

DESIGN NOTES

FCC Agrees to Use Simulation to Replace Some AM Broadcast Field Measurements

In the AM broadcast industry, extensive field measurements have been required to verify proper operation of stations that employ directional antenna systems (multiple tower phased arrays), and some omnidirectional stations that have non-uniform antenna structures (tapered towers or grounded towers with a feed “skirt” system). In a proceeding of September 24, the FCC (www.fcc.gov) has adopted rule changes (FCC 08-228) that replace those measurements with method-of-moments modeling in certain situations.

The key portion of the rule change is contained in Part 73.151(c), “Computer modeling and sample system verification of modeled parameters to establish operation of a directional antenna consistent with the theoretical pattern.” The new rules establishes a specific set of standards for the phase and current monitoring system, and defines a number of physical/electrical relationships that are dependent on construction methods. Only series-fed radiators are allowed for model-verified antenna systems.

The rule also defines a matrix of impedance measurements made on individual radiators, with the other elements of the array shorted and/or open-circuited. These techniques provide an indirect measurement method for obtaining mutual impedances among the array elements, which is a confirmation by measurement that the elements are operating—as-built—in the same manner as they are modeled.

Field measurements are reduced to a series of at least three points in the directions of pattern minima and maxima. In addition to maintaining operating parameters with the required limits, stations licensed using the method-of-moments criteria must verify the proper operation of the current/phase sampling system, and repeat the field measurements in the originally designated directions, every 24 months.

New Rules Proposed for “Disturbance of AM broadcast station antenna patterns”

The FCC further sought comments for a proposed rulemaking that would cover structures constructed close to broadcast towers that could interact and alter the radiation of the antenna, whether an omnidirectional and directional antenna systems.

The rule covers the construction of a tower that is within one wavelength of a non-directional station, and at least 60 degrees electrical height at the AM frequency. New tower owners must notify the station and provide an analysis of the impact. A disturbance of 2 dB or more will require detuning of the new tower.

For a tower to be constructed near directional arrays, the required distance is 3 km, and the minimum electrical height is 36 degrees. In this case, detuning is required if the variation “would result in radiation in excess of the AM stations’ licensed standard pattern or augmented pattern values.” The proposed rule also covers procedures for measurement-based licensees, and for modifications made to AM towers.

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