Need an AFC system? Then think about the underlying incumbent data

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The Federal Communications Commission (FCC) has recently conditionally authorized 13 Automated Frequency Coordination (AFC) systems to manage access to the 6 GHz band by standard-power unlicensed devices. What will make AFCs stand apart in such a crowded field? All will certainly follow the FCC rules on how to operate and service devices. Most, if not all, will follow the AFC specifications being developed by the Wireless Innovation Forum (WInnForum) or Wi-Fi Alliance (WFA). So how do we differentiate our products in this environment? It could be additional services, but will those cost more? Maybe the differentiation is not in the product, but in the data the AFC uses to perform the task.

The main task of the AFC is to provide a list of available frequencies and associated maximum transmit powers to standard power devices so they don't interfere with incumbent microwave systems. Optimum performance of this task requires that the AFC maximize spectrum availability while thoroughly protecting incumbent microwave operations.

The FCC has mandated that AFCs use the Universal Licensing System (ULS) as the reference database of incumbent systems. This is the official regulatory database of licensed and applied-for microwave systems. However, the ULS has several significant shortcomings—most of which have been documented in a technical report by the WInnForum.

One of the main issues with ULS is that it's a regulatory database and lacks sufficient information to conduct detailed engineering analyses without making lots of assumptions. For example, there is no data on microwave antenna patterns, so AFC systems must apply generic patterns to specific antenna models. In addition, the

ULS has no information on microwave diversity receive antennas, which are used on almost a third of microwave receivers. Another issue is lack of data on radios, so AFC systems must make assumptions about a receiver's noise figure. The ULS is also riddled with errors since the data are provided exclusively by licensees with very little error checking. These are just a few of the many issues with the ULS as detailed in the WInnForum technical report.

As noted above, the job of the AFC is to provide spectrum suggestions to devices that won't cause interference into incumbent systems. Clearly, an AFC that relies on the ULS will have to apply numerous assumptions to the ULS data to perform this task. This could easily result in reduced spectrum availability, reduced maximum power and possible interference.

The Comsearch AFC will backstop the ULS with data from our exclusive proprietary microwave databases. These databases have been developed, updated and maintained for almost five decades and contain exhaustive data on every microwave system operating in the 6 GHz bands. This includes a complete set of antenna pattern data, comprehensive data on radio configurations and exhaustive data on microwave path status. Built from our decades of frequency coordination, our databases can also inform users of microwave paths that are either inoperative or just coordinated and not yet in the ULS.

We think the best differentiation for an AFC is to provide optimum spectrum availability recommendations that fully protect incumbent operators. That allows for maximum use of the band. Because, after all, an AFC is only as good as the data it uses.

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