

# RTPGE Test Head

Update from 3/12/13 submission

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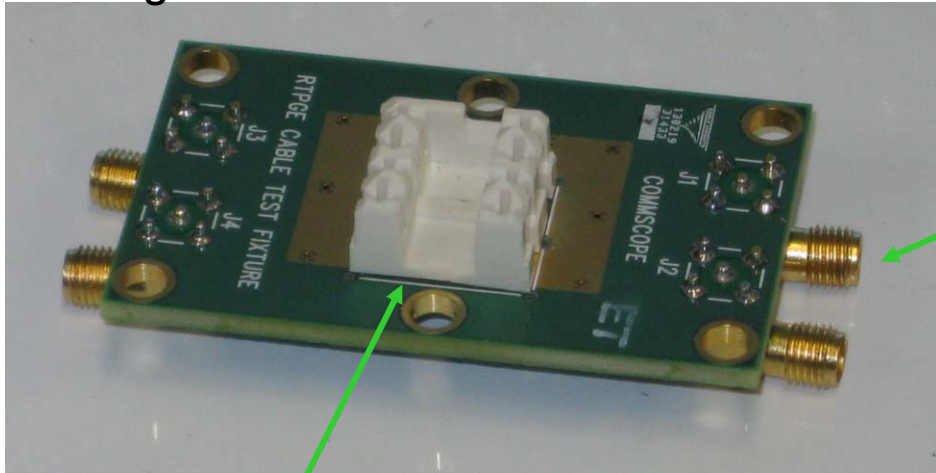
Richard Mei

Bryan Moffitt

Jeff Oberski



## Original Version RTPGE Test Head



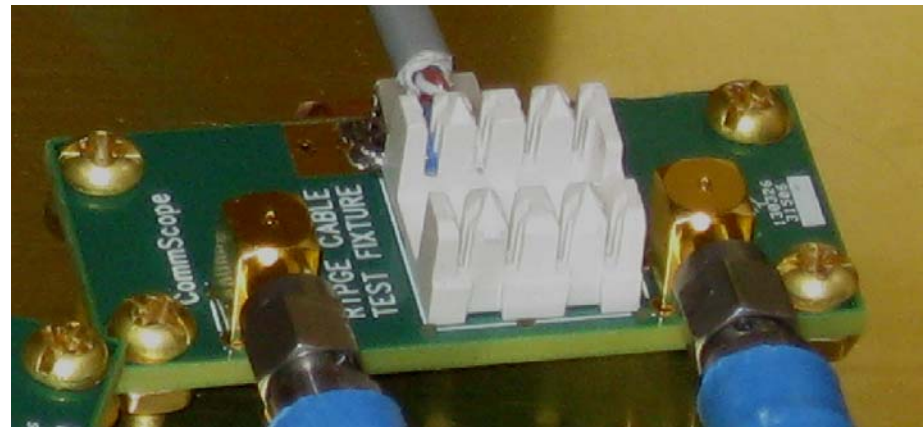
4 SMA ports

1 pair punch block

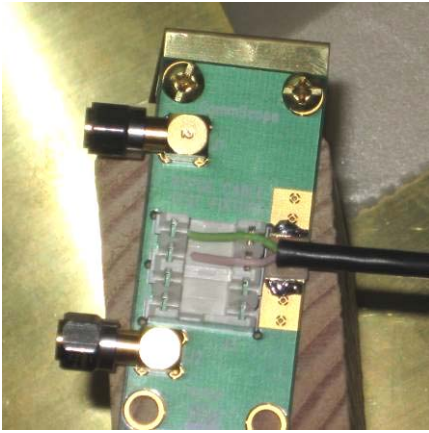
## Insulation Displacement Contacts

2 pair punch block

## New Version RTPGE Test Head



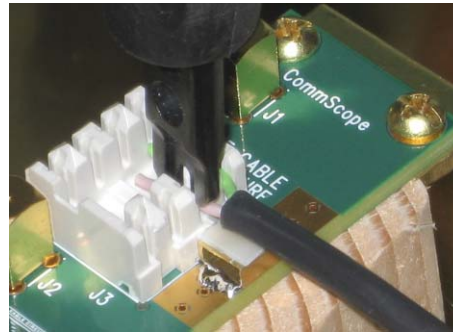
2 SMA ports



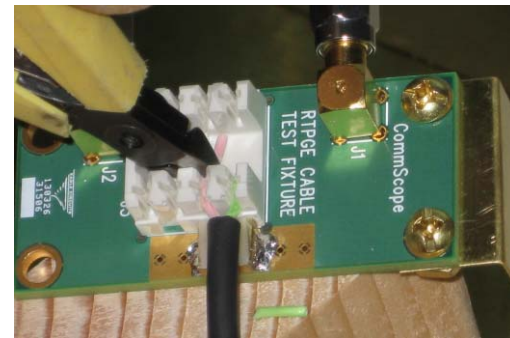
Push conductors into  
the punch slots

Easier termination with the cable  
oriented coming in from the edge

Punch conductors down



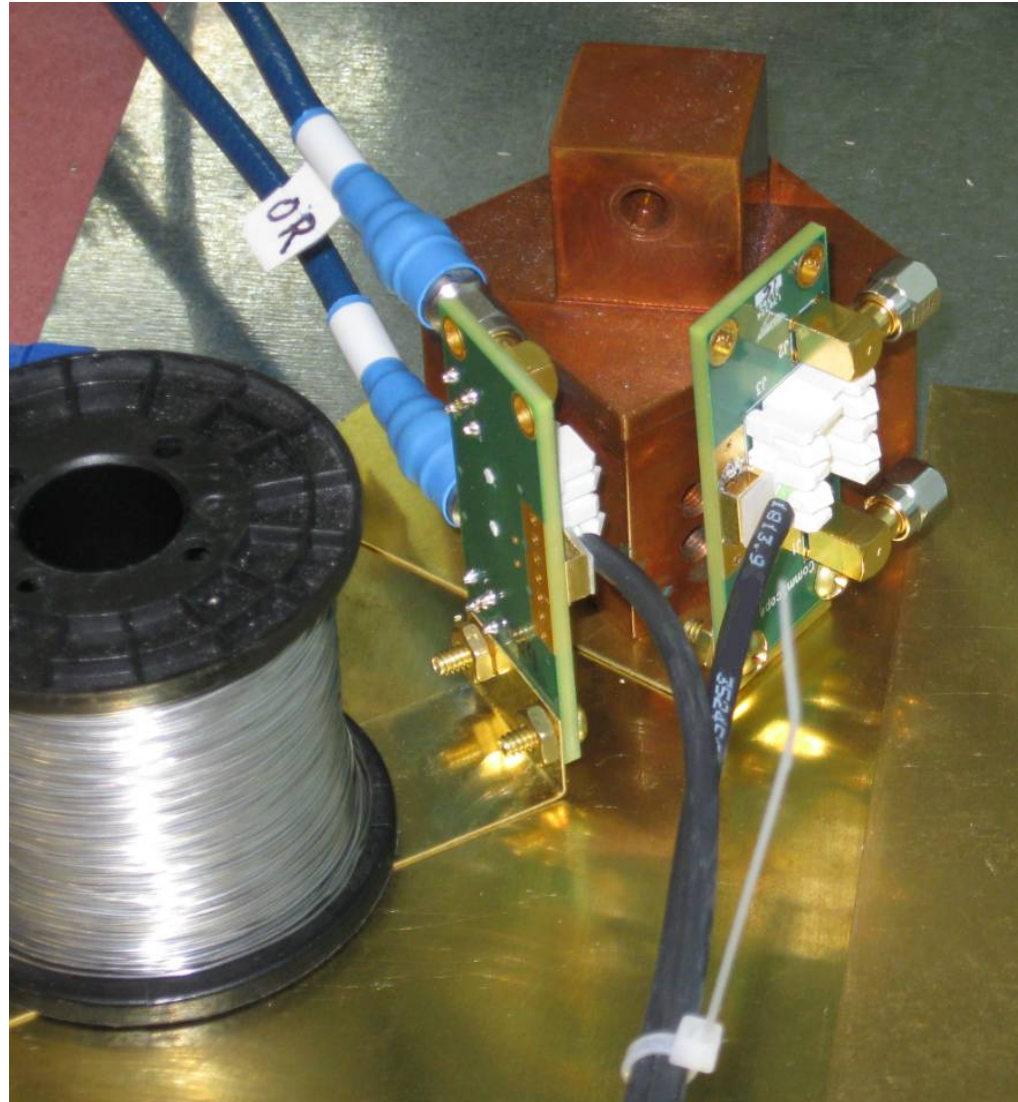
Trim ends with  
fine edge cutter



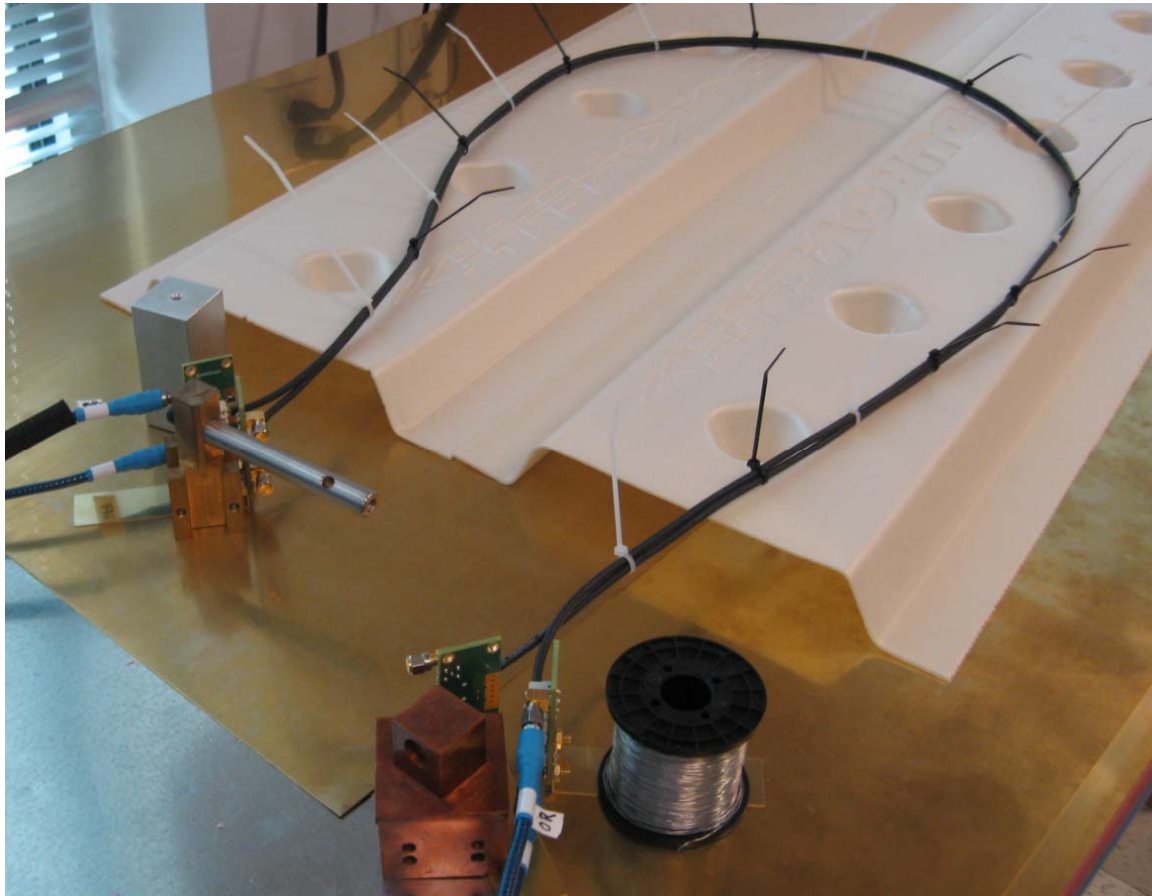
Side mount brass stands position the terminations for conventional stripline cable height over ground plane

Any heavy object will hold the stands down on the ground reference plane for good high frequency contact – necessary for common mode study and verification

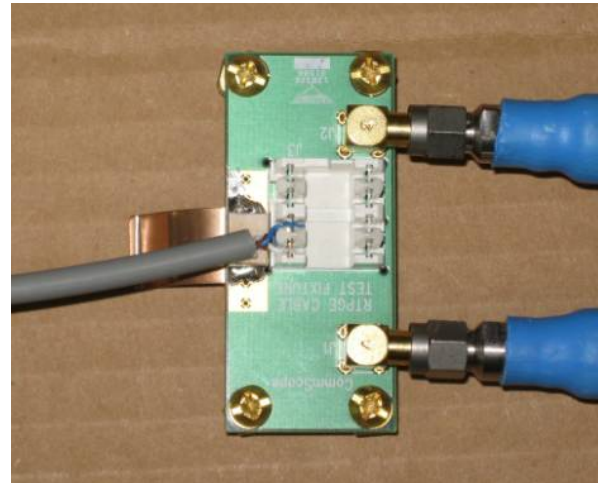
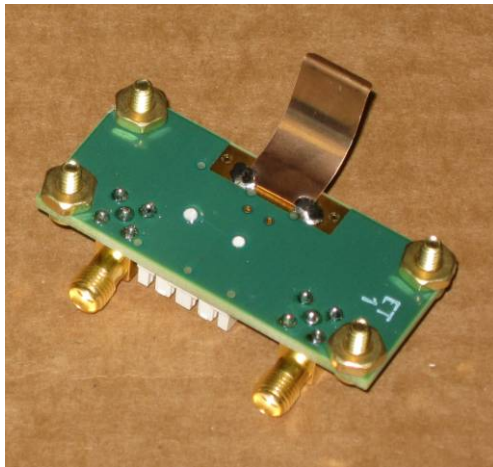
(2 cable alien being measured)



Simple 4 head reference/check measurement  
Alien between two 3 meter cables at stripline height



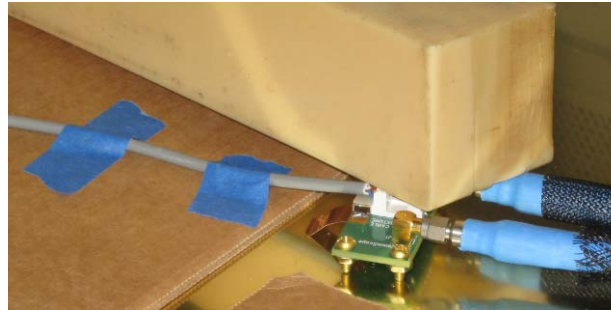
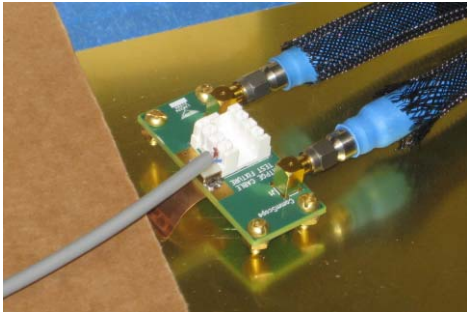
An alternative mounting application is standing on the corner bolts with a [spring grounding contact tab](#) added to the bottom



After termination, a weight on top holds the grounding tab down and properly ties the analyzer signal reference to the ground reference plane

[This mounting configuration is also easier to terminate because the bolts support the termination punching](#)

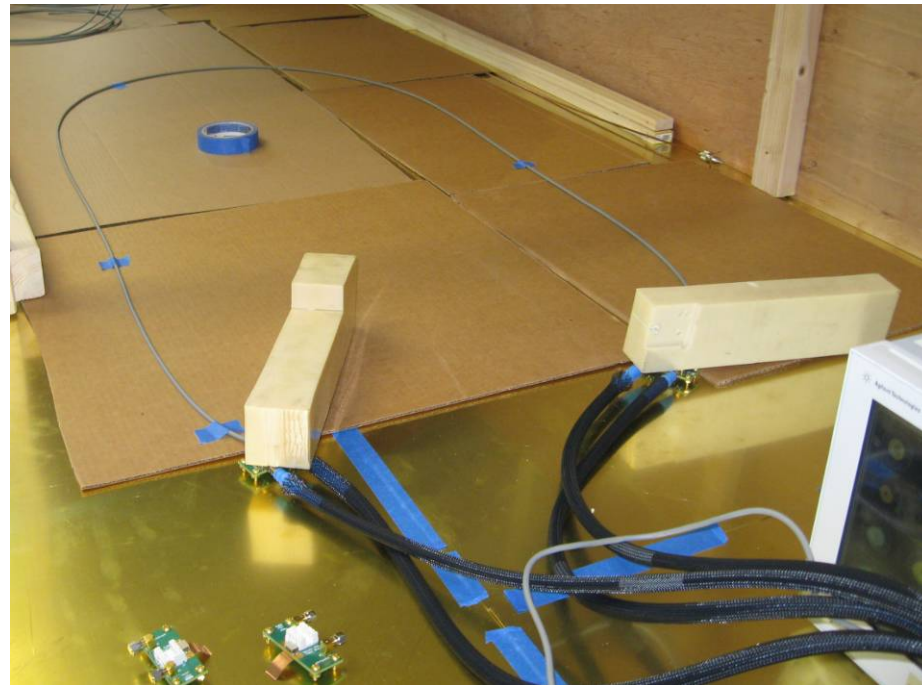
A plastic block is used as a weight to hold the spring contact down onto the ground reference plane



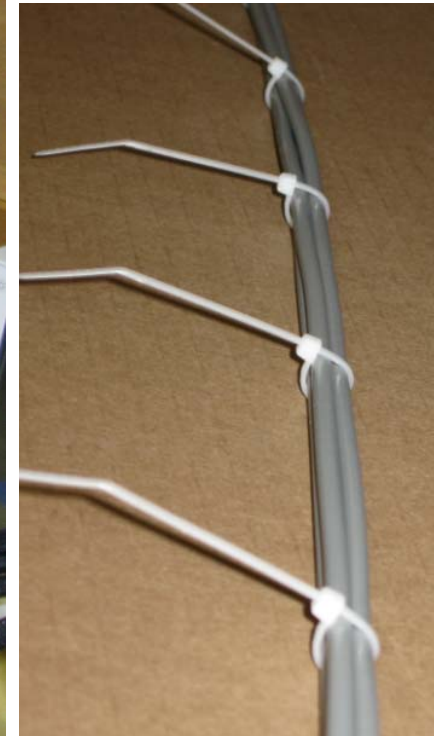
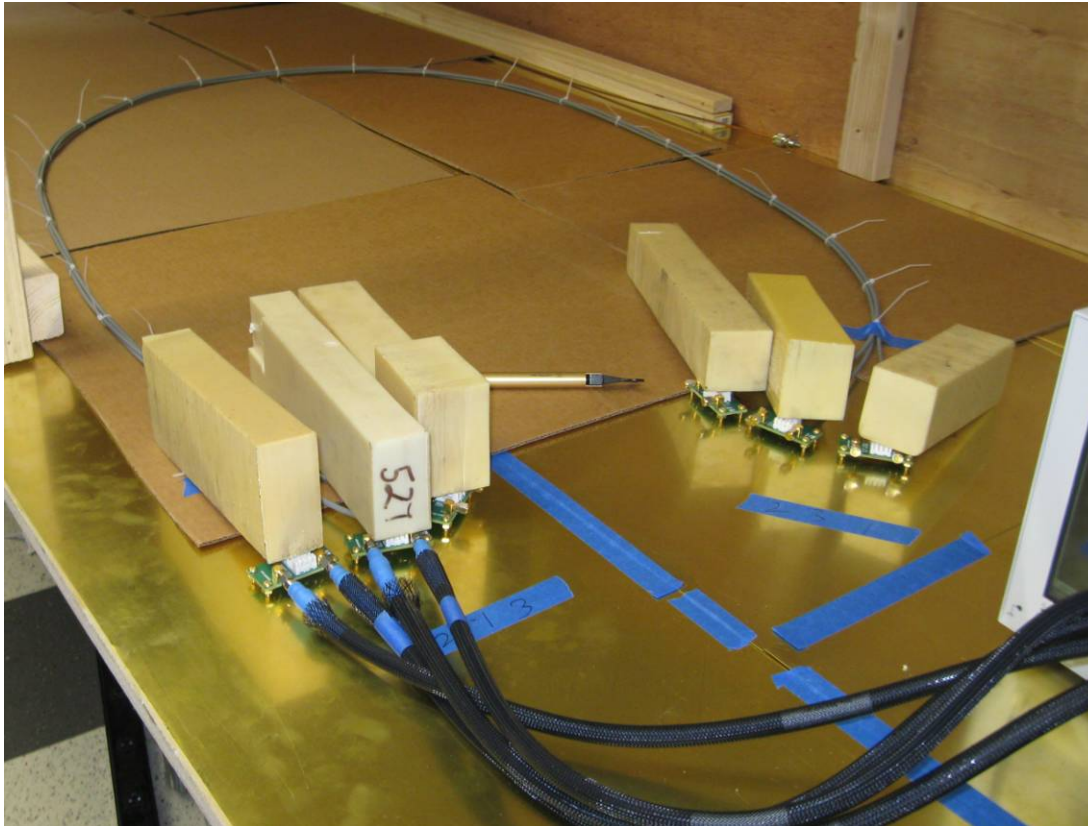
This mounting configuration supports the more recent standards discussions about cables tested closer to the reference ground plane

Closer spacing allows for a smaller testing platform since coupling across adjacent runs of longer channels is minimized

Typical corrugated cardboard provides 4 mm spacing from this 20 mil brass reference plane (4x12 ft<sup>2</sup>)



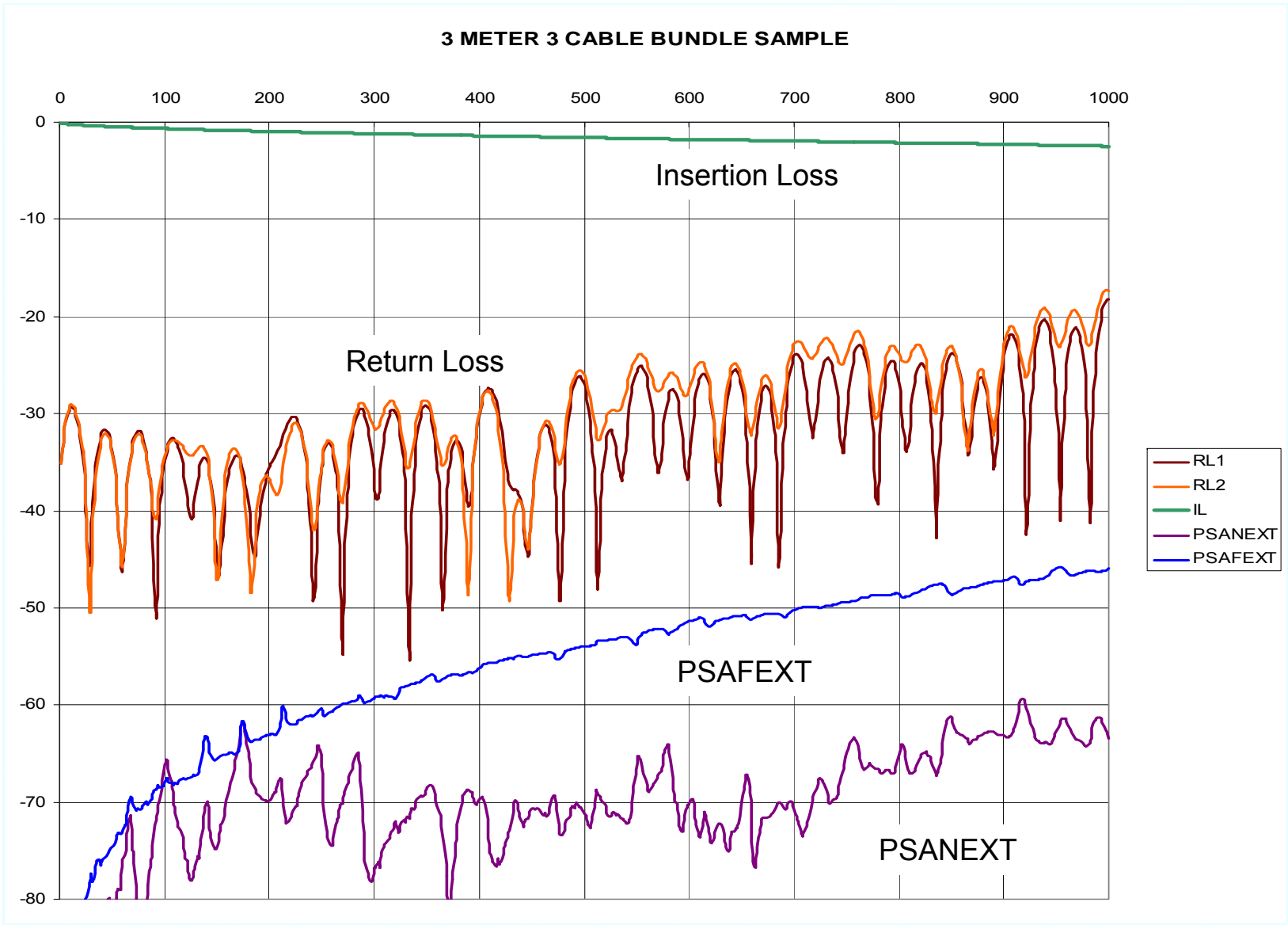
While this head mounting works well for individual channel measurements, alien measurements can become somewhat difficult to manage



Another simple [reference/check measurement](#) (alien of three 3 meter cables) requires 6 test heads to be held in place through numerous coax port changes

(Note: adding inline connectors will make this into one of the recommended worst case configurations)





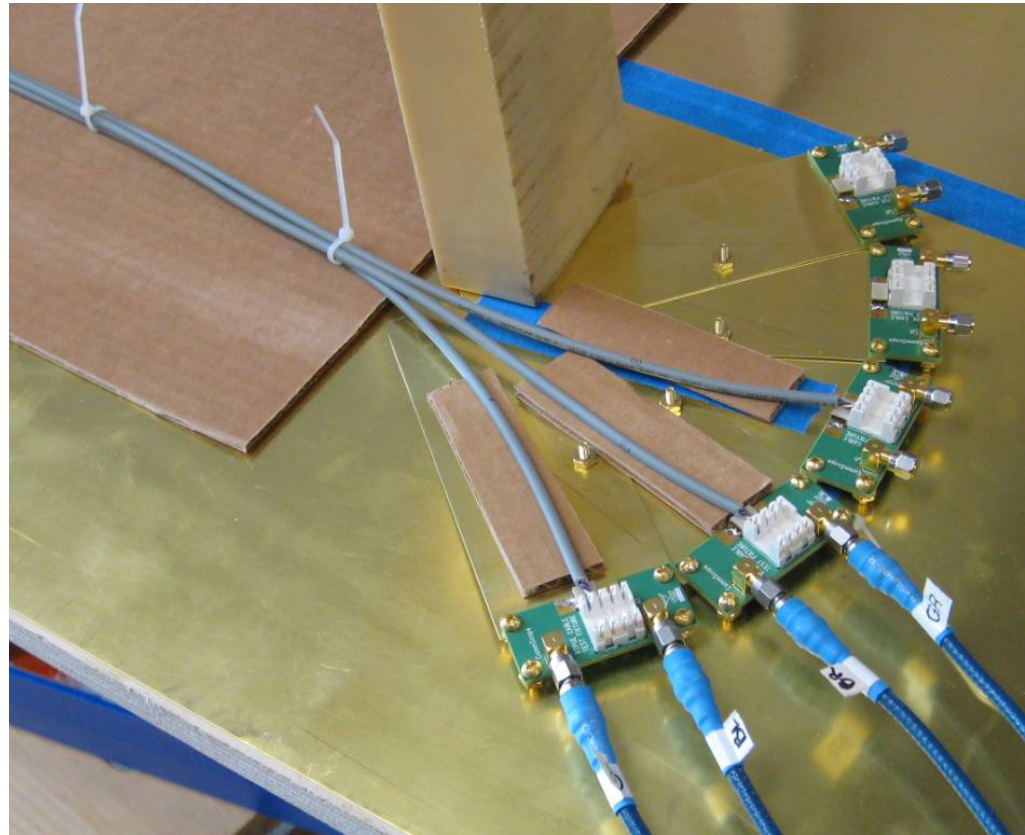
Five channel alien measurements will be significantly more difficult to manage, but a [third mounting configuration](#) helps with this



Each Test Head is bolted to a [20mil brass extension plate](#) and the set of 5 are bolted together. The blue tape is a simple way of eliminating additional bolts.

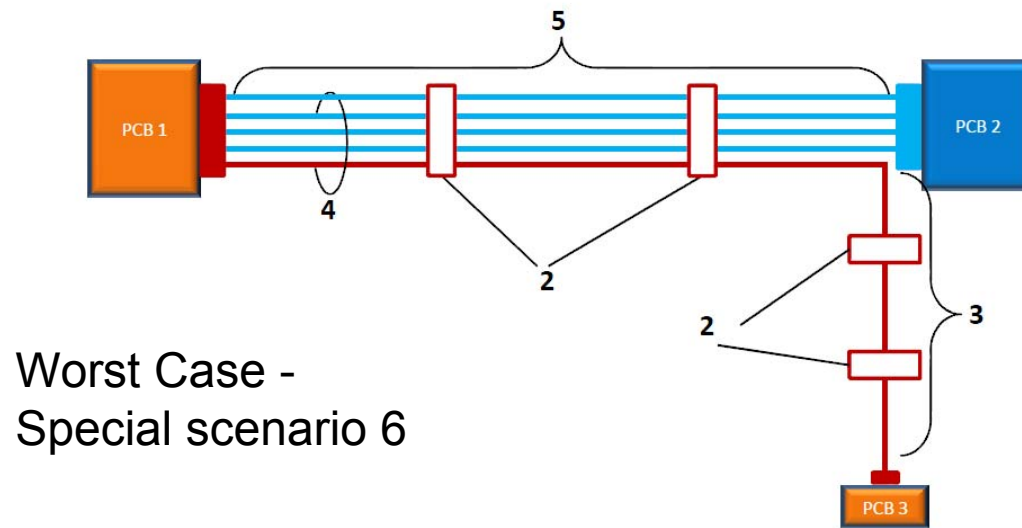
The Test Head Set is weighted at the tip where the extension plates must ramp down to contact the ground reference plane

Cardboard slices manage ground reference plane spacing up to the test heads

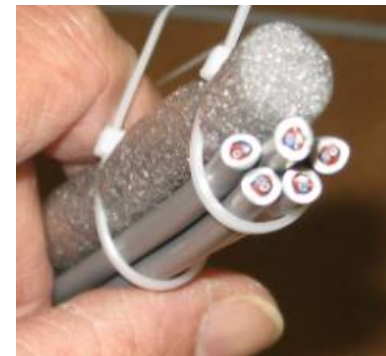


(3 cable Alien NEXT of cables 1 and 2 shown measured – far end not shown)

Note also that numerous details of the five channel test have not been discussed – here are some proposals

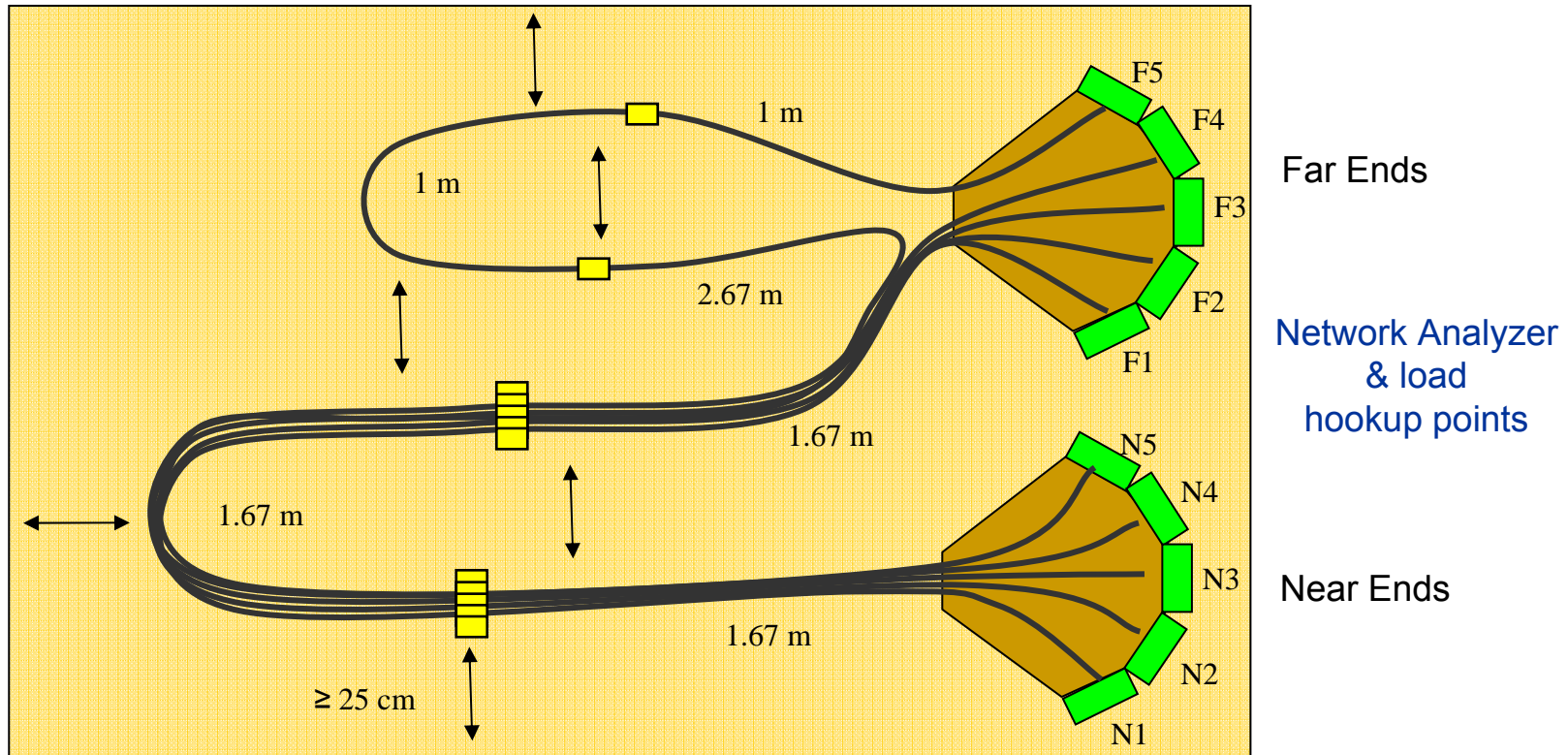


The 5 channel bundling is not like the TIA “6 around 1” but could be made into a “4 around the long 1” using a foam tube



Here, the “center” one could be the 3 meter extended channel, and placing it centered against the tube allows all four other channels consistent direct coupling  
– Note also that two of the other channels have 3 directly coupled disturbers

A proposed layout on a reasonably sized ground reference plane



(Note – if proximity of F5 is a concern, its plate can be unbolted or the individual Head of slide 6 can be used)

## One possible complete test sequence

Note - CommScope labels the 4 network analyzer ports (1, 2, 3, 4) “BLUE, ORANGE, GREEN, BROWN to avoid confusion with the channel bundle ports

Note – SMA loads should be placed on ends not connected to the network analyzer

<b>Start with BLUE/ORANGE on N1 and GREEN/BROWN on N2</b>	
N1N2	(Test sequence moves GREEN/BROWN up through to F5)
N1N3	
N1N4	
N1N5	
N1F1	
N1F2	
N1F3	
N1F4	
N1F5	
<b>MOVE BLUE/ORANGE TO N2 and GREEN/BROWN on N3</b>	
N2N3	(Test sequence moves GREEN/BROWN up through to F5)
N2N4	
N2N5	
N2F1	
N2F2	
N2F3	
N2F4	
N2F5	
<b>MOVE BLUE/ORANGE TO N3 and GREEN/BROWN on N4</b>	
N3N4	(Test sequence moves GREEN/BROWN up through to F5)
N3N5	
N3F1	
N3F2	
N3F3	
N3F4	
N3F5	
<b>MOVE BLUE/ORANGE TO N4 and GREEN/BROWN on N5</b>	
N4N5	(Test sequence moves GREEN/BROWN up through to F5)
N4F1	
N4F2	
N4F3	
N4F4	
N4F5	
<b>MOVE BLUE/ORANGE TO N5 and GREEN/BROWN on F1</b>	
N5F1	(Test sequence moves GREEN/BROWN up through to F5)
N5F2	
N5F3	
N5F4	
N5F5	
<b>MOVE BLUE/ORANGE TO F1 and GREEN/BROWN on F2</b>	
F1F2	(Test sequence moves GREEN/BROWN up through to F5)
F1F3	
F1F4	
F1F5	
<b>MOVE BLUE/ORANGE TO F2 and GREEN/BROWN on F3</b>	
F2F3	(Test sequence moves GREEN/BROWN up through to F5)
F2F4	
F2F5	
<b>MOVE BLUE/ORANGE TO F3 and GREEN/BROWN on F4</b>	
F3F4	(Test sequence moves GREEN/BROWN up through to F5)
F3F5	
<b>And Finally</b>	
F4F5	

## Summary and Conclusions

- Improvements and variations in Test Head provided
- Details of the 5 channel bundle need to be worked out – suggestions provided
- The smaller height from ground reference plane for channel balance measurements appears reasonable – 4 mm evaluated