## Federal Aviation Administration, DOT

(4) Within the elevation coverage sector defined in paragraphs (a) (1), (2) and (3) of this section, the power densities must not be less than those shown in Table 9, but the equipment design must also allow for:

(i) Transmitter power degradation from normal by -1.5 dB.

(ii) Rain loss of -2.2 dB at the coverage extremes.

(b) *Elevation siting requirements*. The Elevation Antenna System must:

(1) Be located as close to runway centerline as possible (without violating obstacle clearance criteria).

(2) Be located near runway threshold such that the asymptote of the minimum glidepath crosses the threshold of the runway at the Approach Reference Datum height. Normally, the minimum glidepath should be 3 degrees and the Approach Reference Datum height should be 50 feet. However, there are circumstances where other glideslopes and reference datum heights are appropriate. Some of these instances are discussed in FAA Order 8260.34 (Glide Slope Threshold Crossing Height Requirements) and Order 8260.3 (IFR Approval of MLS.)

(3) Be located such that the MLS Approach Reference Datum and ILS Reference Datum heights are coincident within a tolerance of 3 feet when MLS is installed on a runway already served by an ILS. This requirement applies only if the ILS glide slope is sited such that the height of the reference datum meets the requirements of FAA Order 8260.34.

(c) Antenna coordinates. The scanning beams transmitted by the elevation subsystem must be conical.

(d) Elevation accuracy. (1) The accuracies shown in Table 13 are required at the approach reference datum. From the approach reference datum to the coverage limit, the PFE, PFN and CMN limits shall be allowed to linearly increase as follows:

(i) With distance along the runway centerline extended at the minimum glide path angle, by a factor of 1.2 for the PFE and PFN limits and to  $\pm 0.10$  degree for the CMN limits;

(ii) With azimuth angle, from runway centerline extended to the coverage extreme, by a factor of 1.2 for the PFE and PFN limits and by a factor of 2.0 for the CMN limits;

(iii) With increasing elevation angles from + 3 degrees to + 15 degrees, by a factor of 2.0 for the PFE and PFN limits;

TABLE 13—ELEVATION ACCURACIES AT THE APPROACH REFERENCE DATUM

Error type     System     Ground sub- system     Airborr subsyste       PFE     12 ±0.133     (3)     ±0       100 CFC     100 CFC     100 CFC     100 CFC			Angular error (degrees)	
PFE 12 ±0.133 (3) ±0.	Error type	System	Ground sub- system	Airborne subsystem 4
$\Box M N \dots U = 10000 \pm 0.000 \pm 0.000 \pm 0.000 \pm 0.0000 \pm 0.00000 \pm 0.00000000$	PFE CMN	<sup>1 2</sup> ±0.133 <sup>1</sup> ±0.050	( <sup>3</sup> ) ±0.020	±0.017 ±0.010

Notes:

 $^1$  Includes errors due to ground and airborne equipment and propagation effects.  $^2$  The system PFN component must not exceed  $\pm 0.087$  de-

Gree.
<sup>3</sup>The mean (bias) error component contributed by the ground equipment should not exceed ±0.067 degree.
<sup>4</sup>The airborne subsystem angular errors are provided for information only.

(iv) With decreasing elevation angle from + 3 degrees (or 60% of the minimum glide path angle, whichever is less) to the coverage extreme, by a factor of 3 for the PFE, PFN and CMN limits; and

(v) Maximum angular limits. the CMN limits shall not exceed  $\pm 0.10$  degree in any coverage region within  $\pm 10$  degrees laterally of runway centerline extended which is above the elevation angle specified in (iv) above.

NOTE: It is desirable that the CMN not exceed  $\pm 0.10$  degree throughout the coverage region above the elevation angle specified in paragraph (d)(1)(iv) of this section.

(2) The system and ground subsystem accuracies shown in Table 13 are to be demonstrated at commissioning as maximum error limits. Subsequent to commissioning, the accuracies are to be considered at 95% probability limits.

(e) Elevation antenna characteristics are as follows:

(1) Drift. Any elevation angle as encoded by the scanning beam at any point within the coverage sector must not vary more than 0.04 degree over the range of service conditions specified in §171.309(d) without the use of internal environmental controls. Multipath effects are excluded from this requirement.

(2) *Beam pointing errors.* The elevation angle as encoded by the scanning beam at any point within the coverage sector