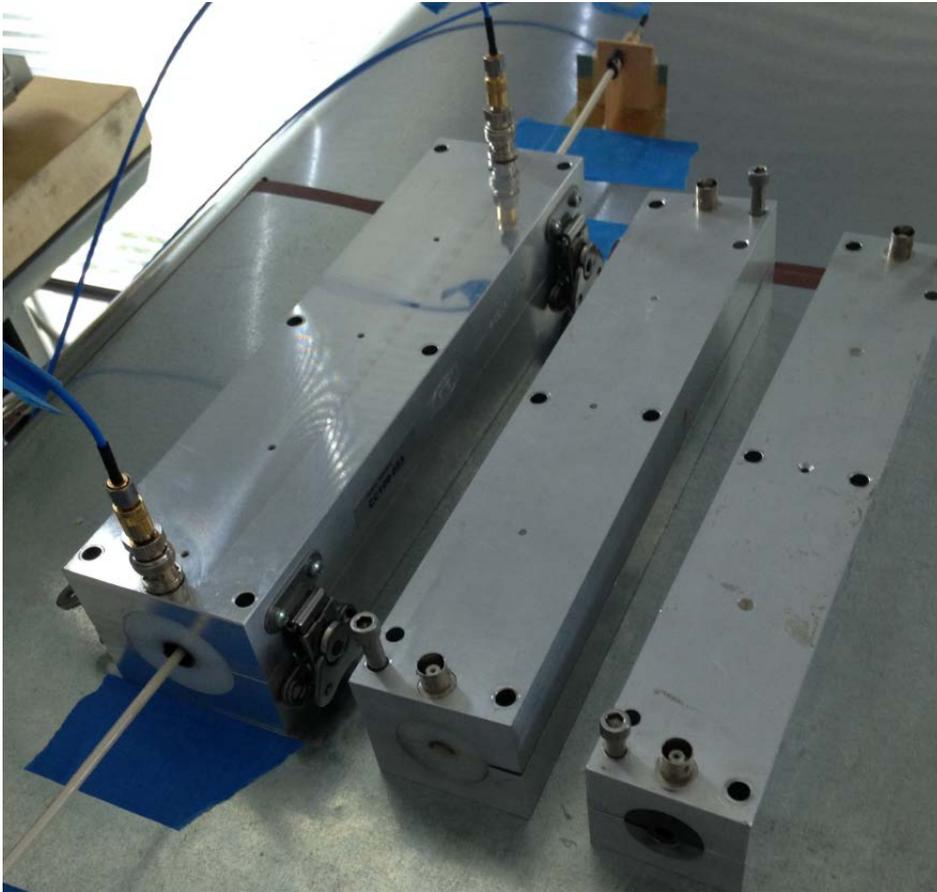


Ethernet EMC Clamp Examination

B. Moffitt
CommScope Systems Engineering

3 Clamps examined for comparison

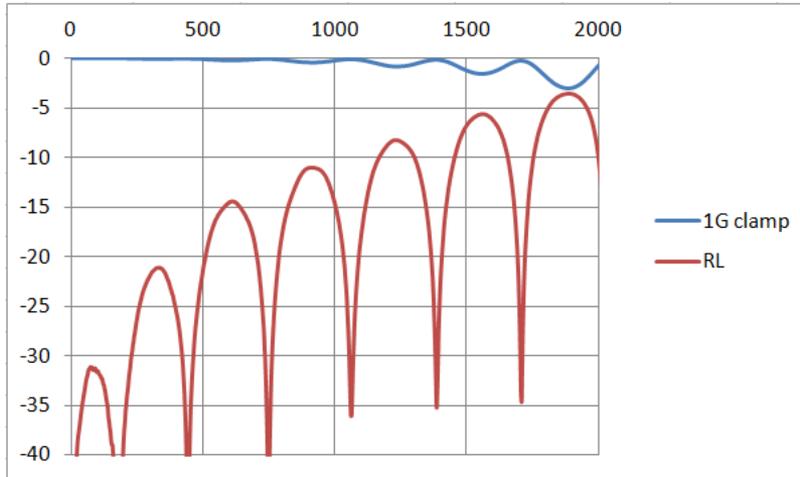
- 2 are available
- The 3rd is an early prototype (not for use)



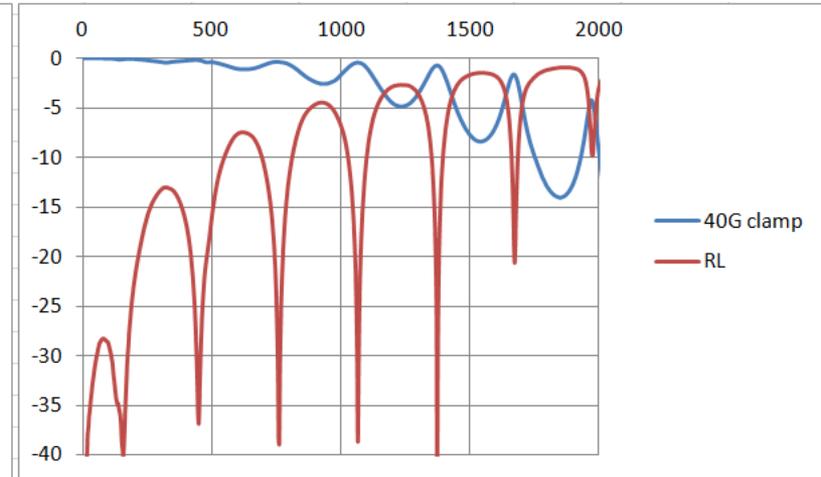
The early prototype is made with a different dielectric



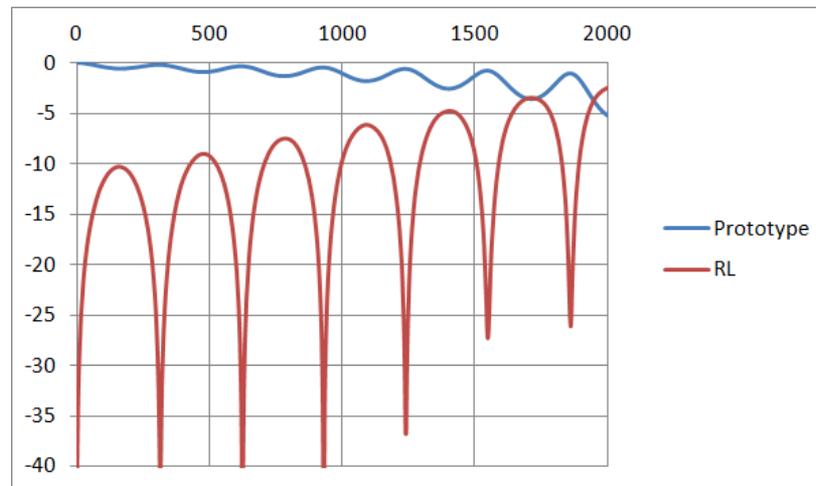
Annex 40B (1G) Clamp



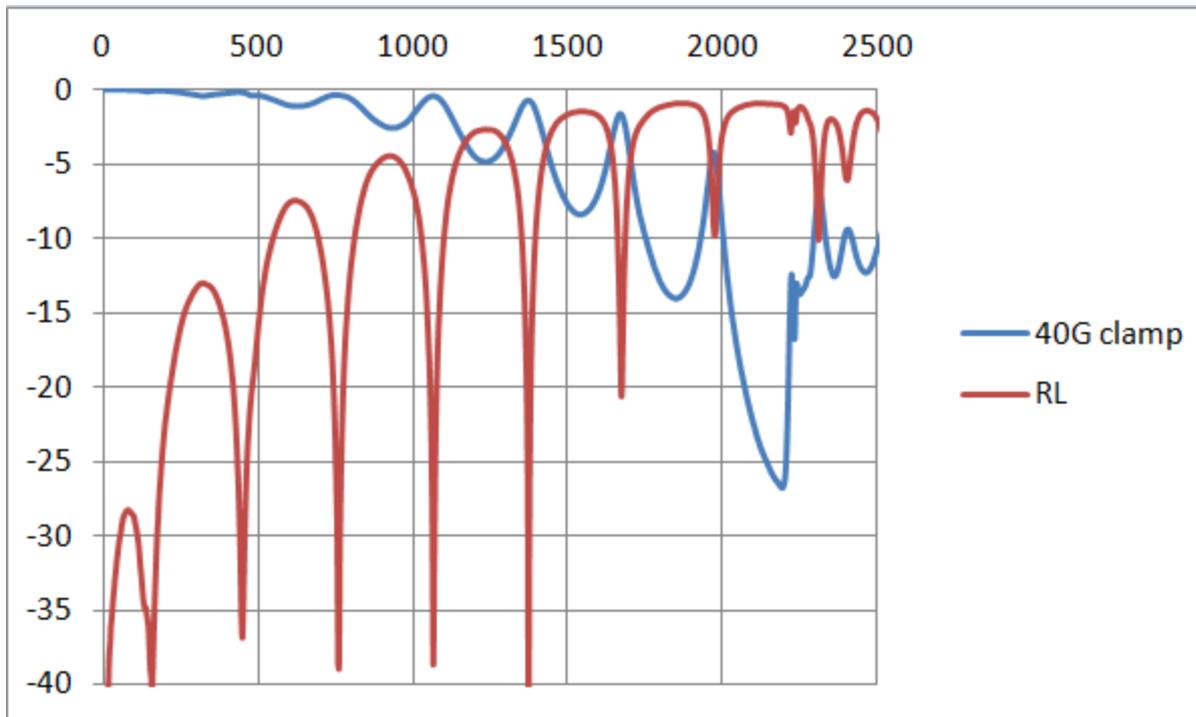
Annex 113 (40G) Clamp



Prototype Clamp
(not for use)



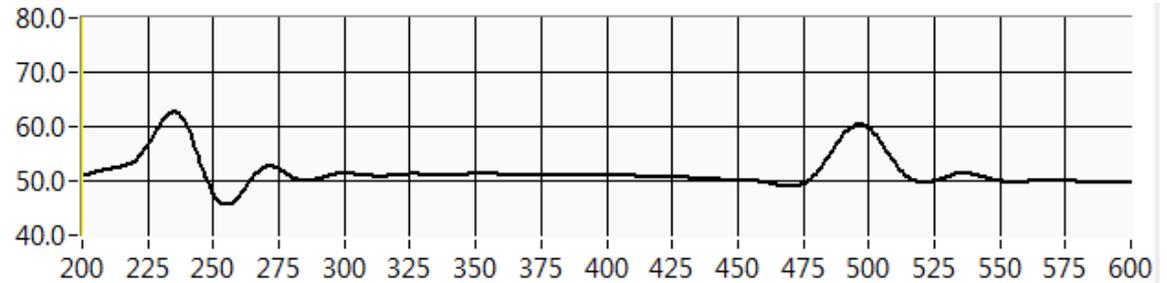
Annex 113 (40G) clamp functions out to 2 GHz



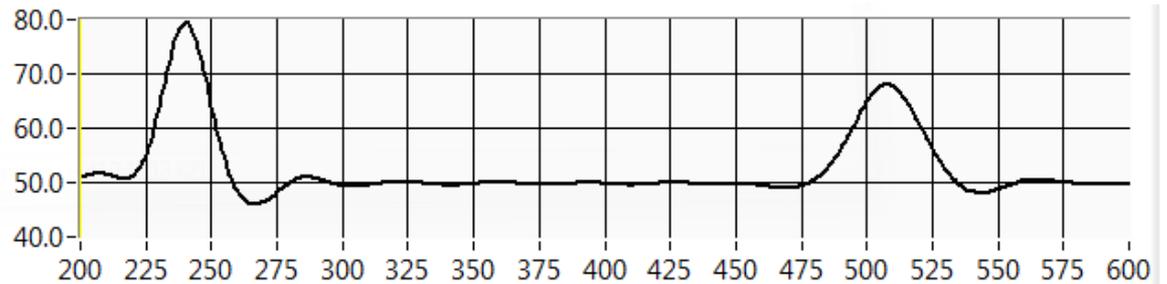
While the clamp Insertion Loss and Return Loss become extreme out at 2 GHz, clamp transmission is operational out to 2.2 GHz

Time Transformation Impedance Profiles

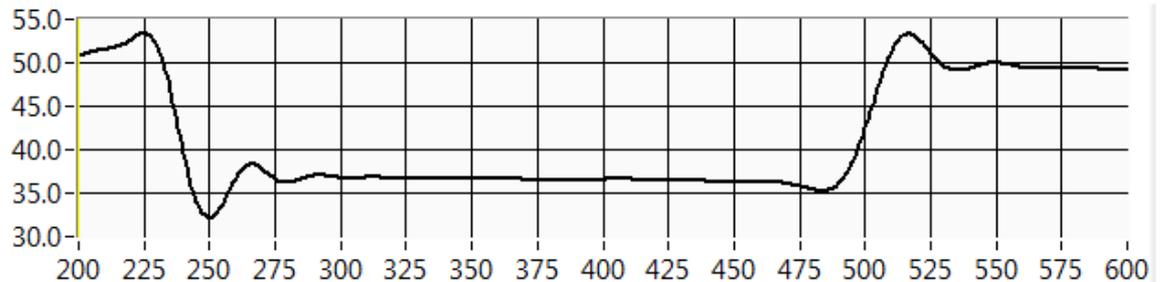
Annex 40B clamp has less hookup deviation



Annex 113 clamp has significant hookup deviation (possibly from a manufacturer alteration)



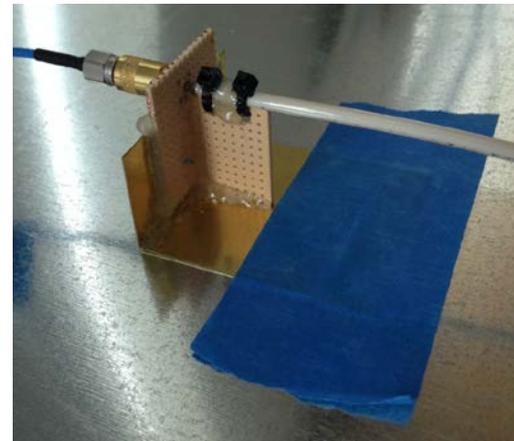
The prototype is 36 Ω



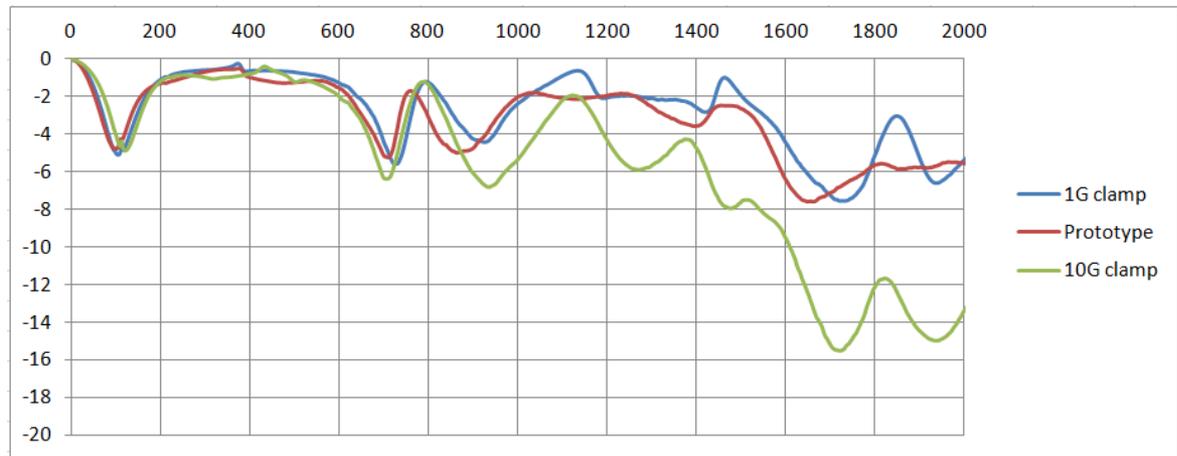
A 61 cm (24 in) reference wire is used in the clamps to compare injection levels



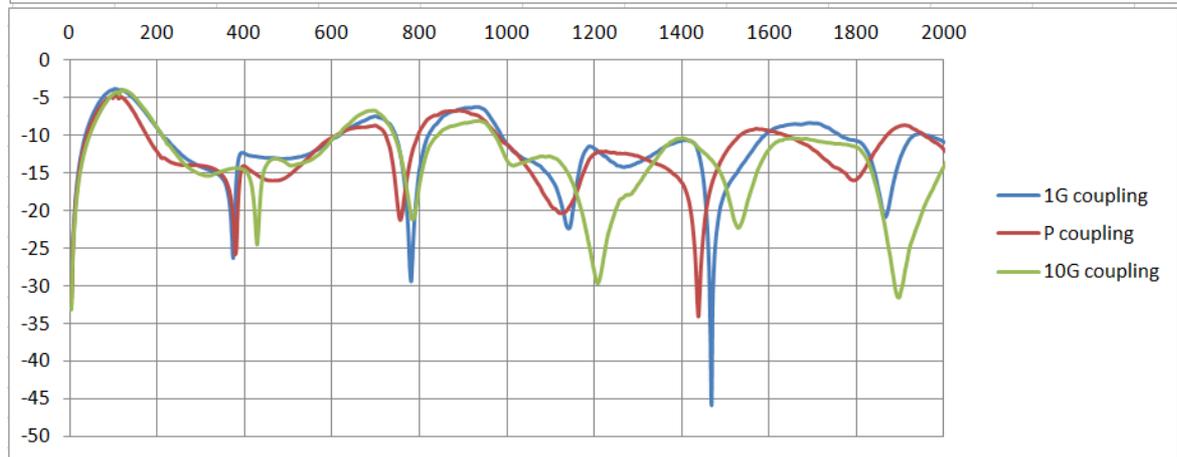
10 AWG conductor directly attached to SMA with the SMA grounded through a 5 cm (2 in) brass plate



Clamp Insertion Loss with wire

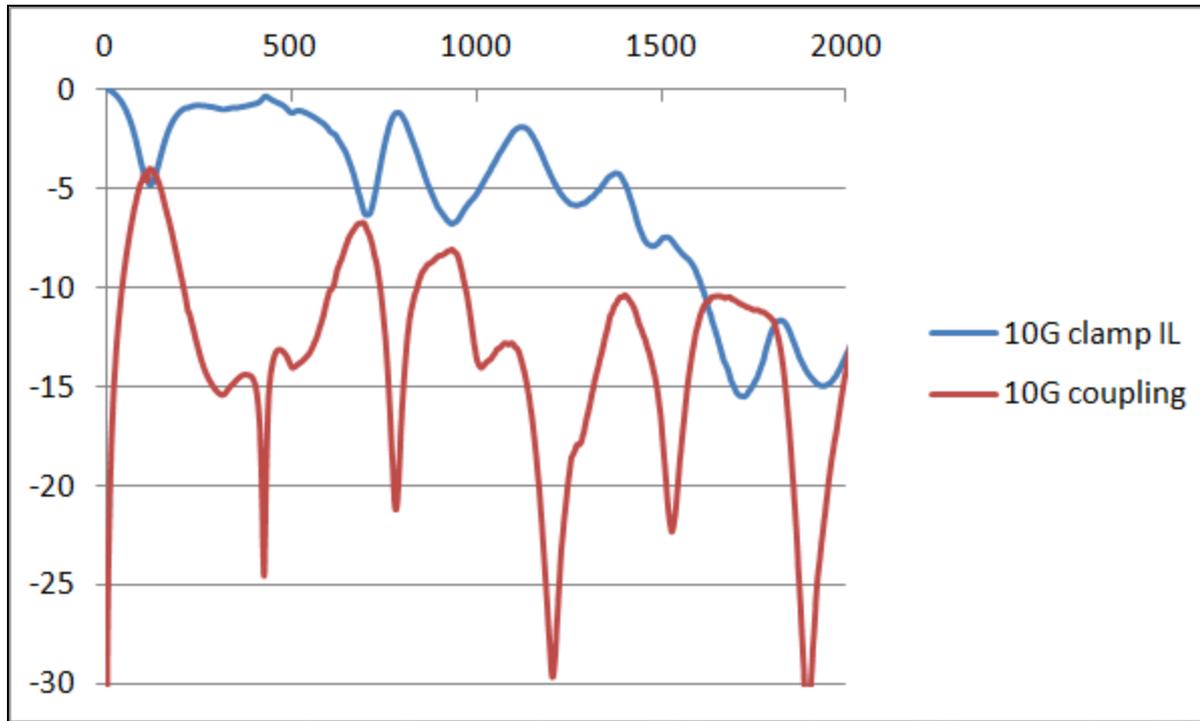


Clamp Injection levels



Conclusions

- Annex 113 Clamp injection levels do not appear to be negatively affected by the high Insertion Loss at higher frequencies
- Nulls are unavoidable due to the clamp structure and significant impedance differences along the clamp and the coupled victim cable



Conclusion

- Sharp inverse correlation between clamp loss and coupling below 1 GHz
- No correlation above 1 GHz

Also true of other clamps