

Dec. 18, 2014

Compliance Testing  
1724 S. Nevada Way  
Mesa, AZ 85204

**Attn: Greg Corbin**  
**EMC-RF Test Engineer**

**Re: FCC PBA Response 9c for 614 series booster**

Our UHF 614 series booster utilizes two kinds of filtering. First, mechanical filters surround the RF chain to protect the inputs from overload and to reduce the harmonic emissions of the output. Secondly, programmable digital DSP filtering is employed within the RF chain to select only the desired channels which should be amplified.

**Input Mechanical Filtering**

The input mechanical filters select a section of the available downlink or uplink bands and provide rejection of the high level signals on the output of the booster. This is needed due to the interleaving of the downlink and uplink sections of the UHF Public safety band. It is not possible for the UHF booster to pass an entire downlink or uplink section because of the contiguous nature of the band-plan. Figure 1 shows an example system with 3 MHz input filtering. The mechanical filters are tunable in the factory only and are customized to the customers' specific frequency range within the downlink and uplink bands and may have any pass-band width narrower than a downlink or uplink section.

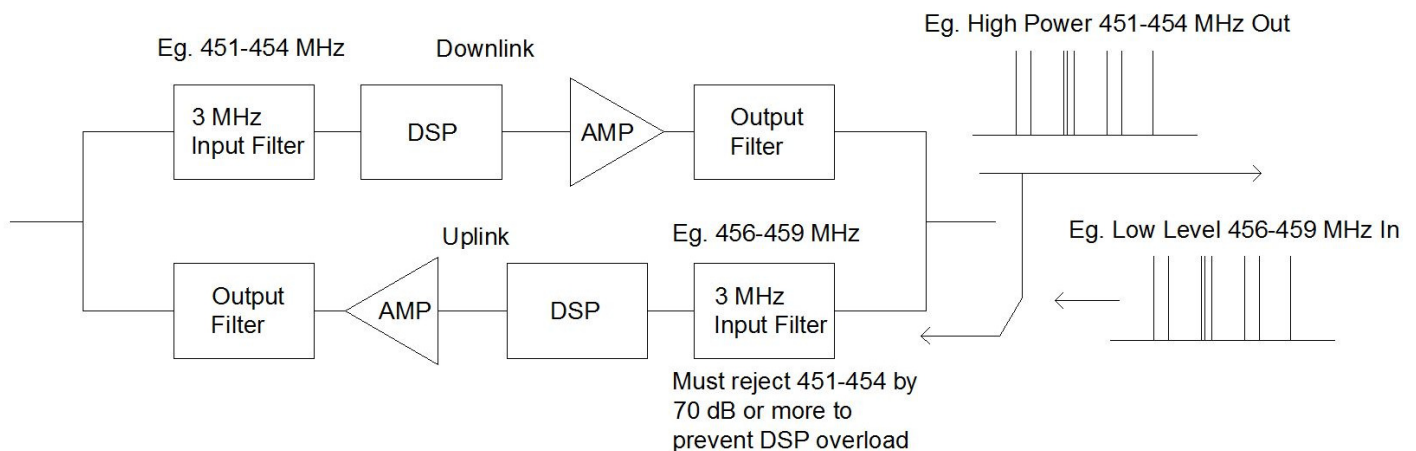


Figure 1. Bi-Directional Booster showing Output to Input Isolation requirement

## Output Mechanical Filtering

The output mechanical filters were tested at the TCB and do not change. They are broadband and are used to reduce the harmonics that are produced by the power amplifier.

## Digital (DSP) Filtering

The DSP filtering is located inside the channel module and is used to provide filtering for individual channels or groups of channels contained within the pass-band of the mechanical filtering. This filter passband can be programmed by the customer to be as narrow as 6.25kHz or as wide as 1.5MHz. Figure 2 depicts a typical arrangement of mechanical input filtering and narrow DSP filtering within the lower downlink/uplink section of the 450-470 MHz band. During the testing at the TCB, we set one of the DSP filters to the widest passband and moved the filter as needed. Two models are available that provide up to 14 filters or up to 30 filters. The difference between the models is the size of the DSP program image. The fit, form, and function is exactly the same. The filters are available for the customer to program different passbands. The need for the number of filters is based on how many channels the customer needs to isolate and whether some closely spaced channels may be grouped together. This allows our unit to be configurable in the field by the customer. The booster does not translate the channel to a different frequency, but passes it filtered and amplified to the output.

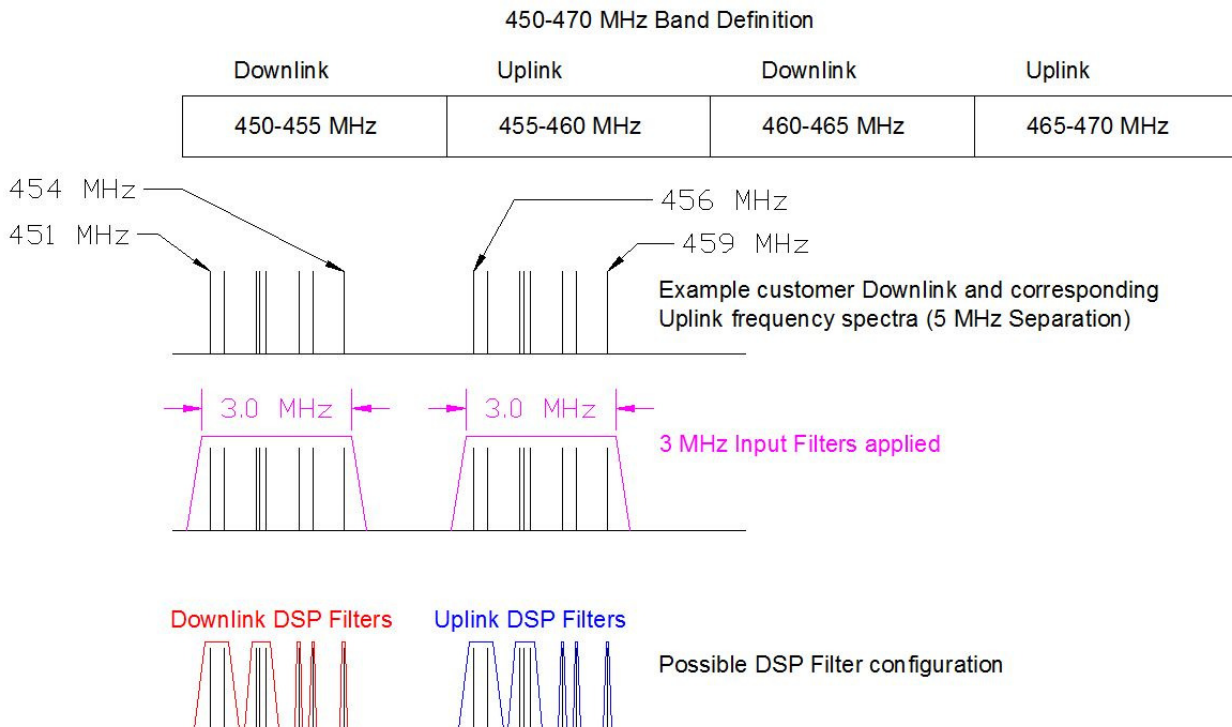


Figure 2. Typical Mechanical and DSP filtering Scenario



Sincerely,

*Amy L Sanvido*

RF Design Engineer

On behalf of Bird Technologies

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