

## 2.4/10 GHz duo-band feed for Es'hail-2 / QO-100

The duoband-feed can be used in front of a primefocus dish with an  $f/D$  of 0,4 as well as in front of a TV offset mirror with an  $f/D$  of 0,6.

Of course you can not expect that always the theoretically possible efficiency is reached. The 10 GHz horn, as supplied, lights a mirror with  $f/D$  of 0,4 almost optimal. By placing a dielectric concentrator (dielectric lens) on the 10 GHz horn then lights up a TV offset mirror with a  $f/D$  of 0,6 to 0,7 very well.

Such a concentrator you can buy from BaMaCom or pull out from an INVERTO LNB (Inverto IDLB-SINL24-MULTI-OPP Single LNB).

Unfortunately, there is no easy solution for the 2.4 GHz patch. Here we have the lesser Efficiency in one or another case. By slightly more power one can compensate that, to obtain the advantage of a single-antenna solution.

The duo-band feed generates on 2.4 GHz a left-handed circular polarization (LHCP), which by the reflection in the dish becomes RHCP. Circular-polarization of patch antennas is frequency dependent and rarely so beautiful like a helix with more than 5 turns.

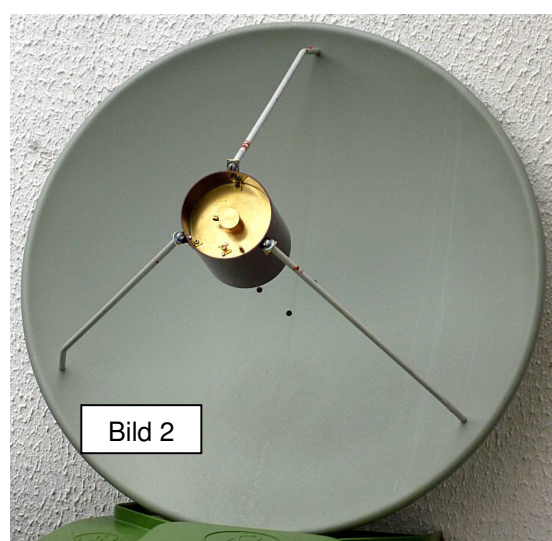
The feeds we make have one basic setting, which is both the resonant frequency and the circular polarization considered. You only should turn on the screw if can use a network analyzer and can also record radiation diagrams.

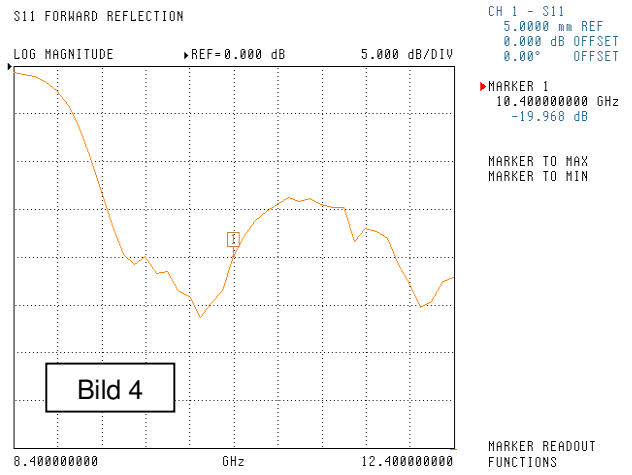
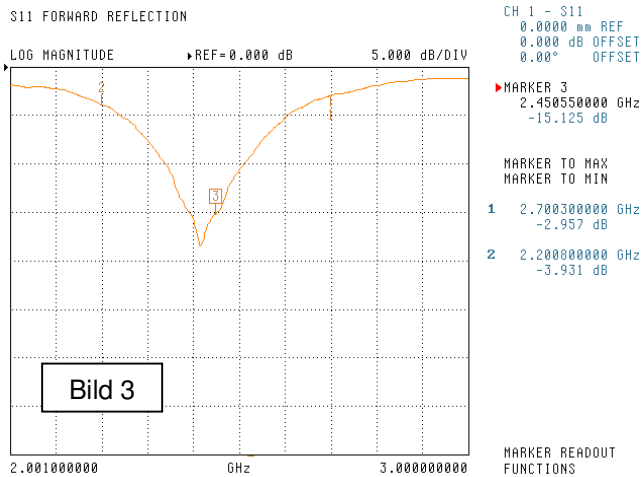
Like all microwave antennas, this duoband feed also has the influence of water (rain) and dirt (pollen dust) on the function, significantly larger than a shortwave-beam or an uhf-yagi and is not negligible. The duo band feed demands regular inspection and care in operation.

It makes sense to use a weather protection hood, as it is offered for TV LNB's. For example the weather protection cover by goobay, Article No.: 67190, which is available in relevant shops.

Of course it is also possible to install the feed in a plastic tube. This is a suitable piece of rainwater downpipe or the like. A good solution is a pipe sleeve from the program of the company MARLEY, item no. : 072739 (in gray). This part also has already the right length.

Since the structure in the offset dish points upwards, it should be in front, and only in front, should be covered with a film or a thin plastic lid. When used in a primefocus dish it looks down the structure, so the back should covered accordingly. An interesting, may not very professional solution, is shown in [www.youtube.com/watch?v=MYTAWqD9ZZg](http://www.youtube.com/watch?v=MYTAWqD9ZZg).





## To the pictures:

Figure 1 shows the assembly of the duoband feed in front of an offset dish (possibly with an adapter ring 23/40 mm). In order to bring the duoband feed into focus, the LNB mount must be used if necessary, reset by 20 to 50 mm.

Figure 2 shows the installation of the duoband feed in a piece of rainwater droppipe in front of a prime focus dish. In this case, the back of the unit should be covered.

Figure 3 shows the typical course of the return loss of the 2.4 GHz patch.

Figure 4 shows the typical course of the return loss of the 10 GHz horn.

## Technical specifications:

- Duoband feed for Es'hail-2 / P4-A  
 2.4/10 GHz antenna systems
- > 2.4 GHz left-handed circular polarization
  - > SMA connector
  - > 20 W continuous wave
  - > 10 GHz linear polarization
  - > SMA connector
  - > Antenna impedance of both systems 50 ohms
  - > for prime- and offset dishes
  - > Material aluminum
  - > all screw connections in stainless steel
  - > shank diameter Ø 23 mm

## References:

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- Skriptum zur GHz-Tagung Dorsten 2016, Ergänzung zu ...
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- Skriptum zur UKW-Tagung Weinheim 2015, Duoband-Antenne für 2,4 und 10 GHz
- CQDL-Spezial, Raumstationen, Satelliten, Reflexionen, Duoband-Antenne für 13 und 3 cm
- Funkamateurl 2016, Heft 5, 6 und 8, Selbstbau einer Duoband-Antenne für 2,4 und 10 GHz
- AMSAT-DL Journal 2/15, Duoband-Antenne für 13 und 3 cm
- AMSAT-DL Journal 1/16, Parabolspiegel für den 2,4/10 GHz Duoband-Feed