§ 73.132

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\[ E_c = A_c \left[ 1 + m \sum_{n=1}^{\infty} C_{sn} \cos(\omega_{sn} t + \phi_{sn}) \right] \cdot \]

\[ \cos \left[ \omega_c t + \tan^{-1} \frac{m \sum_{n=1}^{\infty} C_{dn} \cos(\omega_{dn} t + \phi_{dn}) + 0.05 \sin 50\pi t}{1 + m \sum_{n=1}^{\infty} C_{sn} \cos(\omega_{sn} t + \phi_{sn})} \right] \]

where:

\( A \) = the unmodulated carrier voltage  
\( m \) = the modulation index  
\( C_{sn} \) = the magnitude of the \( n \)th term of the sum signal

\( C_{dn} \) = the magnitude of the \( n \)th term of the difference signal

\( \omega_{sn} \) = the \( n \)th order angular velocity of the sum signal

\( \omega_{dn} \) = the \( n \)th order angular velocity of the difference signal

\( \omega_c \) = the angular velocity of the carrier

\[ \phi_{sn} = \text{the angle of the } n\text{th order term} = \tan^{-1} \left[ \frac{B_{sn}}{A_{sn}} \right] \]

\[ \phi_{dn} = \text{the angle of the } n\text{th order term} = \tan^{-1} \left[ \frac{B_{dn}}{A_{dn}} \right] \]

\( A_{sn} \) and \( B_{sn} \) are the \( n \)th sine and cosine coefficients of \( C_{sn} \)

\( A_{dn} \) and \( B_{dn} \) are the \( n \)th sine and cosine coefficients of \( C_{dn} \)

[58 FR 66301, Dec. 20, 1993]

§ 73.132 Territorial exclusivity.

No licensee of an AM broadcast station shall have any arrangement with a network organization which prevents or hinders another station serving substantially the same area from broadcasting the network’s programs not taken by the former station, or which prevents or hinders another station serving a substantially different area from broadcasting any program of the network organization: Provided, how-
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a network organization. The term “arrangement” means any contract, arrangement or understanding, expressed or implied.

[42 FR 16422, Mar. 28, 1977]

§ 73.150 Directional antenna systems.

(a) For each station employing a directional antenna, all determinations of service provided and interference caused shall be based on the inverse distance fields of the standard radiation pattern for that station. (As applied to nighttime operation the term “standard radiation pattern” shall include the radiation pattern in the horizontal plane, and radiation patterns at angles above this plane.)

(1) Parties submitting directional antenna patterns pursuant to this section and § 73.152 (Modified standard pattern) must submit patterns which are tabulated and plotted in units of millivolts per meter at 1 kilometer.

(b) The following data shall be submitted with an application for authority to install a directional antenna:

(1) The standard radiation pattern for the proposed antenna in the horizontal plane, and where pertinent, tabulated values for the azimuthal radiation patterns for angles of elevation up to and including 60 degrees, with a separate section for each increment of 5 degrees.

(1) The standard radiation pattern shall be based on the theoretical radiation pattern. The theoretical radiation pattern shall be calculated in accordance with the following mathematical expression:

\[
E(\phi, \theta)_{th} = k \sum_{i=1}^{n} F_i \frac{f_i(\theta)S_i}{\cos \theta \cos(\phi_i - \phi)} + \psi_i
\]  

(Eq. 1)

where:

- \(E(\phi, \theta)_{th}\) Represents the theoretical inverse distance fields at one kilometer for the given azimuth and elevation.
- \(k\) Represents the multiplying constant which determines the basic pattern size. It shall be chosen so that the effective field (RMS) of the theoretical pattern in the horizontal plane shall be no greater than the value computed on the assumption that nominal station power (see §73.14) is delivered to the directional array, and that a lumped loss resistance of one ohm exists at the current loop of each element of the array, or at the base of each element of electrical height lower than 0.25 wavelength, and no less than the value required by §73.189(b)(2) of this part for a station of the class and nominal power for which the pattern is designed.
- \(n\) Represents the number of elements (towers) in the directional array.
- \(i\) Represents the \(i^{th}\) element in the array.
- \(F_i\) Represents the field ratio of the \(i^{th}\) element in the array.
- \(\theta\) Represents the vertical elevation angle measured from the horizontal plane.
- \(f_i(\theta)\) represents the vertical plane radiation characteristic of the \(i^{th}\) antenna. This value depends on the tower height, as well as whether the tower is top-loaded or sectionalized. The various formulas for computing \(f_i(\theta)\) are given in §73.160.
- \(S_i\) Represents the electrical spacing of the \(i^{th}\) tower from the reference point.
- \(\phi_i\) Represents the orientation (with respect to true north) of the \(i^{th}\) tower.
- \(\psi_i\) Represents the azimuth (with respect to true north).

The standard radiation pattern shall be constructed in accordance with the following mathematical expression:

\[
E(\phi, \theta)_{std} = 1.05 \sqrt{\left[ E(\phi, \theta)_{th} \right]^2 + Q^2}
\]  

(Eq. 2)

where:

- \(E(\phi, \theta)_{std}\) represents the inverse distance fields at one kilometer which are produced by the directional antenna in the horizontal and vertical planes. \(E(\phi, \theta)_{th}\) represents the theoretical inverse distance fields at one kilometer as computed in accordance with Eq. 1, above.
- \(Q\) is the greater of the following two quantities: \(0.05g(\theta) E_{\omega}\) or \(10.0g(\theta) \sqrt{P_{\omega}}\)

where: