§ 73.316 FM antenna systems.

(a) It shall be standard to employ horizontal polarization; however, circular or elliptical polarization may be employed if desired. Clockwise or counterclockwise rotation may be used. The supplemental vertically polarized effective radiated power required for circular or elliptical polarization shall in no event exceed the effective radiated power authorized.

(b) Directional antennas. A directional antenna is an antenna that is designed or altered for the purpose of obtaining a non-circular radiation pattern.

(1) Applications for the use of directional antennas that propose a ratio of maximum to minimum radiation in the horizontal plane of more than 15 dB will not be accepted.

(2) Directional antennas used to protect short-spaced stations pursuant to §73.213 or §73.215 of the rules, that have a radiation pattern which varies more than 2 dB per 10 degrees of azimuth will not be authorized.

(c) Applications for directional antennas. (1) Applications for construction permit proposing the use of directional antenna systems must include a tabulation of the composite antenna pattern for the proposed directional antenna. A value of 1.0 must be used to correspond to the direction of maximum radiation. The pattern must be tabulated such that 0° corresponds to the direction of maximum radiation or alternatively, in the case of an asymmetrical antenna pattern, the pattern must be tabulated such that 0° corresponds to the actual azimuth with respect to true North. In the case of a composite antenna composed of two or more individual antennas, the pattern required is that for the composite antenna, not the patterns for each of the individual antennas. Applications must include tabulations tabulated at intervals of not greater than ten (10) degrees. In addition, tabulated values of all maxima and minima, with their corresponding azimuths, must be submitted.

(2) Applications for license upon completion of antenna construction must include the following:

(i) A complete description of the antenna system, including the manufacturer and model number of the directional antenna. It is not sufficient to label the antenna with only a generic term such as “dipole.” In the case of individually designed antennas with no model number, or in the case of a composite antenna composed of two or more individual antennas, the antenna must be described as a “custom” or “composite” antenna, as appropriate. A full description of the design of the antenna must also be submitted.

(ii) A plot of the composite pattern of the directional antenna. A value of 1.0 must be used to correspond to the direction of maximum radiation. The plot of the pattern must be oriented such that 0° corresponds to the direction of maximum radiation or alternatively, in the case of an asymmetrical antenna pattern, the plot must be oriented such that 0° corresponds to the actual azimuth with respect to true North. The horizontal plane pattern must be plotted to the largest scale possible on unglazed letter-size polar coordinate paper (main engraving approximately 18 cm × 25 cm (7 inches × 10 inches)) using only scale divisions and subdivisions of 1, 2, 2.5, or 5 times 10-th. Values of field strength less than 10% of the maximum field strength plotted on that pattern must be shown on an enlarged scale. In the case of a composite antenna composed of two or more individual antennas, the composite antenna pattern should be provided, and not the pattern for each of the individual antennas.

(iii) A tabulation of the measured relative field pattern required in paragraph (c)(1) of this section. The tabulation must use the same zero degree reference as the plotted pattern, and must contain values for at least every 10 degrees. Sufficient vertical patterns to indicate clearly the radiation characteristics of the antenna above and below the horizontal plane.
§ 73.317 FM transmission system requirements.

(a) FM broadcast stations employing transmitters authorized after January 1, 1960, must maintain the bandwidth occupied by their emissions in accordance with the specifications detailed below. FM broadcast stations employing transmitters installed or type accepted before January 1, 1960, must achieve the highest degree of compliance with these specifications practicable with their existing equipment.