

Commercial feedhorns for 10 GHz dishes

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Which feedhorn is best for my 10 GHz dish?

There are several good feedhorn designs available which work well and are easily constructed. However, some hams choose not to make their own or lack confidence in their homebrewing skills, so they are left with rather limited choices.

Few feeds are manufactured for 10 GHz, but many are available for DSS satellite use at Ku-band (roughly 11 to 12 GHz). Surplus horns also appear occasionally. Some of these horns work well as 10 GHz feeds, while some others work poorly or not at all (if the waveguide is too small to propagate 10 GHz). For instance, W1RIL¹ has shown the RCA DSS horn to be a good performer for offset dishes, but some machine work is required to remove the horn from the LNB and modify it.

Until recently, no good commercial feeds were available for 10 GHz. A few years ago, the Chaparral “11 GHz Superfeed” was found to be a good performer; unfortunately, it was discontinued and is no longer available. However, three possibilities have recently become available.

The first is the “10368feed” from Down East Microwave (www.downeastmicrowave.com). This is a version of the VE4MA feed², a proven performer on all bands from 1296 up. It uses simple copper waterpipe construction, with good workmanship — you could make your own, and after a dozen or so, you’d get a pretty one (and the ugly ones would work fine). The computer simulation curves for a VE4MA 10 GHz feed show excellent efficiency for an f/D around 0.4; since many conventional prime-focus dishes have an f/D between 0.35 and 0.45, this feed is perfect. The phase center is about 0.16λ , or 5 mm, inside the horn.



Another possibility was suggested by Dale, W4OP, who found a feedhorn on the web, the ADL KU-855 from ADL Feeds, Inc (www.adlfeeds.com), and sent me one. I measured the dimensions, ran them through the computer, and got the curves shown below. The efficiency at 10.368 GHz should be excellent for an f/D around 0.4, ideal for common dishes. The input is common WR-75 waveguide, so no modification is necessary. The phase center is about 0.19λ inside the horn. The ADL feeds are nicely made of powder-coated aluminum.



Dale wanted his horn back, so I ordered my own — ADL sells direct with no hassle. The web page also showed an offset feed, the KU-860, so I ordered one of these as well. The computer simulation curves show excellent efficiency for an f/D of around 0.6. Most offset dishes need a feed f/D around 0.7, so the performance of this feed will be down just a bit, but still very good. This horn also uses WR-75 waveguide input, and the phase center is at the center of the aperture.

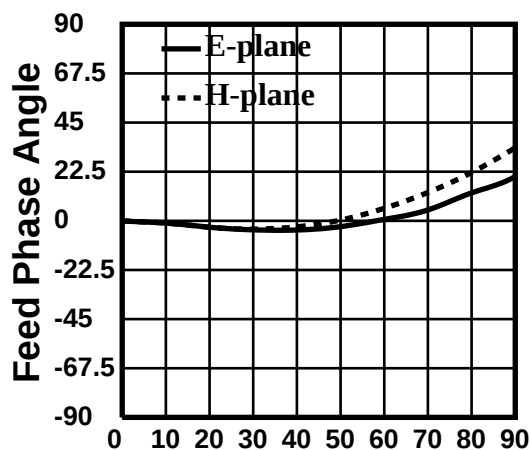
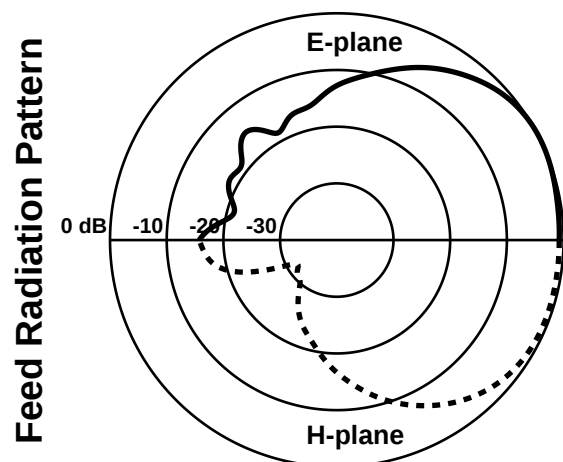


The only one of these that I've actually tested is the offset feed; sun noise measurements looked promising, but some equipment troubles prevented accurate results. Now the sun won't be high enough again until spring, when I intend to test all three of these feeds.

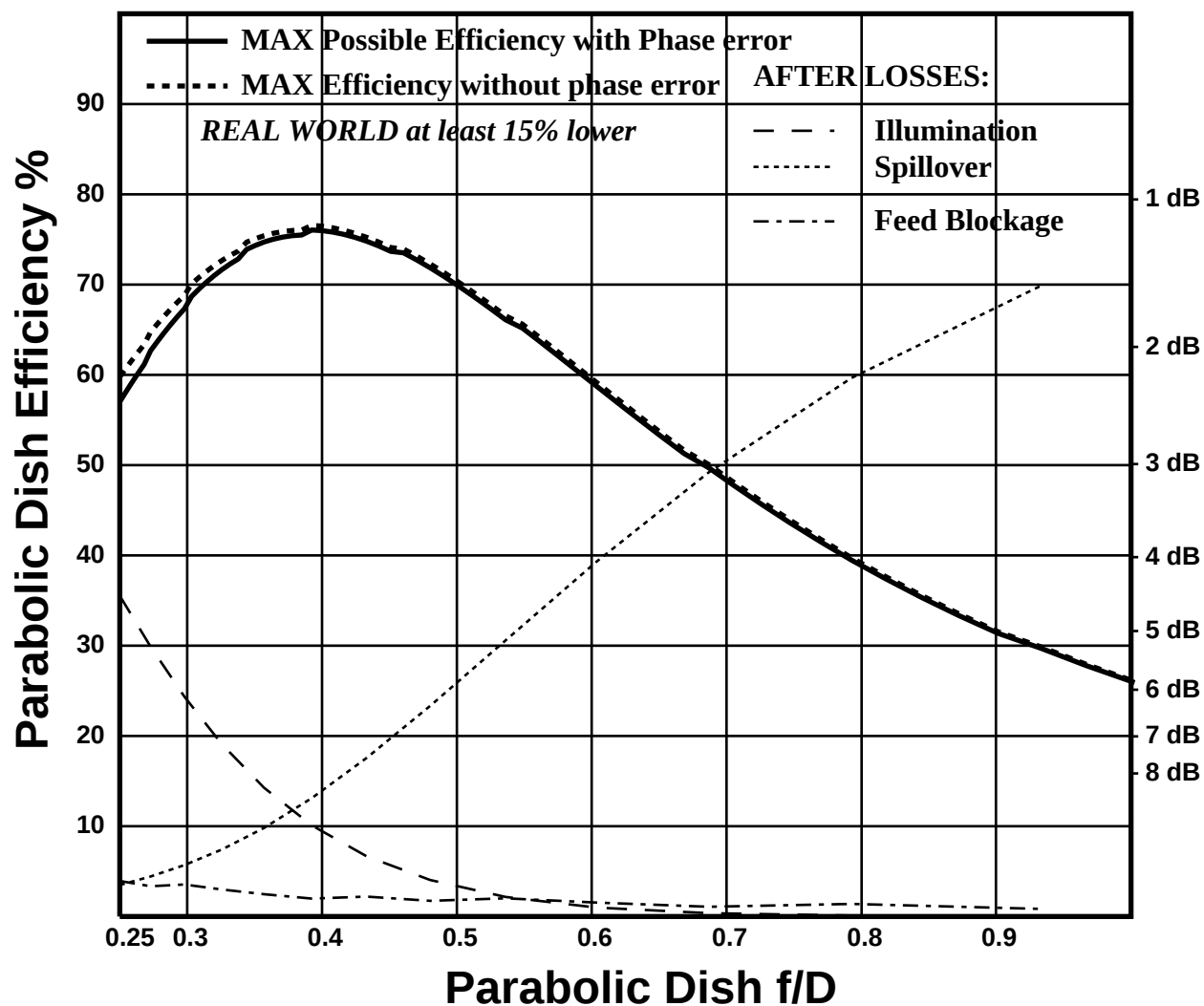
So there are at least three good 10 GHz feedhorns you can buy. Even so, I'd urge you to try making your own — it's not too hard and can be fun. See www.w1ghz.cx for some ideas.

1. Ken Schofield, W1RIL, "Modifying the RCA DSS Dish for 10 GHz," *Proceedings of the 25th Eastern VHF/UHF Conference*, ARRL, 1999, pp. 410-415. Also <http://www.qsl.net/k1uhf/NEWS/news9901.pdf>
2. Barry Malowanchuk, VE4MA, "VE4MA 10 GHz Copper Water Pipe Feedhorn," *Proceedings of Microwave Update '97*, ARRL, 1997, p. 288.

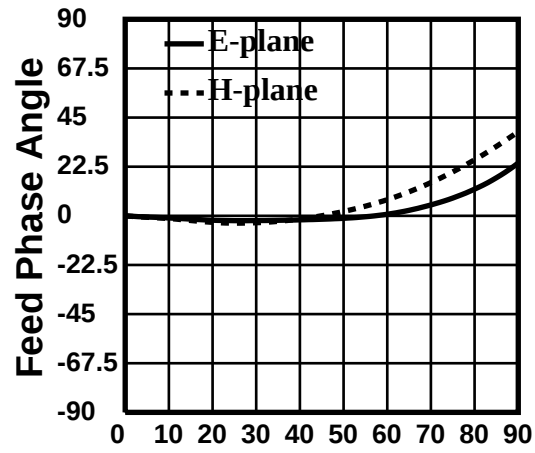
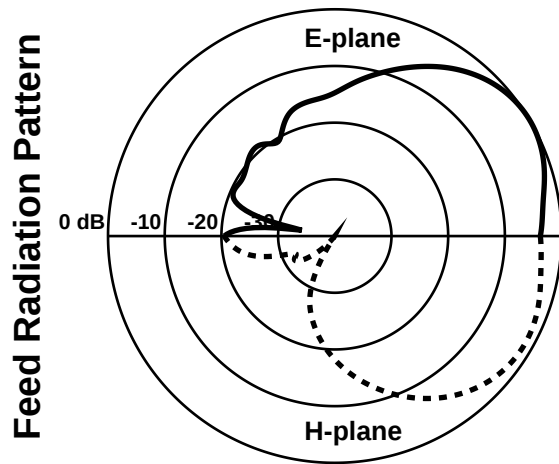
VE4MA 10 GHz feedhorn - choke flush with horn



Dish diameter = 20λ Feed diameter = 1.9λ

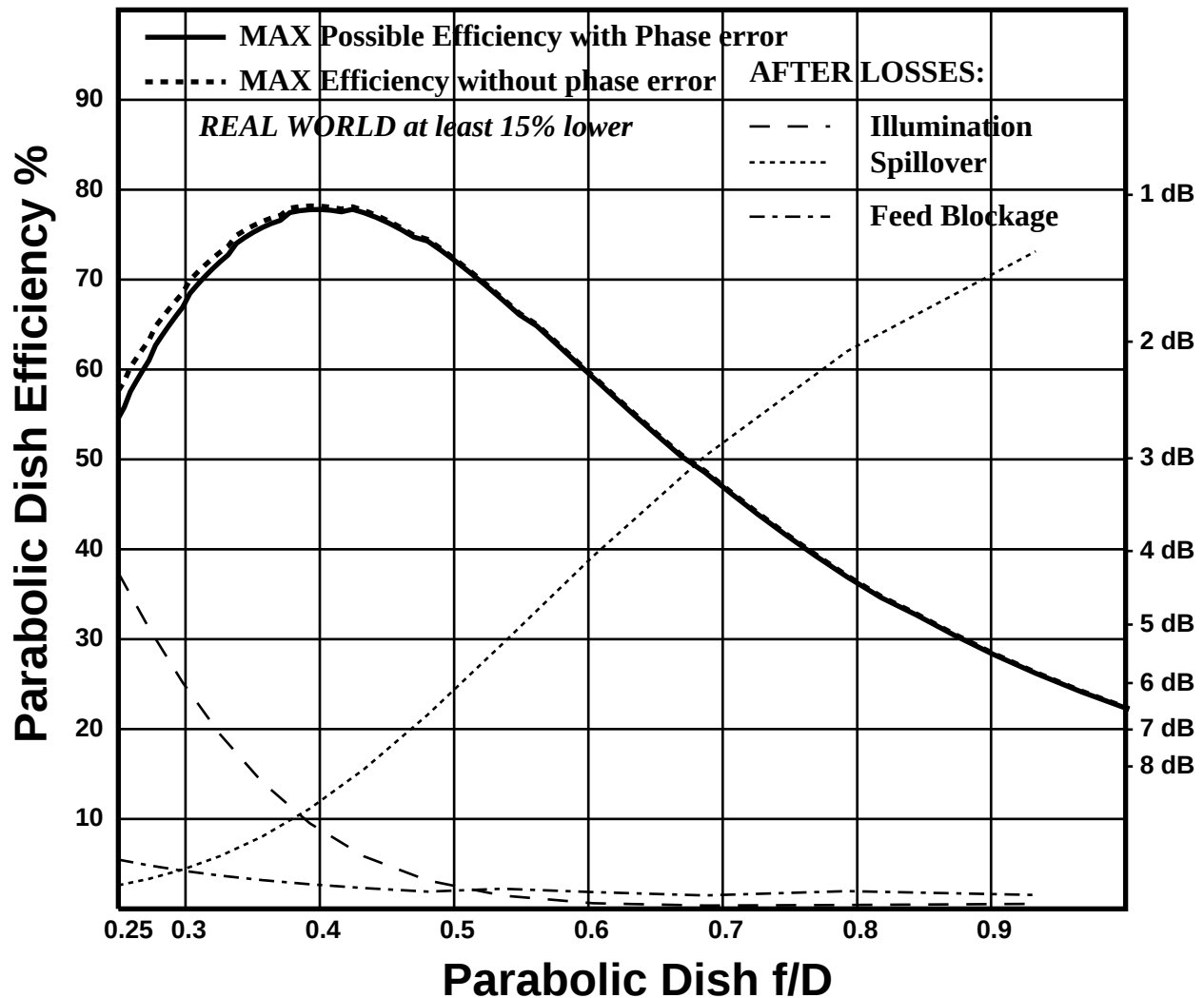


ADL KU-855 feedhorn at 10.368 GHz

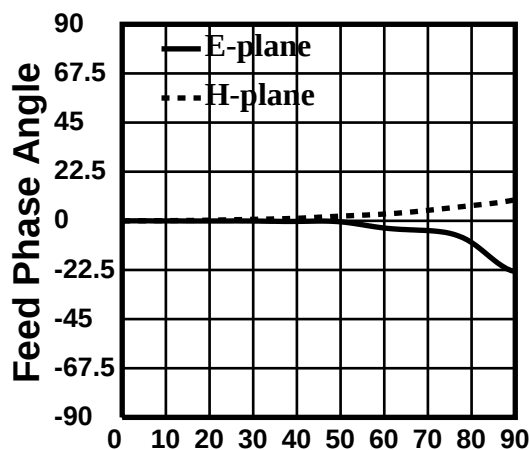
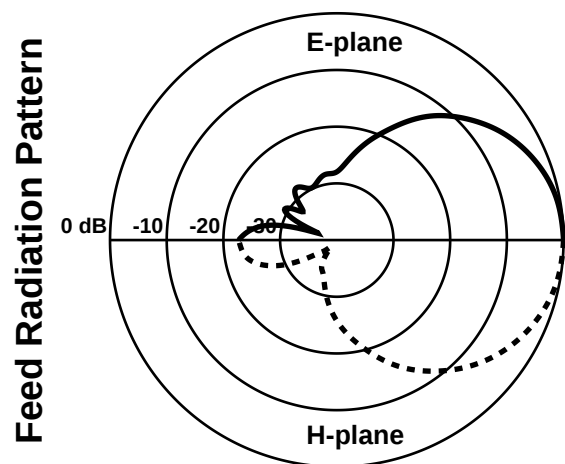


Dish diameter = 20λ Feed diameter = 2.35λ

Phase Center = 0.19λ inside aperture



ADL KU-860 offset feedhorn at 10.368 GHz



Dish diameter = 15.8λ Feed diameter = 0.1λ

Rotation Angle around specified
Phase Center = 0λ beyond aperture

