequency or group of frequencies.

Required information for selecting the correct model:

- Power level
- Exact frequency(ies) to pass
- Exact frequency(ies) to notch (reject)
- If single unit, does customer require rack bars or panel







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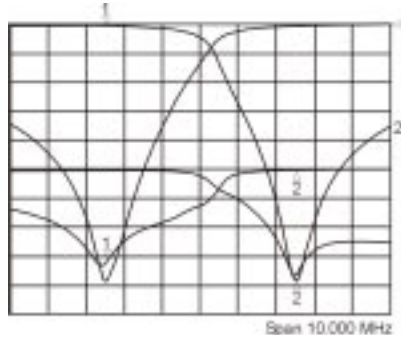
DUPLEXERS

Duplexers are a group of cavity resonators connected and tuned together to allow both a transmitter and a receiver to share a common antenna. These cavities need to be arranged in an order in which to provide enough isolation to keep the transmitter from interfering with the receiver.

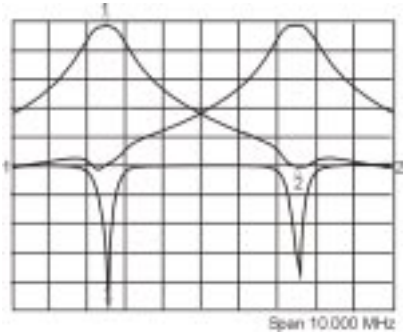
Mobile antenna duplexers are used when the application calls for a compact, rugged unit, such as in a vehicle.



Required information for selecting the correct model:

- Power level (The radio must have an output power level of no more than 40 watts)
- Exact transmit and receive frequencies (Common minimum frequency separation is 5.0 MHz in VHF or UHF)

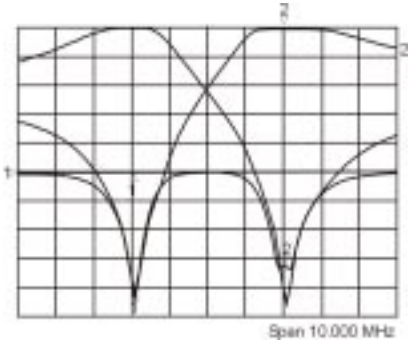
Base station band pass antenna duplexers are used when there is a need for band pass protection against other transmitters at the antenna site.



Required information for selecting the correct model:

- Maximum input power level
- Exact transmit and receive frequencies being duplexed (Verify that frequencies meet the minimum separation requirements.)
- Advise customer of isolation provided by various units

Base station pass notch antenna duplexers are used in most applications due to high isolation/low insertion loss characteristics.



Required information for selecting the correct model:

- Maximum input power level
- Exact transmit and receive frequencies being duplexed (Verify that frequencies meet the minimum separation requirements.)

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TRANSMITTER COMBINERS

Transmitter combiners are designed to allow a number of transmitters to share a common antenna. It is important to follow the minimum spacing requirements when selling a combiner, as less than the minimum may cause the combiners performance to be seriously degraded or not work at all.

Cavity Filter-Ferrite Transmitter Combiners are a combination of band pass cavity resonators and isolators. This design will allow for good transmit to transmit and antenna to transmit isolation with low loss. Although this is generally the preferred method of combining, it is not always feasible due to the fact that as channel separation becomes closer, moretransmitter power is lost.

Required information for selecting the correct model:

- Maximum input power level
- Desired isolation
- Number of channels to be combined
- Exact transmit frequencies (Verify that frequencies have the recommended minimum spacing requirements. EMR recommends 300 kHz for single cavity models, and 200 kHz if dual cavities are used. There are always possible exceptions.)

Hybrid-Ferrite Transmitter Combiners are a combination of hybrid couplers, isolators and load terminations. This design provides excellent transmit to transmit and antenna to transmit isolation with minimal channel-to-channel spacing requirements. However, these units have much higher insertion loss. For each two radios using Hybrid Couplers an additional 1/2 of input power is lost.

Required information for selecting the correct model:

- Maximum input power level
- Desired isolation
- Number of channels to be combined
- Exact transmit frequencies
- How much loss can be tolerated

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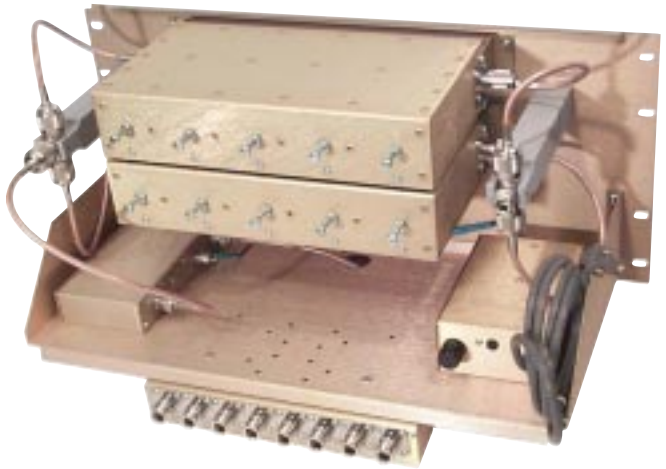
RECEIVER MULTICOUPLERS

Receiver multicouplers are used to allow a number of receivers to share a common antenna. By design, the divider used in a receiver multicoupler provides a minimum of 20 dB of port-to-port isolation. Because of the almost non-existent power into the divider, this 20 dB is more than adequate to prevent the receivers from mixing up incoming signals, even with minimal channel separation. The greatest concern lies in whether or not there is sufficient isolation from nearby transmitters, either by antenna separation or adequate filtration.

Required information for selling the correct model:

- Frequency passband (Lowest to highest receive frequency)
- Number of receivers (Try to include possibility of expansion)
- Type of output connectors (N-female, BNC-female)
- Primary voltage available at site
- Set or adjustable gain amplifier



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