

Retrospective on Advantech Wireless Technologies response to C-band spectrum re-allocation for 5G deployment.

Advantech Wireless Technologies

In the summer of 2018, the FCC released a C-band frequency reallocation plan that would establish a framework of spectrum-sharing between the satellite communications industry (Satcom) and emerging 5G terrestrial operators. This initiative led to the formation of the C-band Alliance (CBA), a group comprised of Intelsat, SES, Eutelsat and Telesat, that would oversee the transition of a portion of the C-band spectrum from Satcom to 5G.

C-band has been a cornerstone of Satcom since its inception and is still popular today, particularly in areas plagued with excessive rainfall. But even the portion of the band that would continue to be labeled 'Satcom' could be rendered unusable due to bleed-over from the neighboring (and much more powerful) 5G traffic signals. A study by the CBA concluded that the best way to mitigate these bleed-over effects was by installing waveguide filters on the receive ports of satellite antennas that would essentially notch out the interfering signals.

Having a long history in the design and manufacture of microwave passives, Advantech Wireless Technologies (AWT) was contacted by the CBA, resulting in a technical collaboration that would ultimately lead to their release of a line of highly efficient C-band 5G interference rejection filters. Since 2019, AWT has produced thousands of these filters for major C-band Earth Station Operators, and by doing so, has enabled the graceful cohabitation of satellite service operators and 5G base stations.

With the implementation of Phase 1 nearing completion, AWT has ramped-up its production-capacity to address the even more demanding deployment of Phase 2. AWT has already established a market reputation for producing the highest performing 5G interference rejection filters that are endorsed by members of the CBA for utilization in their satellite networks.

As the following plots show, these filters have been optimized to exceed the original rejection mask targets and provide – 60dB interference rejection below 3.8GHz per the Flexible Use Licence frequency allocation.

The high order filter with a distribution of multiple transmission zeroes results in maximum interference rejection that will insure there is no front-end de-sensitization of the receiver. Such a response will allow an earth station to operate with the smallest separation-distance to an interfering 5G base station.

Pass-band - 3820 – 4200MHz. Rejection at 3800MHz – 60dB min.

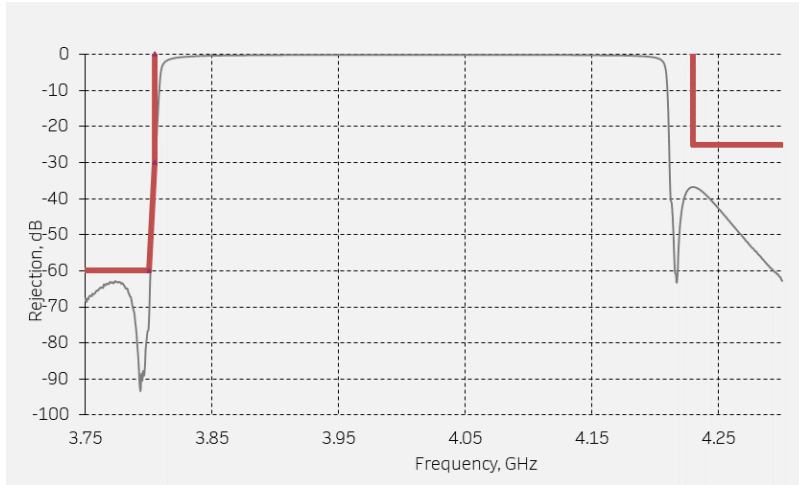


Figure 1: Red filter rejection response

- Pass-band - 4000 – 4200MHz. Rejection at 3980MHz – 60dB min

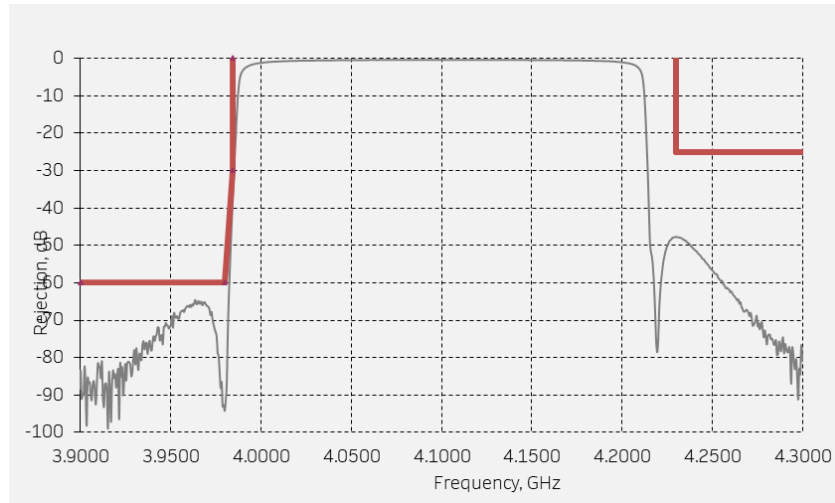


Figure 2: Blue filter rejection response

AWT's 5G interference rejection filters can provide comparable performance for satellite operators around the world. Customized frequency band filters are also available upon request.

<https://advantechwireless.com/product/c-band-5g-interference-reject-filter-for-satellite-uplinks/>