each radial. The points need not be limited to those measured in the last full proof of performance.

(c) The results of the measurements are to be analyzed as follows. Either the arithmetic average or the logarithmic average of the ratios of the field strength at each measurement point to the corresponding field strength in the most recent complete proof of performance shall be used to establish the inverse distance fields. (The logarithmic average for each radial is the antilogarithm of the mean of the logarithms of the ratios of field strength (new to old) for each measurement location along a given radial). When new nondirectional measurements are used as the reference, as described in paragraph (b)(2) of this section, either the arithmetic or logarithmic averages of directional to nondirectional field strength on each radial shall be used in conjunction with the measured nondirectional field from the last proof to establish the inverse distance field.

(d) The result of the most recent partial proof of performance measurements and analysis is to be retained in the station records available to the FCC upon request. Maps showing new measurement points, *i.e.*, points not measured in the last full proof, shall be associated with the partial proof in the station's records, and shall be provided to the FCC upon request.

[66 FR 20756, Apr. 25, 2001, as amended at 82 FR 51165, Nov. 3, 2017]

§ 73.155 Directional antenna performance recertification.

A station licensed with a directional antenna pattern pursuant to a proof of performance using moment method modeling and internal array parameters as described in § 73.151(c) shall recertify the performance of the antenna monitor sampling system only in the case of repair to or replacement of affected system components, and then only as to the repaired or replaced system components. Any recertification of repaired or replaced system components shall be performed in the same manner as an original certification of the affected system components under § 73.151(c)(2)(i) of this part. The results of the recertification measurements shall be retained in the station's public inspection file.

[82 FR 51162, Nov. 3, 2017]

§ 73.157 Antenna testing during daytime.

(a) The licensee of a station using a directional antenna during daytime or nighttime hours may, without further authority, operate during daytime hours with the licensed nighttime directional facilities or with a nondirectional antenna when conducting monitoring point field strength measurements or antenna proof of performance measurements.

(b) Operation pursuant to this section is subject to the following conditions:

(1) No harmful interference will be caused to any other station.

(2) The FCC may notify the licensee to modify or cease such operation to resolve interference complaints or when such action may appear to be in the public interest, convenience and necessity.

(3) Such operation shall be undertaken only for the purpose of taking monitoring point field strength measurements or antenna proof of performance measurements, and shall be restricted to the minimum time required to accomplish the measurements.

(4) Operating power in the nondirectional mode shall be adjusted to the same power as was utilized for the most recent nondirectional proof of performance covering the licensed facilities.

[50 FR 30947, July 31, 1985]

§ 73.158 Directional antenna monitoring points.

(a) When a licensee of a station using a directional antenna system finds that a field monitoring point, as specified on the station authorization, is no longer accessible or is unsuitable because of nearby construction or other disturbances to the measured field, an application to change the monitoring point location, including FCC Form 302–AM, is to be promptly submitted to the FCC in Washington, DC.

(1) If the monitoring point has become inaccessible or otherwise unsuitable, but there has been no significant

construction or other change in the vicinity of the monitoring point which may affect field strength readings, the licensee shall select a new monitoring point from the points measured in the last full proof of performance. A recent field strength measurement at the new monitoring point shall also be provided.

(2) Alternatively, if changes in the electromagnetic environment have affected field strength readings at the monitoring point, the licensee shall submit the results of a partial proof of performance, analyzed in accordance with § 73.154, on the affected radial.

(3) The licensee shall submit an accurate, written description of the new monitoring point in relation to nearby permanent landmarks.

(4) The licensee shall submit a photograph showing the new monitoring point in relation to nearby permanent landmarks that can be used in locating the point accurately at all times throughout the year. Do not use seasonal or temporary features in either the written descriptions or photographs as landmarks for locating field points.

(b) When the description of the monitoring point as shown on the station license is no longer correct due to road or building construction or other changes, the licensee must prepare and file with the FCC, in Washington, DC, a request for a corrected station license showing the new monitoring point description. The request shall include the information specified in paragraphs (a)(3) and (4) of this section, and a copy of the station's current license.

[66 FR 20757, Apr. 25, 2001, as amended at 84 FR 2758, Feb. 8, 2019]

§ 73.160 Vertical plane radiation characteristics, f(θ).

(a) The vertical plane radiation characteristics show the relative field being radiated at a given vertical angle, with respect to the horizontal plane. The vertical angle, represented as θ, is 0 degrees in the horizontal plane, and 90 degrees when perpendicular to the horizontal plane. The vertical plane radiation characteristic is referred to as f(θ). The generic formula for f(θ) is:

$f(\theta) = E(\theta)/E(O)$

where:

E(θ) is the radiation from the tower at angle θ.

E(O) is the radiation from the tower in the horizontal plane.

(b) Listed below are formulas for f(θ) for several common towers.

(1) For a typical tower, which is not top-loaded or sectionalized, the following formula shall be used:

$$f(\theta) = \frac{\cos(G \sin\theta) - \cos G}{(1 - \cos G)\cos\theta}$$

where:

G is the electrical height of the tower, not including the base insulator and pier. (In the case of a folded unipole tower, the entire radiating structure's electrical height is used.)

(2) For a top-loaded tower, the following formula shall be used:

$$f(\theta) = \frac{\cos B \cos(A \sin\theta) - \sin\theta \sin B \sin(A \sin\theta) - \cos(A + B)}{\cos\theta\,(\cos B - \cos(A + B))}$$

where:

A is the physical height of the tower, in electrical degrees, and

B is the difference, in electrical degrees, between the apparent electrical height (G, based on current distribution) and the actual physical height.

G is the apparent electrical height: the sum of A and B; A + B.

See Figure 1 of this section.