



# Phase Matching

We have good experience in making phase matched RF cable sets. We have delivered for many projects to DRDO upto 18 GHz.

Phase matching is done using in-house Agilent Vector Network Analyzer. We can phase match complete range of cables including Semiflexible, Semi-rigid, Corrugated, Handformable, RG types.

## APPLICATIONS

- Multi-Channel Amplifiers
- Phased Array Radars & EW
- Multi-Beam Antenna Arrays
- RF Combiners and Filters

### ABSOLUTE PHASE MATCH

A 'golden' cable is made & preserved. All the cables are then matched to the golden cable. Any cable in the set can be replaced without replacing all cables of the set. Expressed as XX nS ± YY pS OR XXX° ± Y° @ ZZ GHz

### RELATIVE PHASE MATCH (Matched Set)

Cables are matched to other cables in the same set. There is no guarantee that cables in 1 set will match those of another set. Lowest cost options since yield is high. Disadvantage is that if any 1 cable of a set is to be replaced, the entire set have to be replaced. Specified as ± X° @ YY GHz relative to a designated cable in the set

- Relative or Absolute Phase Matching
- DC~18 GHz range
- Our complete range of cables can be matched.
- Phase matching available in pairs or in sets
- Available with common connectors as SMA, TNC, N, etc.

### PHASE MATCH TOLERANCE

- ± 0.75 degree/GHz for semi-rigid cable
- ± 1 degree/GHz for flexible cables types  
(Above is applicable for cables upto 10 feet in length, for longer lengths please contact us)
- Tighter tolerances are also possible upon request. We have delivered tighter tolerances on special request many times. For example we have delivered ± 5 degree @ 18 GHz for 0.5m length cable sets with SMA connectors in length, for longer lengths please contact us).

#### Electrical Length (degrees)

$$\varnothing = \frac{360 \times F(\text{MHz}) \times L_{\text{TH}} (\text{Feet})}{984 \times V_p (\text{Percent})}$$

#### Electrical Length (deg) - our MF02 (Vp = 70%)

Frequency	Physical Length		
	0.5 m	1 m	2m
1 GHz	857.36°	1714.72°	3429.44°
2 GHz	1714.72°	3429.44°	6858.89°
3 GHz	2572.08°	5144.17°	10288.35°
6 GHz	5144.17°	10288.35°	20576.7°
9 GHz	7716.26°	15432.52°	30865.04°
12 GHz	10288.34°	20576.7°	41153.39°
13.5 GHz	11574.39°	23148.78°	46297.57°
18 GHz	15432.52°	30865.04°	61730.09°

#### Electrical Length (deg) - Our ULL04 (Vp = 76%)

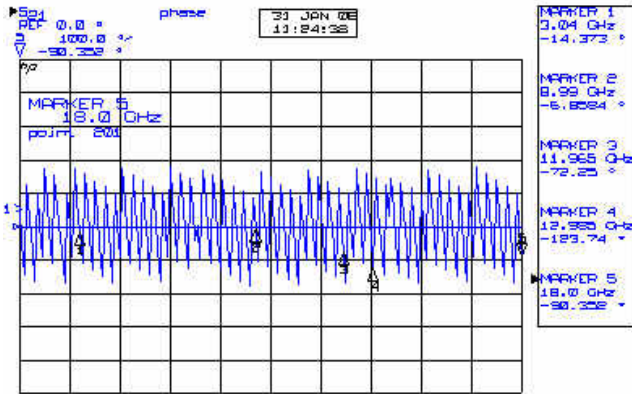
Frequency	Physical Length		
	0.5 m	1 m	2m
1 GHz	789.67°	1579.35°	3158.70°
2 GHz	1579.35°	3158.70°	6317.40°
3 GHz	2369.02°	4738.05°	9476.11°
6 GHz	4738.05°	9476.11°	18952.22°
9 GHz	7107.08°	14214.17°	28428.33°
12 GHz	9476.11°	18952.22°	37904.44°
13.5GHz	10660.62°	21321.25°	42642.5°
18 GHz	14214.16°	28428.33°	56856.66°

Note: Above are theoretical values. In actual practice, these values will be slightly different.

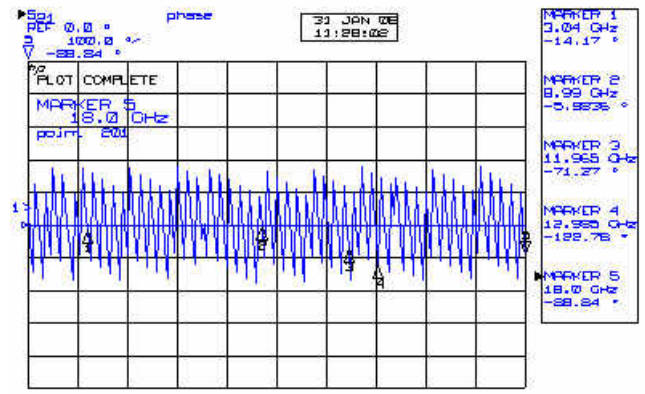
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**0.75 meter Phase Matched ( $\pm 5$  degree) Cable Sets @18 GHz ULL04 Series, 76% Vp**

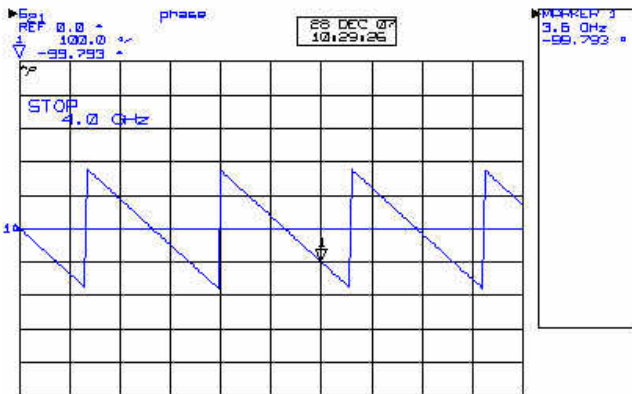


Start : 1.000000 GHz Stop : 18.000000 GHz

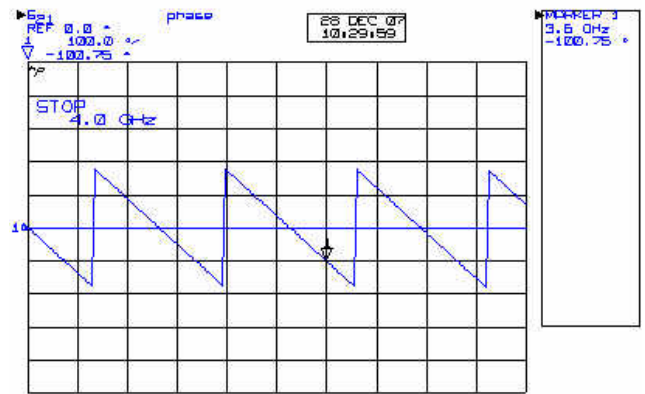


Start : 1.000000 GHz Stop : 18.000000 GHz

**0.6 meter Phase Matched ( $\pm 3$  degree) Cable Sets @3.6 GHz, MF02 Series, 70% Vp**

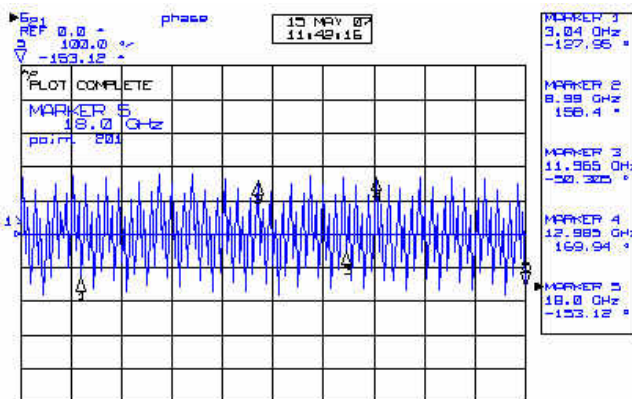


Start : 3.000000 GHz Stop : 4.000000 GHz

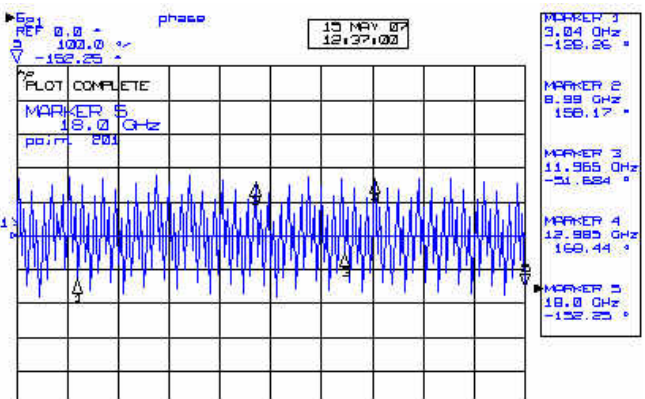


Start : 3.000000 GHz Stop : 4.000000 GHz

**0.5 meter Phase Matched ( $\pm 5$  degree) Cable Sets @18 GHz M17/130-RG402 Semirigid, 70% Vp**



Start : 1.000000 GHz Stop : 18.000000 GHz



Start : 1.000000 GHz Stop : 18.000000 GHz

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