

RFS Broadcast Auxiliary Service Filter Proves its Value to Broadcasters and Mobile Operators in New Orleans

RFS' purpose-built interference mitigation filter eliminates all AWS spectrum interference on Broadcast Auxiliary Service channels 1 through 10

Summary

A new Broadcast Auxiliary Service (BAS) Interference Mitigation Filter (IMF) from RFS is helping broadcasters and mobile operators tackle the growing AWS interference issue. The compact filter rejects all AWS-1 and AWS-3 spectrum emissions while passing BAS channels 1 through 10.

With RFS' purpose-built, weatherproof IMF installed in its BAS link, a major New Orleans TV broadcaster is confirming that transmissions from mobile news teams are dramatically improved. The station can transmit high-quality, highly reliable signals from further afield with complete confidence. And station engineers have the flexibility to install the filter exactly where it's needed — indoors or out.

The Challenge

As mobile operators start delivering more services on AWS spectrum, there's greater likelihood their cellular transmissions will interfere with transmissions on broadcasters' adjacent 2 GHz BAS band. Broadcasters use the BAS band to backhaul signals from mobile news teams in the field and to transmit signals between the studio and the transmitter.

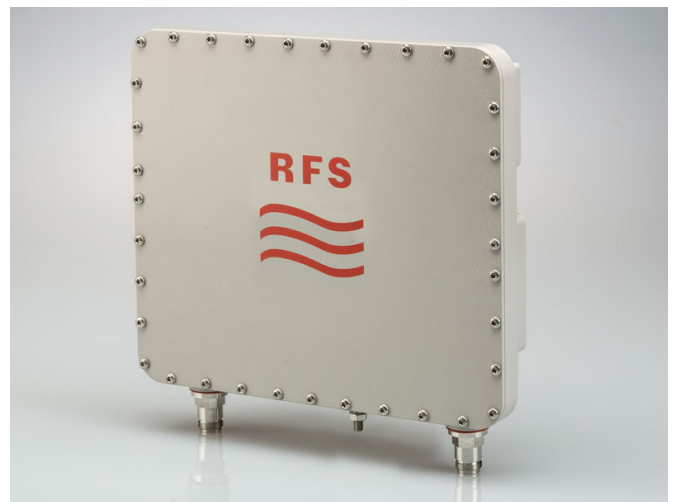
While many operators are already eliminating interference caused by AWS-1 A block emissions, recent tests have revealed that AWS-1 B block and C block spectrum are also interfering with broadcasters' BAS signals.

Restricted operations

For the team at WGNO TV in New Orleans, interference from mobile operators' AWS transmissions had become so severe, it was significantly affecting news gathering operations. On

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– Richard Bach, WGNO Engineer



RFS' BAS Interference Mitigation Filter eliminates the interference issues broadcasters face when nearby mobile operators transmit on AWS spectrum. And it ensures broadcasters won't experience AWS interference issues in the future.

BAS channels 4 through 7, interference was reaching 25 dB above the noise floor. Even on lower channels, interference was reaching 10 to 15 dB.

“With the interference from the AWS spectrum, our news operation could only operate on about 60 percent of what it used to operate on,” says Richard Bach, an Engineer at WGNO. “We had to change our news coverage plans every day based on where events were and whether we could reliably transmit from that location.”

Unfortunately, due to its proximity to a mobile operator's transmitter, the broadcaster's main site in downtown New Orleans was hit hardest by AWS interference. And that created major challenges when covering centrally located events, including the world-famous Mardi Gras celebrations held annually in New Orleans.

Limited filtering solutions

In an attempt to resolve the issue, IMFs had been installed, but those filters could only operate in very precise environmental conditions, which meant they had to be installed inside the building. “The problem,” explains Bach, “is that our preamps are close to the antennas. However, because we were forced to install the original filters indoors,



they were located after the preamps so we were actually boosting the noise as well as the signal. As a result, we couldn't use our preamps and that limited our range from about 25 miles to 18 or 20 miles."

The preamps were not the only equipment the WGNO team could not use due to AWS interference. "About 99 percent of the time we could not use our diversity receiver," says Bach. "We would occasionally tune it to the upper 2.5 GHz band and if we were really close, we could use it, but it was problematic. The interference degraded that particular part of the system by about 80 percent."

Mobile operators' tests confirmed the severity of the problem at WGNO and other broadcasters. Their test results revealed that some broadcasters' receivers were being saturated with interference from AWS Blocks A, B and C to the point where they were experiencing -13 dBm composite power.

The Solution

A wireless engineer at one of the mobile operators that was transmitting on adjacent spectrum told Bach that RFS was custom-designing an IMF that would address every aspect of the AWS interference challenges the broadcaster was facing.

The RFS BAS filter rejects all AWS-1 and AWS-3 spectrum emissions, resolving broadcasters' interference issues today and in the future. In addition, the weatherproof filter can be easily installed on poles, closer to antennas, or rack-mounted indoors. "These filters have a unique, ceramic design so they hold up to all of the temperature variations we experience,"

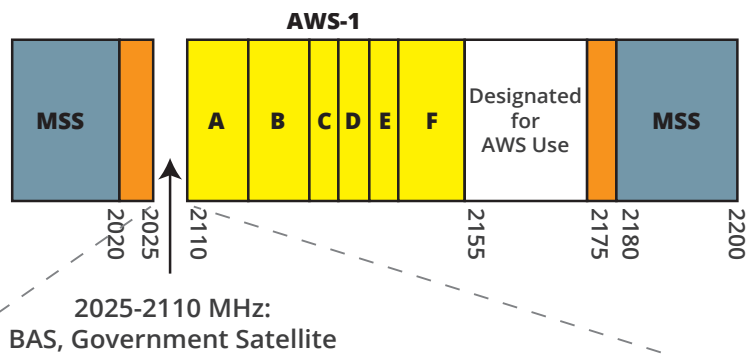
If broadcasters haven't heard about these filters and are having problems with AWS interference, they should contact RFS to see about getting them so they can regain their distance.



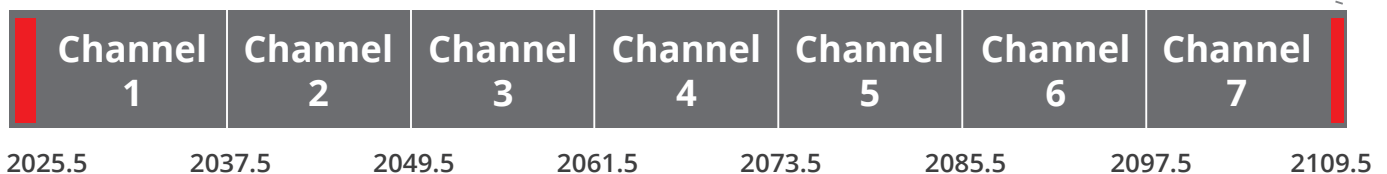
The BAS Interference Mitigation Filter can be easily rack mounted if required.

says Bach. "I knew when I saw them for the first time that they are really well made."

The wireless engineer has worked with multiple broadcasters to resolve the interference issue and says the ability to block all AWS spectrum is the ideal solution. The engineer says he was also impressed with the fact that RFS' filter is only about one-third the weight of competing products and compact in size, making it easy to move and install. The superior performance characteristics offered by RFS' BAS filter confirmed it was the right choice to address the AWS interference issues.



BAS CHANNEL MAP





The Benefits

WGNO has installed several RFS BAS IMFs, and the filters are proving their value.

The filter's robust design means it can be installed outdoors on antenna poles. This location places the filter before the preamps, so only the high-quality, filtered signal is amplified. As a result, the WGNO preamps are back in action and mobile news teams can once again report from up to 25 miles away. "With the RFS filters, we're back to about 99 percent of our normal range," says Bach. The station's diversity filter is also back in operation, reducing the need to rely exclusively on trickier, steerable antennas.

Proven results

Bach's test results confirm the filters are delivering reliable and stable performance in temperatures ranging from the high heat of a New Orleans summer to a November cold snap.

Overall, Bach says he's very pleased with the results. And he appreciated the fact that RFS assisted with installing and fine-tuning the filters. "I've found RFS really good to work with. They're a big player in the industry, they're going to be around for quite a long time, and they have a quality product." He strongly encourages other broadcasters to consider the RFS AWS filtering solution. "If broadcasters haven't heard about these filters and are having problems with interference, they should contact RFS to see about getting them so they can regain their distance."

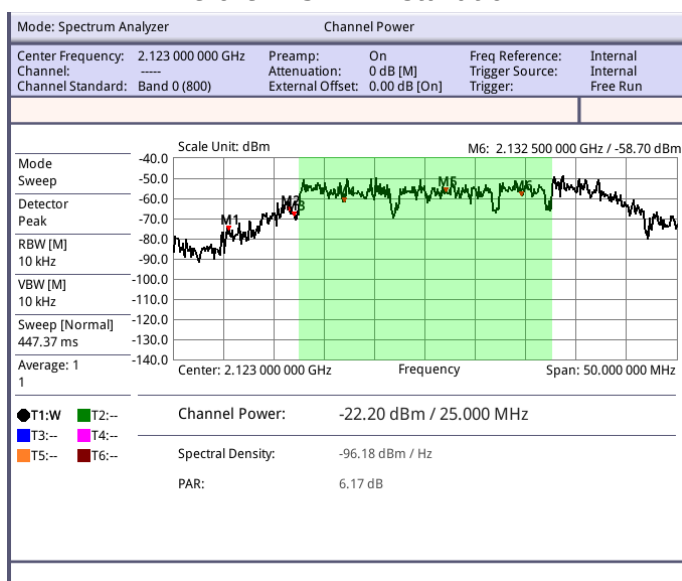
Mobile operators' field tests have confirmed the RFS BAS filters are exceeding their expectations and requirements for noise suppression. Their tests also confirm the RFS



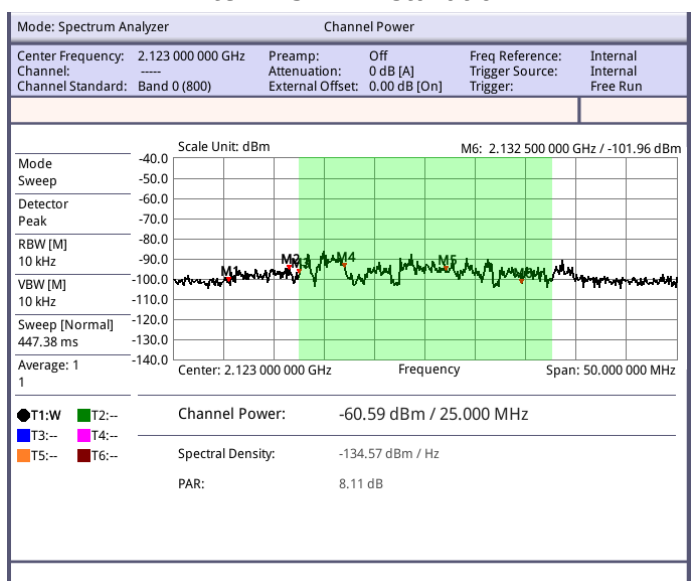
A BAS Interference Mitigation Filter installed in a rooftop setting.

filter lowers the overall composite power affecting the BAS receiver due to AWS spectrum interference, allowing mobile operators to comply with Federal Communications Commission (FCC) regulations for AWS/BAS interference. With these results, the RFS BAS filter is proving it's a win-win solution for mobile operators and broadcasters.

Before BAS IMF Installation



After BAS IMF Installation



Photos supplied by a wireless engineer from a mobile operator

Network performance with (right) and without (left) the BAS IMF installed. Note the dramatic reduction of interference with the BAS IMF installed.



Solving the AWS interference challenge across the country

With the RFS BAS IMF installed in broadcasters' systems, mobile operators can densify and expand their networks with no worries about generating AWS interference that hinders broadcasters' operations. They can proactively address all AWS interference issues before there are complaints to regulators. And they can meet their FCC BAS filtering obligations today and tomorrow.

As one wireless engineer points out, AWS interference is a national challenge that affects every mobile operator with AWS spectrum. As a result, he sees great potential for all mobile operators to take advantage of the RFS filter's broad AWS interference mitigation capabilities.

An all-in-one BAS filter delivering unbeatable performance

- Typical downlink insertion loss of just 0.3 dB
- Minimum stopband rejection of 40 dB
- Ingress protection to IP67 levels
- The ability to withstand temperatures ranging from -40° C to 65° C (-40° F to 149° F)
- Lightning protection according to IEC 61000-4-5 Level 4 and IEC 61312-4



An RFS BAS IMF fully integrated in a rack.

ABOUT RFS

Radio Frequency Systems (RFS) delivers the end-to-end RF solutions and expert services needed to evolve wireless and broadcast networks today and tomorrow. Our cables, connectors, antenna systems and RF conditioning products are based on more than 100 years of experience delivering cutting-edge RF solutions and industry firsts. As a result, our solutions are recognized globally for their innovation, superior performance and unmatched quality.

As an ISO-compliant company with global operations, we bring our customers world-class engineering and manufacturing skills backed with comprehensive local support services. Our customers know they can rely on our expertise and commitment to excellence from initial design to final delivery and beyond — whether they're looking to support 5G, deploy small cells, empower smart cities or improve indoor coverage in the most challenging locations.