Power Over Ethernet - Plus
(via Midspan over 4 wire pairs)

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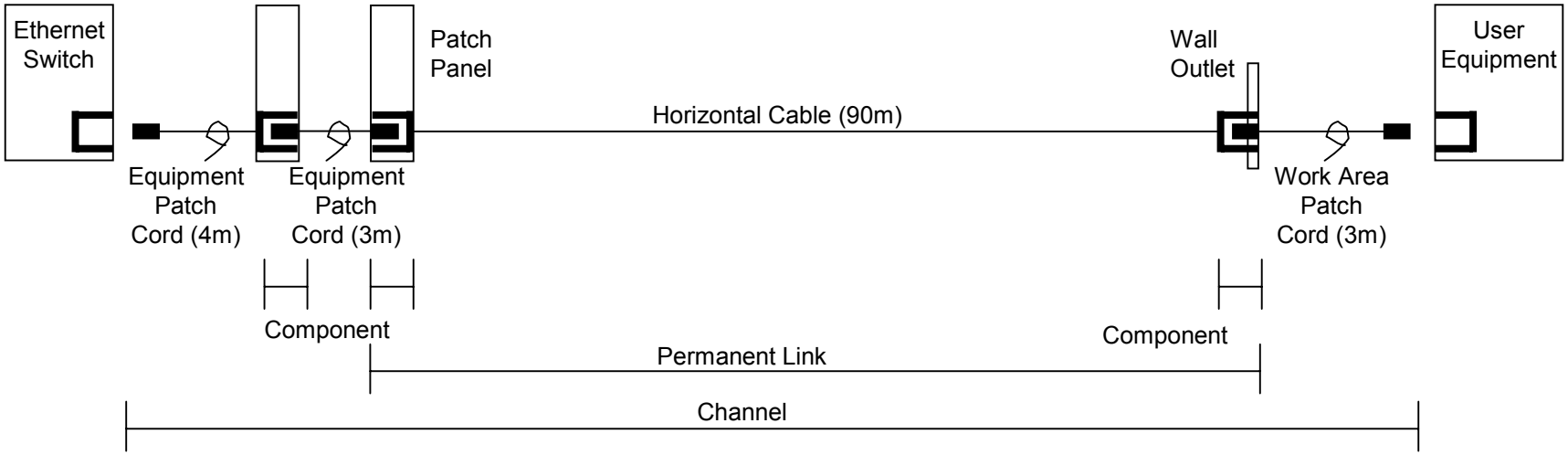
Objectives:

- To demonstrate the feasibility and capability of Midspans providing power via 4 wire pairs
- To demonstrate that Midspans can support GbE (via cabling performance measurements)

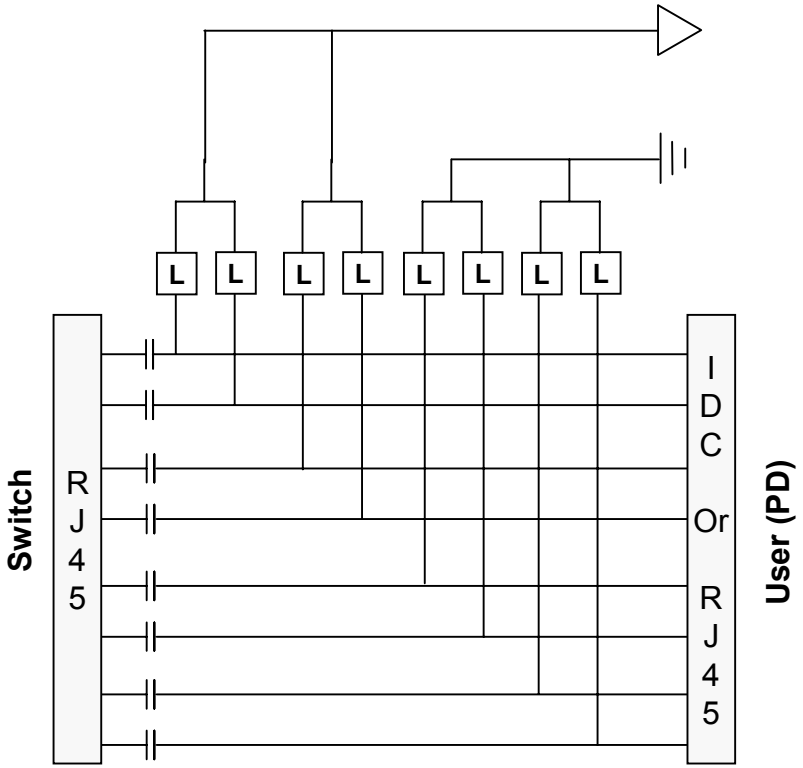
Cabling Topology

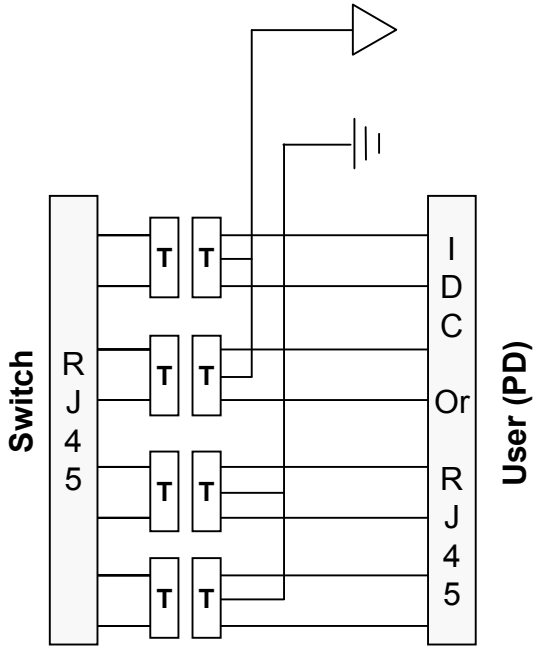


Specifications for Class D (Cat 5E)

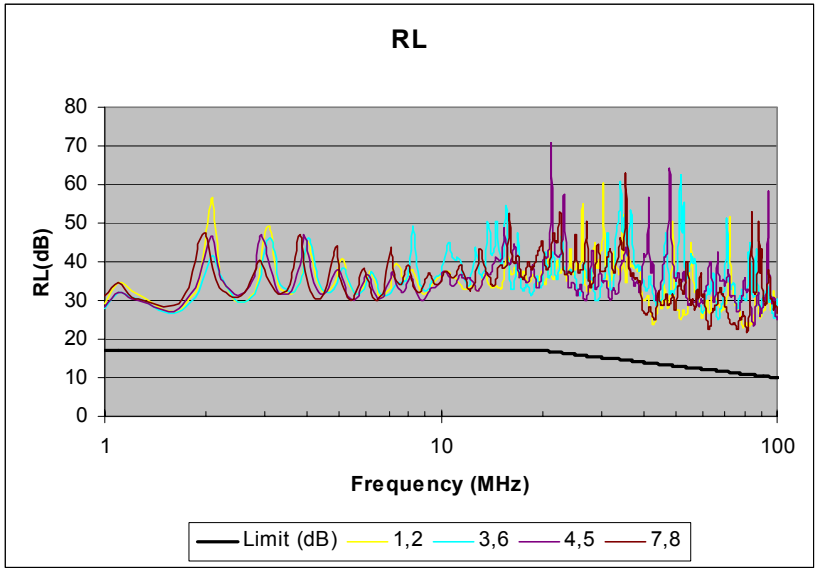
- Return Loss
- Insertion Loss
- Next

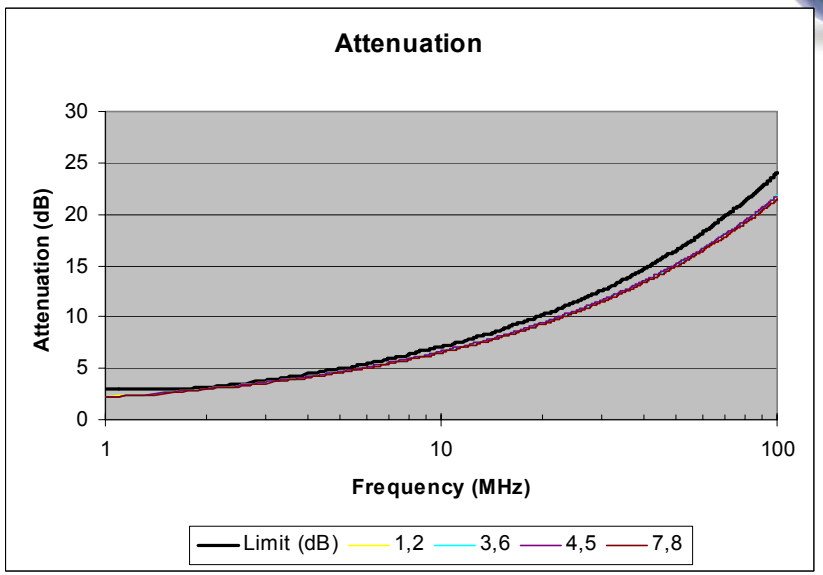
PoE Midspan Circuit Topologies for Power Injection:

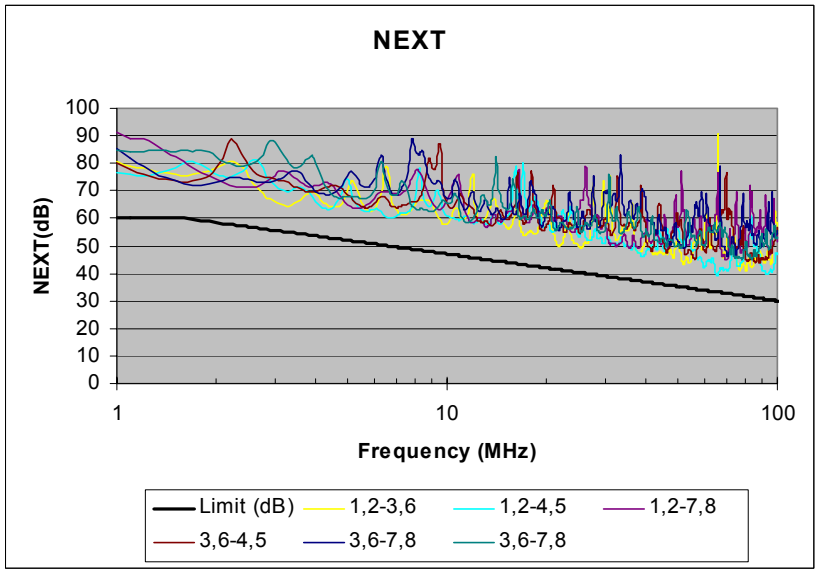


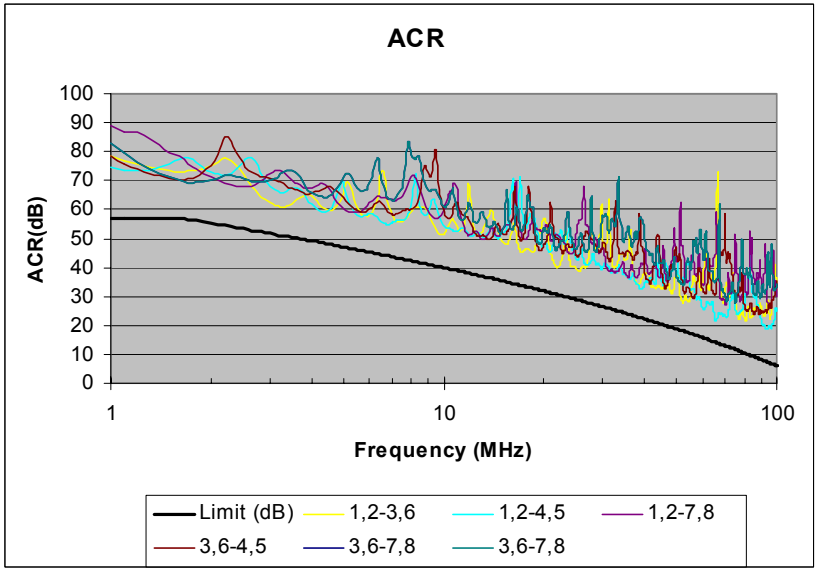


PoE Midspan Channel Measurements

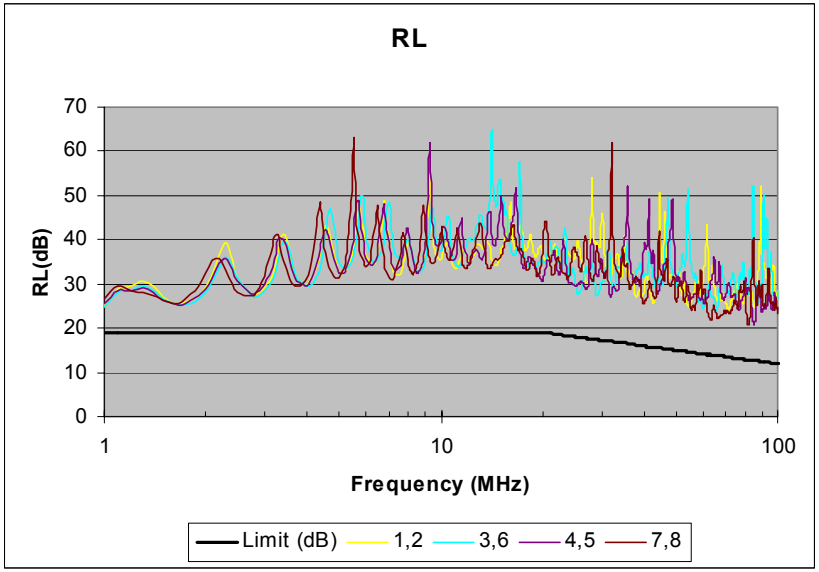


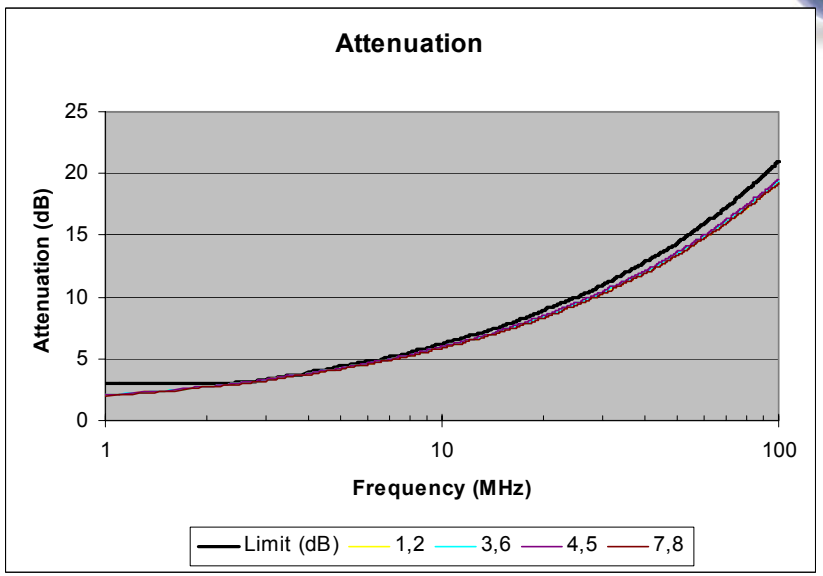


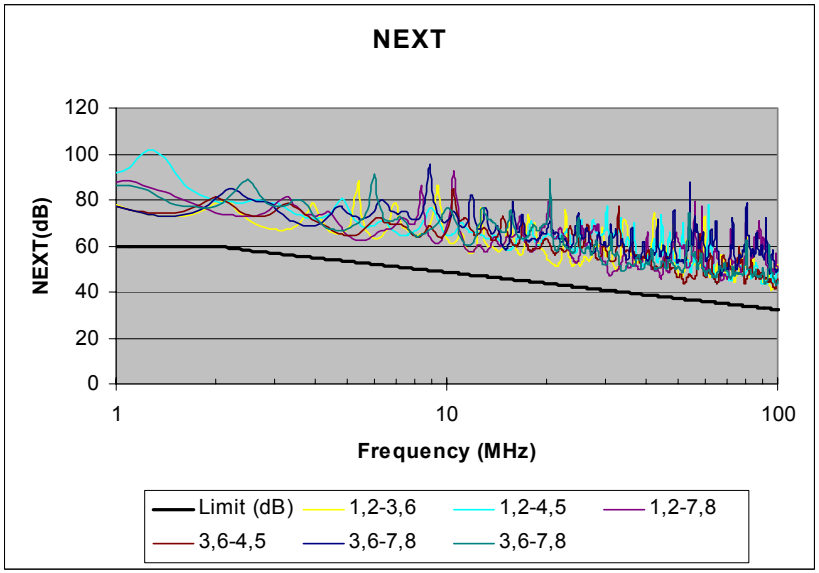


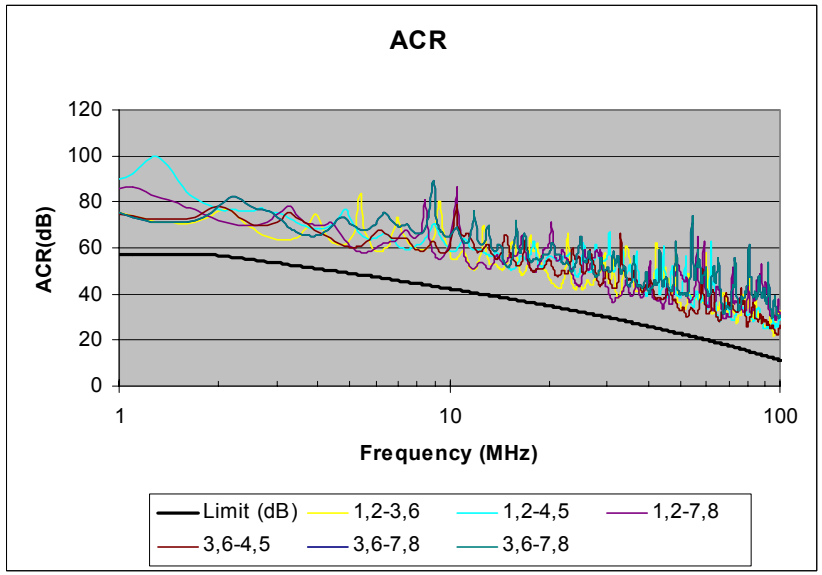


PoE Midspan Permanent Link Measurements







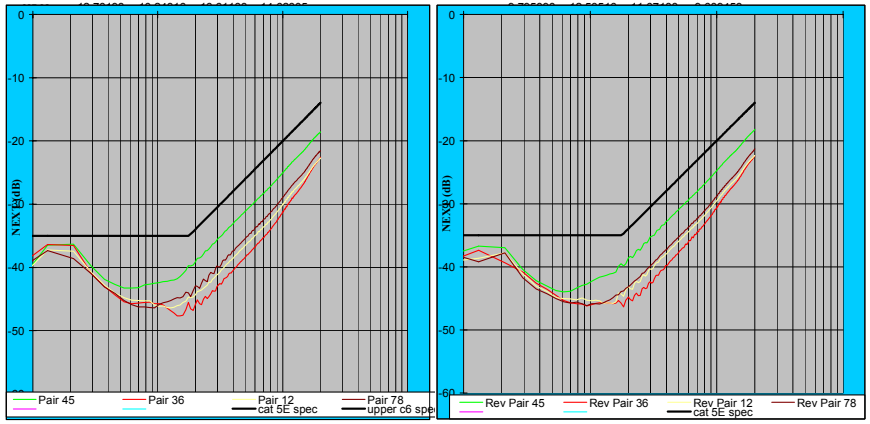


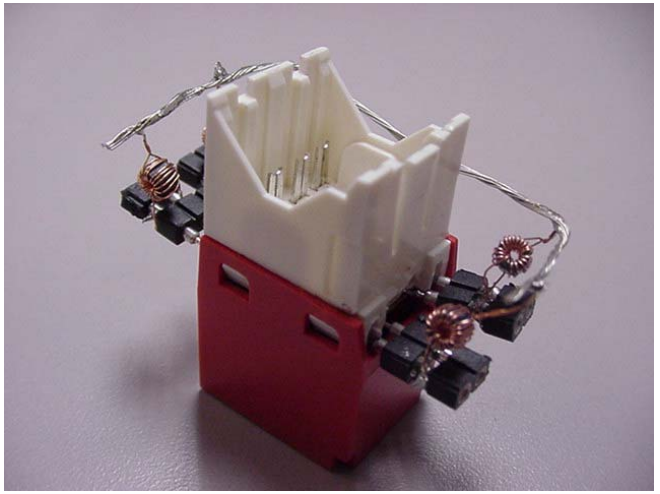
PoE Midspan Component Measurements
Return Loss

T5 5E CONNECTED MID TAP CONNECTED

	Jack #		Cap			
	Tuning					
	Forward Return Loss					
	Pair 45	Pair 36	Pair 12	Pair 78		
min dist	1.35	1.40	2.25	2.33		
where min	2.12	1.31	1.31	1.31		
50MHz	-31.13	-38.42	-36.53	-35.46		
100MHz	-24.98	-31.20	-29.98	-28.93		
0.50	-47.21289	-42.5293	-45.78711	-42.78125		

	Jack #		Cap			
	Tuning					
	Reverse Return Loss					
	Rev Pair 45	Rev Pair 36	Rev Pair 12	Rev Pair 78		
min dist	1.70	2.39	2.80	2.80		
where min	1.31	1.31	2.12	2.12		
50MHz	-30.93	-37.74	-35.92	-35.23		
100MHz	-24.75	-30.56	-29.52	-28.73		
	-39.41015	-40.57422	-39.59375	-36.6875		





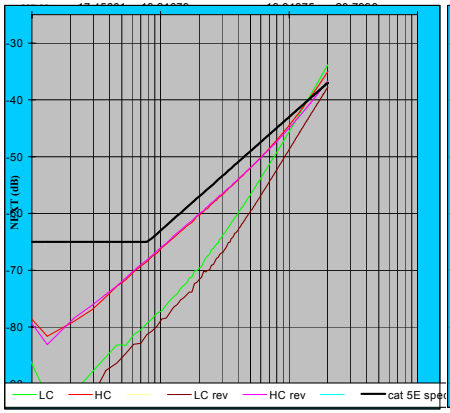
PoE Midspan Component Measurements
NEXT

T5 5E CONNECTED MID TAP

Jack #		Cap	
Tuning			

Common Mode NEXT 45-36

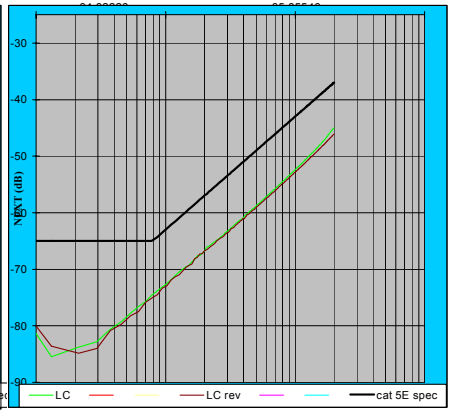
	LC	HC		LC rev	HC rev
min dist	2.57	1.48		5.69	1.96
where min	100.36	100.36		100.36	100.36
50MHz	-56.67	-51.95		-59.59	-51.94
100MHz	-45.60	-44.49		-48.73	-44.98
0.50	-71.73437	-71.07031		-72.84765	-70.02343



Jack #		Cap	
Tuning			

Common Mode NEXT 45-12

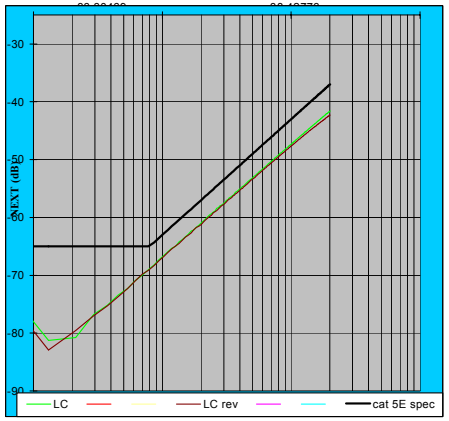
	LC			LC rev	
min dist	9.37			9.59	
where min	20.80			18.36	
50MHz	-58.80			-59.04	
100MHz	-52.44			-52.86	
	-70.99218			-71.03125	



Jack #		Cap	
Tuning			

Common Mode NEXT 45-78

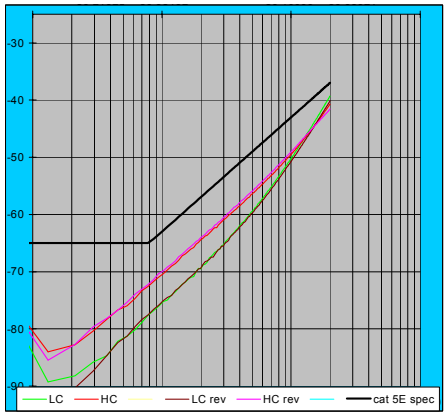
	LC			LC rev	
min dist	3.77			3.88	
where min	9.43			11.87	
50MHz	-53.17			-53.39	
100MHz	-47.32			-47.64	
	-69.68359			-71.21094	



Jack #		Cap	
Tuning			

Common Mode NEXT 36-12

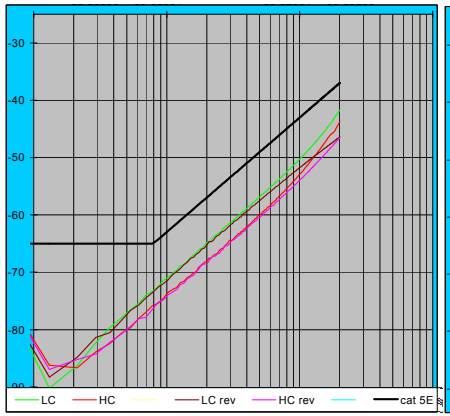
	LC	HC		LC rev	HC rev
min dist	7.1	6.4		7.6	6.0
where min	101.17	101.17		101.17	101.17
50MHz	-59.44	-56.44		-59.80	-55.97
100MHz	-50.22	-49.46		-50.72	-49.05
0.50	-71.55468	-71.30468		-71.59765	-71.50781



Jack #		Cap	
Tuning			

Common Mode NEXT 36-78

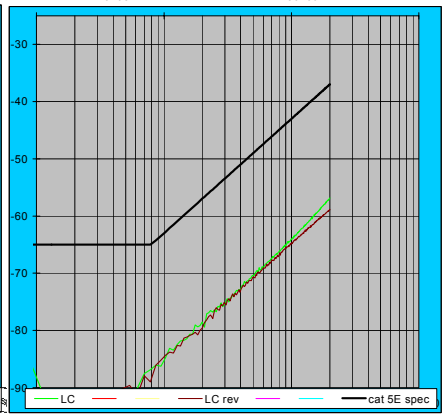
	LC	HC		LC rev	HC rev
min dist	7.2	9.9		8.0	10.9
where min	99.55	101.17		20.80	18.36
50MHz	-56.92	-60.04		-57.55	-60.37
100MHz	-50.25	-52.94		-51.75	-53.95
	-70.30859	-70.53515		-71.83203	-70.51171



Jack #		Cap	
Tuning			

Common Mode NEXT 12-78

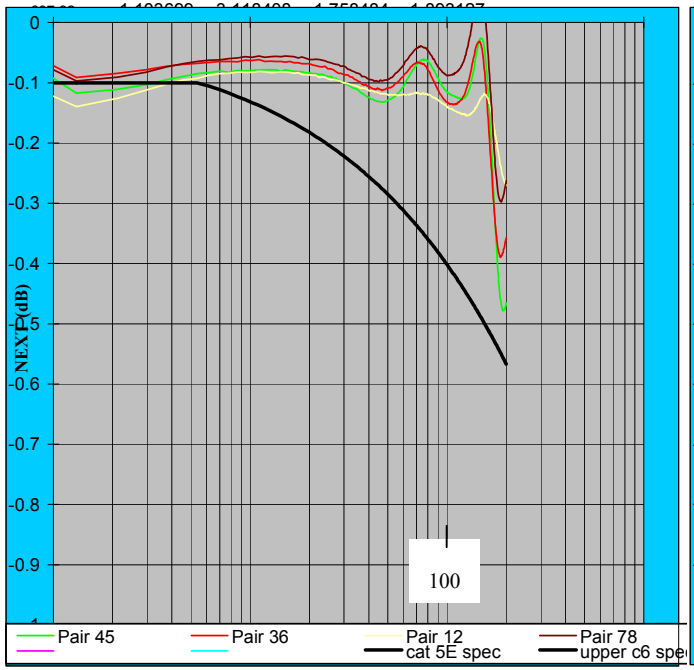
	LC			LC rev	
min dist	20.8			21.2	
where min	21.61			25.67	
50MHz	-70.37			-70.68	
100MHz	-64.09			-64.74	
	-71.16405			-71.80469	

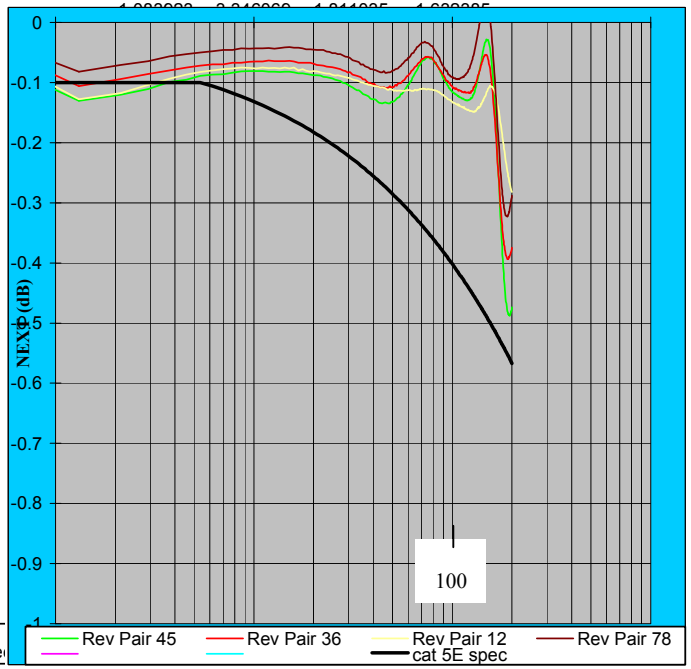


PoE Midspan Component Measurements
Insertion Loss

T5 5E CONNECTED MID TAP

	Jack #		Cap				Jack #		Cap			
	Tuning						Tuning					
	NOT GROUNDED						GROUNDED					
	Pair 45	Pair 36	Pair 12	Pair 78			Rev Pair 45	Rev Pair 36	Rev Pair 12	Rev Pair 78		
min dist	-0.30	-0.28	-0.26	-0.31			0.30	0.30	0.27	0.32		
where min	82.50	78.44	98.74	100.36			82.50	80.06	99.55	79.25		
50MHz	-0.13	-0.11	-0.12	-0.09			-0.13	-0.11	-0.11	-0.08		
100MHz	-0.11	-0.13	-0.14	-0.09			-0.12	-0.11	-0.13	-0.09		





Summary:

- Midspans can support (from a cabling performance aspect) GbE with sufficient margin (from cabling specifications)

- Midspans can support 4 wire pair power transmission

Next Step …

Place GbE / 4 wire pair power transmission for Midspan's as an objective for the study group