

You Can Detune a Tower, but ...

New FCC rules go a long way toward mitigating any confusion among affected parties while ensuring consistent protection of AM station operations and providing greater cost certainty for tower owners.

By Michael L. Higgs Jr.



Most telecommunications towers host a variety of antennas, with each antenna emitting signals to be received at some distant point. For AM radio transmissions, however, the tower itself functions as the antenna. Omnidirectional AM radiation patterns are created using a single tower, and directional AM radio patterns are achieved using an array of multiple radiating towers. An obvious problem arises when a new tower is constructed in the vicinity of an AM tower array: The new tower could potentially reradiate the AM radio signal and distort

the broadcast station's authorized radiation pattern.

The FCC's broadcast rules contained several sections dealing with tower placement near AM antennas to protect AM stations from the potential effects of nearby tower construction. However, two prominent rule sections dealing with wireless communications, namely Part 90 (Land Mobile Radio) and Part 24 (Personal Communications Services) entirely lack provisions for protecting AM stations from the possible effects of nearby tower construction. By its recent Order in MM Docket No. 93-177 (Rel. Aug. 16, 2013), the FCC seeks to harmonize and streamline its rules by establishing a single protection scheme for tower construction and modification near AM tower arrays, and by designating "moment method" modeling as the principal means of determining whether a nearby tower affects an AM station radiation pattern.

First come, first served

In the absence of explicit rules governing parties' behavior in these instances, the FCC relied on its longstanding "newcomer" policy, which

mandates that a newcomer (i.e., the party constructing a new or modified tower) is responsible, financially or otherwise, for taking steps necessary to eliminate objectionable interference to existing stations. This policy dates back to 1947 when the agency held a broadcaster responsible for resolving interference to incumbent operations caused by its new facilities, holding that no specific rule or express condition on a construction permit is required for the FCC to apply the newcomer policy.

Seeking to eliminate any confusion among new tower developers and incumbent AM operators, the FCC proposed uniform rules for all services, thus ensuring consistent protection for AM stations. The FCC engaged with various groups representing

Background photo: WKTA, 1330 AM, Evanston, Ill., near Chicago, uses six towers to control its directional signal. Five nearby cellular towers have the potential to distort the signal pattern, which would cause the station to violate the terms of its license. To prevent the distortion, the cellular towers are fitted with detuning equipment. Photo courtesy of Waterford Consultants/Larry Giessman



broadcasters, tower developers, RF engineers, and equipment manufacturers to develop the new rules.

Out with the old

The prior rules required licensees and permittees to notify AM stations and take appropriate action when a tower was constructed within a fixed distance of an AM station. This fixed distance approach has now been replaced by one that defines the critical distance from AM stations based on the incumbent's frequency and the proponent's tower height. The critical

distance for a nondirectional AM station is one wavelength at the frequency of the AM station. The critical distance for a directional AM station is 10 wavelengths of the frequency of the AM station up to a maximum distance of three kilometers.

The new rules exempt short towers from the AM proximity analysis requirement because such low-in-stature towers are inefficient radiators that would not generally affect an AM broadcast pattern. The threshold height for new tower erections or major modifications to comply with the requisite AM proximity

analysis is 36 electrical degrees for a directional antenna array, and 60 electrical degrees for a nondirectional antenna. Three hundred sixty electrical degrees equals one wavelength at the frequency of the AM transmitter. Most AM towers are built to a height of one-quarter of the wavelength of the station's transmitting frequency, or 90 electrical degrees (this comes in handy for back-of-the-napkin calculations). Therefore if the proposed new tower is shorter than 1/10 of the transmitting AM wavelength for a directional pattern, or 1/6 of the transmitting AM wavelength for a nondirectional pattern, then an AM proximity analysis is not necessary.

Up on the roof

When proposing the new rules, the FCC initially suggested excluding all antenna structures mounted on buildings from the AM proximity analysis requirements. Several commenters noted that buildings may support towers tall enough to be significant reradiators at an AM frequency. Although the FCC noted that it is possible for a building itself to be a reradiator of AM signals, it is impossible to detune a building or the combination of a building and tower. Because it is not feasible to analyze the combined effects of the building and tower, the new rules require only that a rooftop antenna structure alone be measured for compliance with the rules as if it were a freestanding tower situated on the ground.

Construction notice

So your proposed new tower is not too short, and not too far. Now what? Prior to the start of construction of the new site, its proponent must notify any potentially affected AM stations. The planned construction notice should be in writing, and contain the coordinates of the tower to be constructed or modified, a physical description of the planned construction and the results of the analysis showing the predicted effect on the AM pattern, if such "moment-method" analysis was performed. The AM licensee will have 30 days in which to respond to the notice. If no response is received, construction on the new site may commence.



Wires that parallel the tower form a skirt as part of a system to detune the tower, which means to modify its electrical wavelength so it does not reradiate the AM station signal. Photo courtesy of Waterford Consultants/Larry Giessman



Stand-off insulators support a portion of the wire skirt engineered specifically for the cellular tower. Photo courtesy of Waterford Consultants/Larry Giessman

In emergency situations involving essential public services, health or welfare, the FCC allows that a tower proponent may erect a temporary new tower or make a temporary significant modification to an existing tower without prior notice to potentially affected AM stations. As long as the emergency tower proponent provides written notice to potentially affected AM stations within five days after the erection or modification of the tower and cooperates with such AM stations to promptly remedy any pattern distortions that arise as a consequence of such construction, then the rules are deemed satisfied.

Only licensed and operational AM stations are covered under the rules; the permittee of an unconstructed AM station

need not be notified about proposed new tower projects. All too often, construction permits expire without the station making it to air, or the permits are modified prior to commencing station operations. Thus, the FCC determined that requiring proximity analysis and possible alterations to new site developments on a speculative basis would be unproductive. Furthermore, if an AM proximity analysis were to indicate potential problems, the steps necessary to determine proper remedial measures require the presence of the AM signal.

Determining the distance to a nondirectional AM antenna is as simple as plugging in the coordinates of the site listed in the FCC's database. Towers

forming part directional AM antennas, on the other hand, could be situated several hundred meters apart. The relatively large spacing between antenna towers left room for confusion in determining the distance to directional AM stations. The new rules clarify that the center coordinates of the directional AM array, as listed in the Media Bureau's database, CDBS, should be used for any AM proximity analysis.

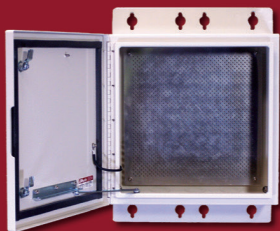
It's the limit

What if a new tower passes all preconstruction evaluations, but nonetheless alters an AM station's radiation pattern? The FCC took note that in certain situations a tower situated over 3 kilometers from an incumbent AM

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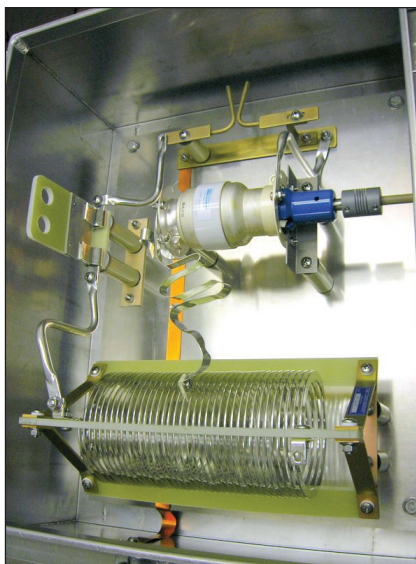
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A capacitor (top) and inductor form a network that tunes the tower skirt to make the tower nonresonant at the AM station frequency. Photo courtesy of Waterford Consultants/Larry Giessman

station still may cause interference to the broadcaster, or that a particularly short tower might still cause problems if it is constructed too close to an AM antenna. Tower proponents argued that a lack of clear rules under these circumstances left the tower owner's responsibilities open-ended. The rules now define the type of showing required from an AM station when an otherwise excluded tower erection or modification affects the station's radiation pattern, and require that the studies be shared with the tower owner. A two-year time limit on claims of adverse effect has been established to encourage AM licensees to promptly identify potential pattern disruptions and provide tower owners with greater certainty regarding future liability.

The proceeding that led to the issuance of the new rules considered what types of structures should be subject to regulation in this regard. This becomes a tricky issue of FCC jurisdiction. Buildings, bridges, water towers and power lines can all become AM reradiators. How far should the FCC extend its regulatory reach? What about a greenfield tower project that does not require FCC registration and that has no FCC licensee tenants? An argument can be made that all of the aforementioned examples are

incidental radiators, and as such, would be subject to Part 15 restrictions. Opting for administrative restraint, the FCC determined that the new rules should only apply to applicants, licensees and permittees. In the future, a licensee or permittee may only place its antennas on towers that have completed all of the necessary steps outlined herein prior to the licensee's or permittee's collocation. In addition, if an AM station owner has shown that a tower creates a disturbance to its radiation pattern, no licensee or permittee may collocate on that site until such time as appropriate remedial action has been taken.

The new preclearance rules only apply to towers constructed or modified after the effective date of the order. However, the FCC will apply the new rules' remediation requirement to any construction commenced prior to the effective date, except that currently pending interference complaints will be resolved in accordance with the preexisting rules that were then applicable to the service in question. Once the rules become effective, AM station owners will have one year to submit a showing that their stations' RF propagation has been adversely affected by any tower constructed prior to the effective date but after the AM stations commenced operations.

Living in harmony

By this order, the FCC has harmonized and streamlined the rules regarding tower construction and modification near AM stations, improved the protections afforded AM broadcasters, and reduced the time required to determine the effect of tower construction in the vicinity of AM stations while reducing the costs of such analysis. The adoption of the new rules goes a long way toward mitigating any confusion among affected parties while ensuring consistent protection of AM station operations and providing greater cost certainty for tower owners. ■

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