External Filter Options for Cellular BDAs

Models: 48610, 48543-N, 48549-N

RFS broadband repeaters provide cost-effective coverage improvement for cellular service providers. However, some installations may require additional filtering. The external filter ports provide an easy way to modify the repeater's pass bands. This application note will focus on the 48610 Micro-BDA but the application and filters will be the same for the 48543-N and 48549-N BDAs. The 48549-N has a notch filter installed in the downlink, loops are provided for the uplink only. (For SMR repeaters see AN9905)

Background:

Low cost repeaters, like the 48610, use pass band filters in duplexer configuration to direct signals and shape the response. Since these units are built for lower cost and smaller size, the filters tend to have lower Q and broader bandwidth. The model 48610 for example will pass the entire cellular spectrum, 824-849/869-894 MHz.

In many installations the broad bandwidth is acceptable and provides flexibility. The 48610 may be used as a stand-alone repeater or as an in-line booster where the incoming spectrum is controlled by a micro-cell or a band specific repeater. However, In applications where undesired signals are exceptionally strong, a method of reducing the undesired signals is needed. A highly directional donor antenna is often used to attenuate undesired signals on the downlink. Failing this, the external filter ports may offer the best alternative to a band specific repeater.
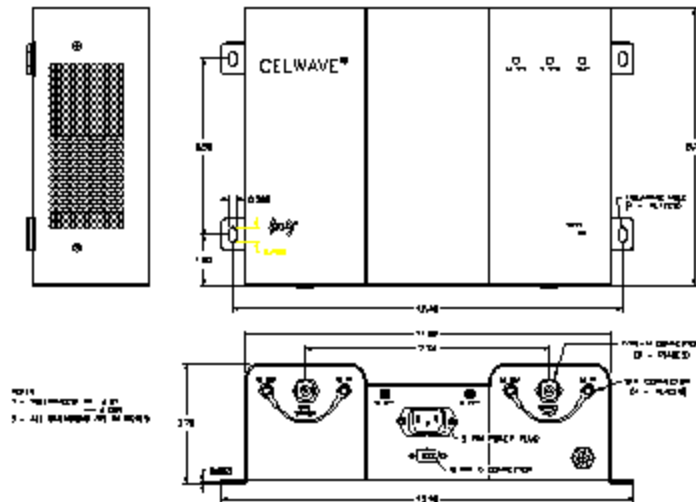
48610 Micro-BDA Pass Band
Frequency VS Gain
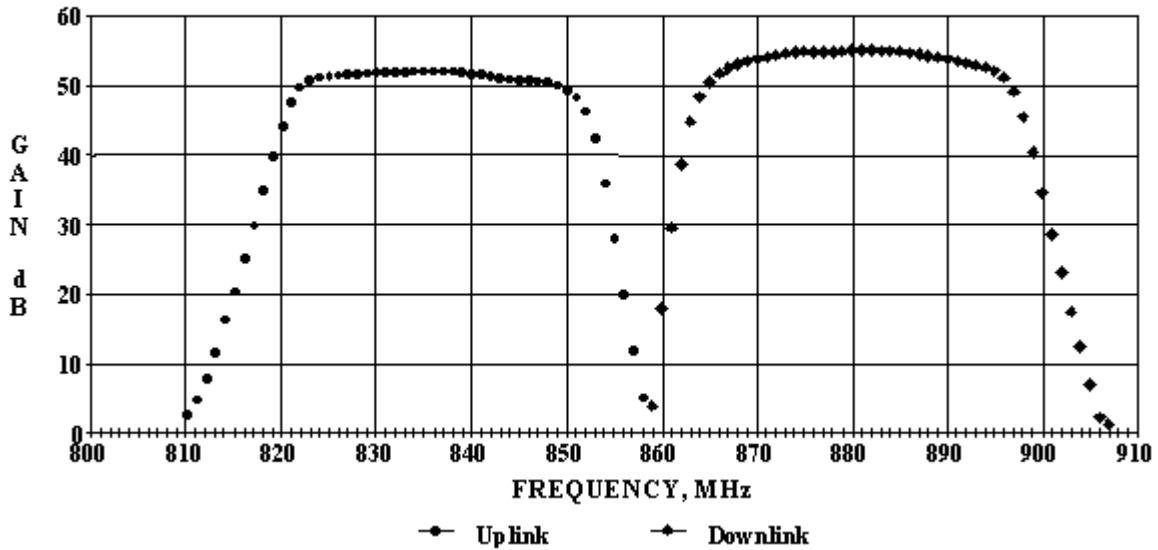
Application:

External filter ports on the 48610 allow for an external filter to be connected to the uplink and/or downlink RF paths. The ports consist of SMA female connectors on the bottom of the 48610; TNC female on the 48543 and 48549. The connectors are labeled "DL Out", "DL In" and "UL Out", "UL In". Replacing the jumper with a filter will modify the pass band of the repeater by the characteristics of the filter.

The external filter loop is placed between amplifier stages to minimize VSWR mismatch. In addition, the gain of the pre-amplifier will reduce the impact of the filter loss on the repeater's noise figure. However, the gain of the repeater will be reduced by the insertion loss of the filter.
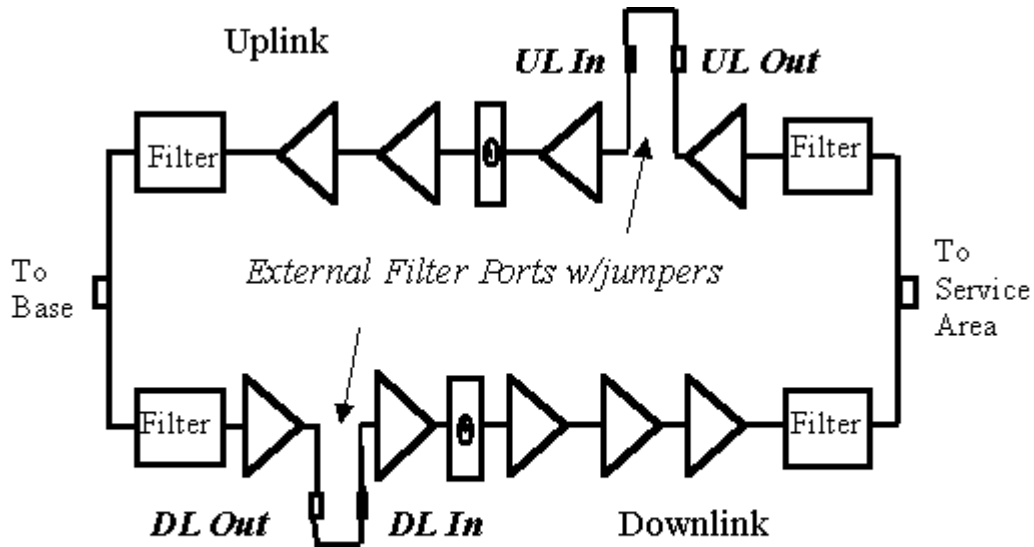
For FCC compliance only passive filters may be used. Below are filters and jumper cables that can be ordered from Celwave. Note that the physical size and cost of these filters is relative to performance.

Model Number	Description
5478	A Band RX, w/35 dB notch 837-844 MHz
719610	A Band TX, w/40 dB notch 882-888 MHz
CFX842-8	B Band RX, 835-849 MHz band pass
5198T	B Band RX, 5198 on 19" tray
J09038	B Band TX/RX Filter Set - TNC Connectors
5192-14NBK	B Band TX, 880-894 MHz band pass
5044-8	10-15 MHz bandwidth 806-960MHz

6920270 (36")	SMA male to N male RG142- 36" jumper
659560	TNC male to N male RG142- 36" jumper
690570-39.00	SMA male to TNC male RG142-39" jumper
102300020065	TNC male to TNC male RG400-36" jumper

Notes:

1. Two jumpers are needed for each filter used. All filters have Type N connectors.

2. TNC Jumper can be used for the 48543-N and the uplink on the 48549-N BDAs, SMA for the 48610.

3. Filter mounting hardware is not provided.

Uplink or Downlink:

An uplink and/or downlink filter may be employed. Downlink filters are most commonly used to reduce the strength of the alternate provider's downlink signals. If these signals are within 10 dB of the level of the desired signals, they may consume some of the BDAs composite power. However, RX filters have sharper band edge performance and can prevent call set up on the alternate provider by attenuating their mobile signals. B band can use a simple band pass filter (880-894) to attenuate most of the A band but A band will need to notch the B band spectrum which is a bit more expensive.

Finally, if the best efforts to reduce interference fail, a band specific repeater may be the only solution. RFS models 48550-N and 48551-N are exceptional values. For more information or technical support on BDAs, call 1-877-RFSWORLD [737-9675] or visit our web site at www.rfsworld.com.