Analog Amplitude Margins

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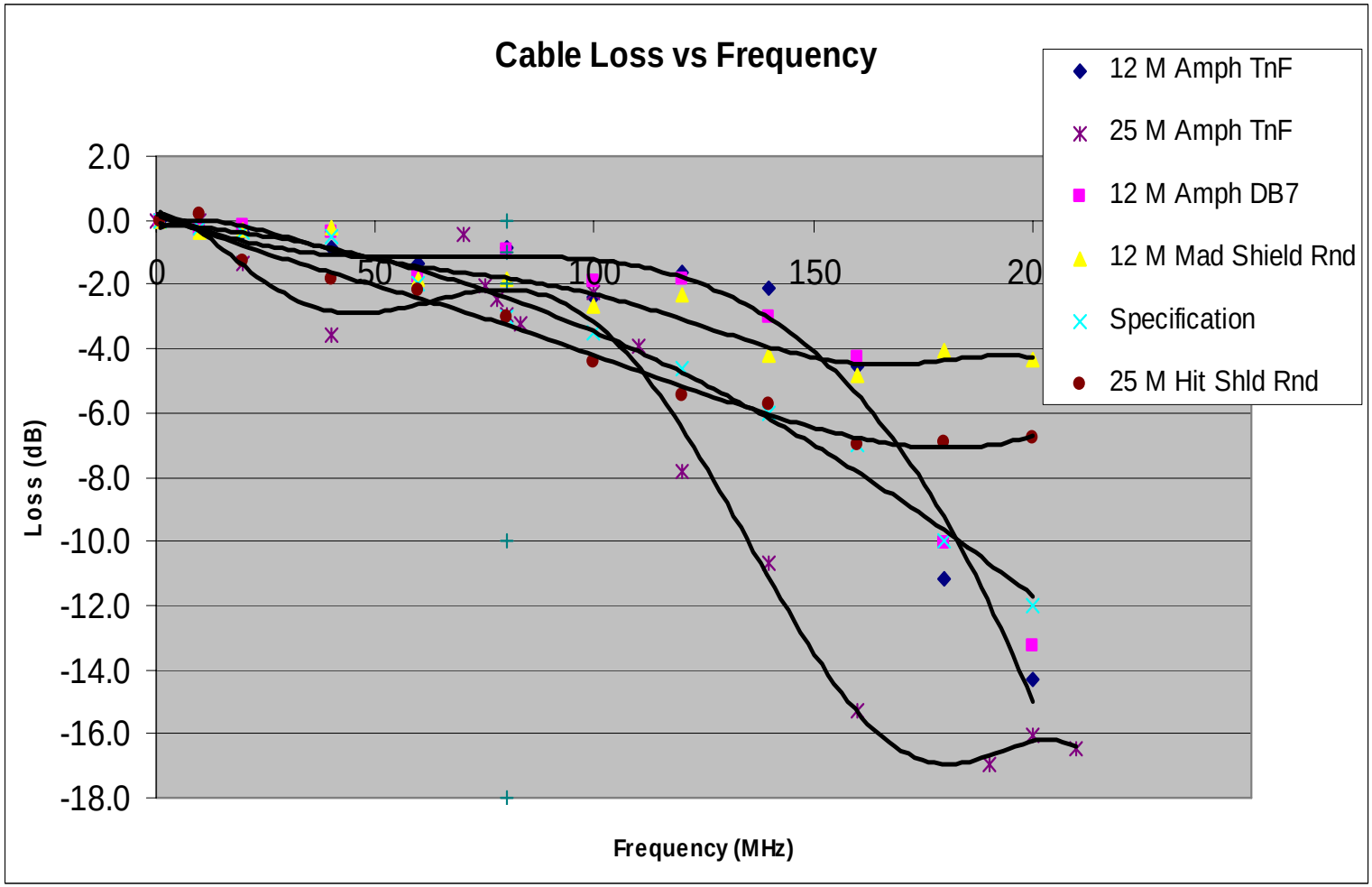
Cable losses

- Worst Case is long cable with backplane
- Most backplanes are used with short cables which have little frequency dependant loss
- If a backplane is required to be used with a long cable it is likely to be a round cable
- 10 Meters of round cable shows a loss of 2.8/3.2 dB @ 200MHz and 1.2/1.4 dB @ 80 MHz - well within the 3dB allowance

Cable measurements shown to SPIP WG

- Round Robin of cable measurements
- Multiple companies measuring with their own procedure Vs. a fixed procedure
- Comparing results

Cable Losses Vs. Frequency



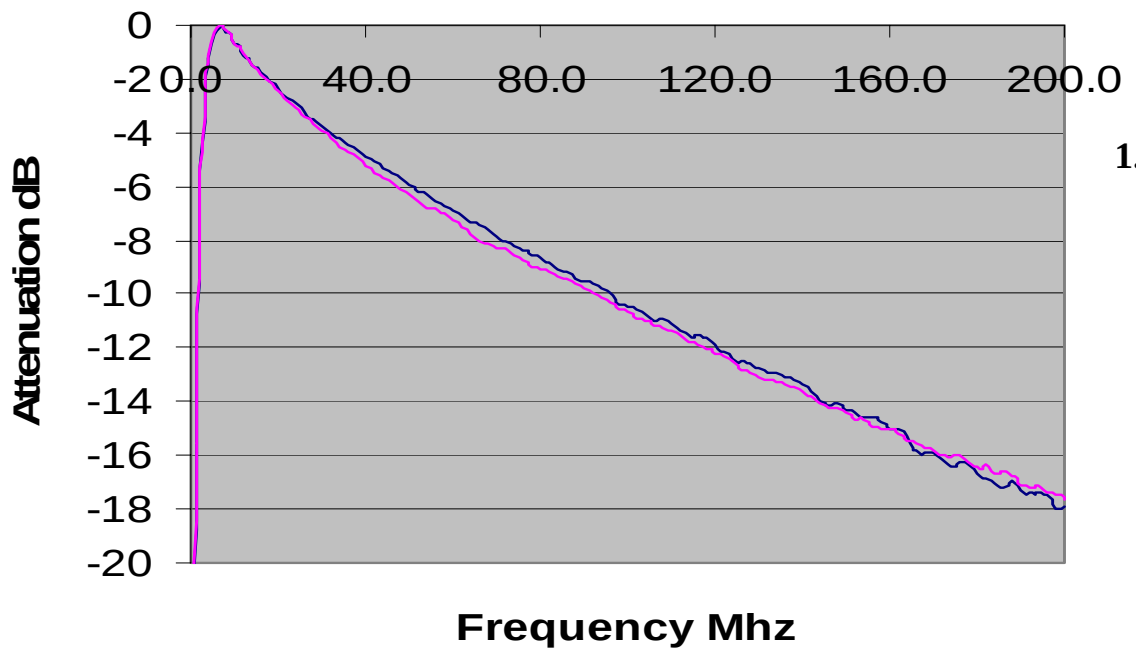
Cable (Hitachi Rd 30 AWG solid)

#49557-068 SCSI 3 (ENV06811388)

Hitachi Shielded Cable - 200ft

blue - inner twisted pair

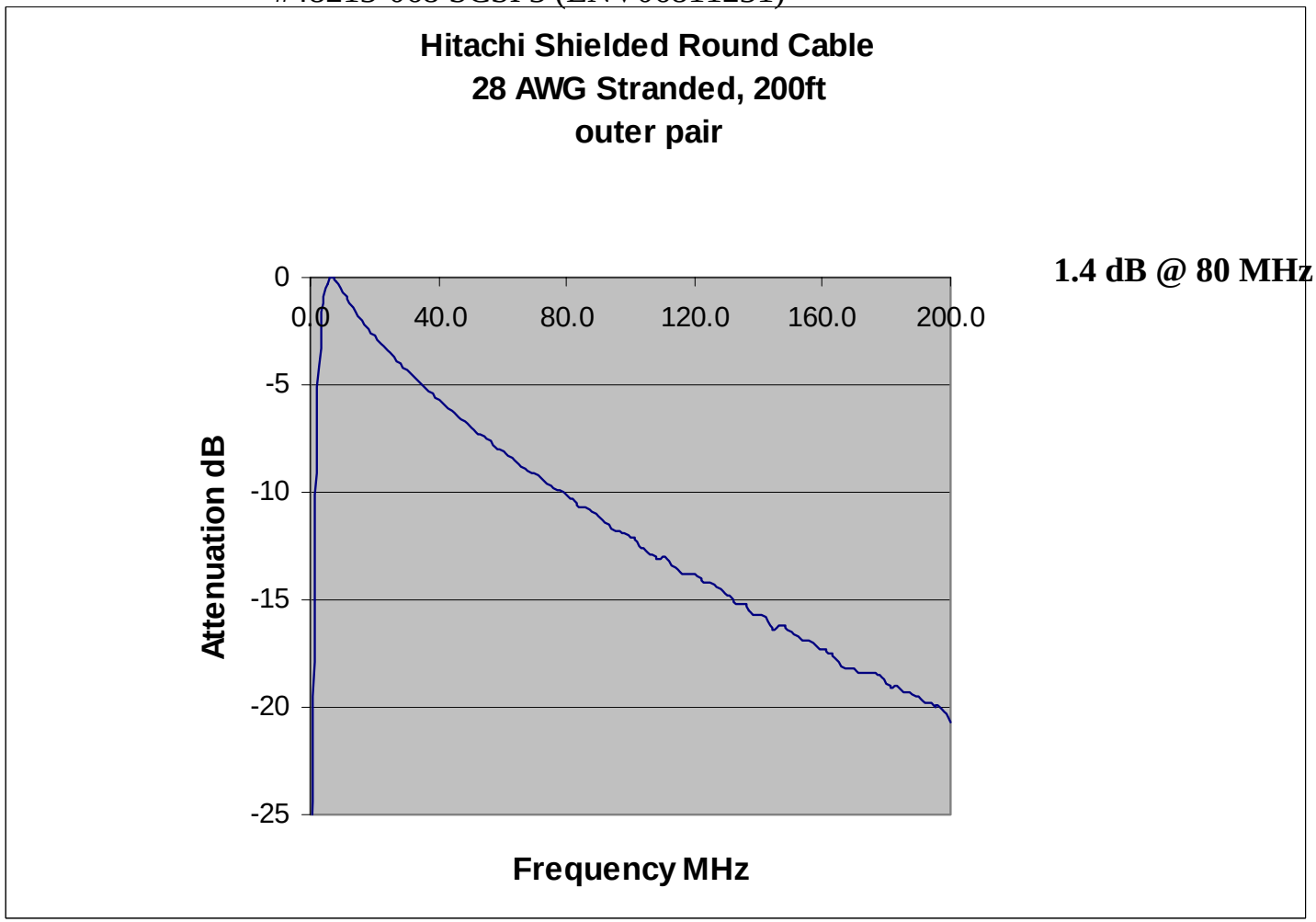
pink - outer twisted pair



1.2 dB @ 80 MHz for 10 Meters

Cable (Hitachi Rd 28 AWG stranded)

#48213-068 SCSI 3 (ENV06811231)



1.4 dB @ 80 MHz for 10 Meters

00-217r1 - SPIP WG Document

8.4 Interoperability points

Interoperability points are physical points in the system where separable connectors exist and where it is required that the components on either side of the connector may be supplied from different compliant vendors. Following is a list where interoperability might be expected in a SCSI segment. A “Y” following the position designation means that this will be considered an interoperability point for SPIP purposes. Similarly, a “N” following the position designation means that the point will NOT be considered an interoperability point for SPIP purposes.

Disk drive connector mounted directly on the disk drive (Y)

Backplane interoperability point

Question: should the external connector to a disk drive array that does not contain an expander be considered an interoperability point? The group agreed that this should NOT be an interoperability point until proven otherwise in the SSM group. (N)

SPI-4 Update to Aloisi Model

- Driver Symmetry
  - Was 69%
  - U3 silicon better than 85% with input from major silicon vendors
- Connector/Terminator/DC loss/Cable
  - Was 15% now 10% (included in measured losses)
- Cable frequency loss (max) @ 3 dB (30%) @ 80 MHz

SPI4 - Update to Aloisi Model

Driver Precomp Proposal, Review[2]	Seagate Proposal & Data								
Update to									
Paul Aloisi - TI/ABM-Seagate	427	500	600	700	800	Millivolt drive			
Nominal Voltage									
No driver imbalance, matched assertion and negation									
Driver fall back 15%	363	425	510	595	680	376	mV	**First step min ~~650 mV~~ 427 mV with**	
Driver fall back 25%	320	375	450	525	600	427	mV	**cable loss at proposed cutback**	
Driver Fall back 33%	282	330	396	462	528	485	mV		
Driver Fall Back 40%	256	300	360	420	480	533	mV		
Worst case						Min high drive, for 320 mV			
Cable roll off to 71% signal									
Trans FB 15% roll off to 71%	**198**	**232**	**278**	**324**	**371**				
	178	**209**	**250**	**292**	**334**	10% connector/terminator/DC loss/cable			
Trans FB 40% roll off to 71%	**229**	**246**	**296**	**345**	**394**	mV signal at the receiver minus cable loss			
	206	**222**	**266**	**310**	**355**	10% connector/terminator/DC loss/cable			
Blue 80 mV receiver									
80 mV @ receiver									
60 mV noise+crosstalk	**140**	**140**	**140**	**140**	**140**	**mV**	Signal required with Noise + Crosstalk		
Tolerance driver									
Cable roll off to 71% signal									
Trans fb 15% roll off to 71%	**188**	**214**	**250**	**285**	**321**	mV signal at the receiver minus cable loss+drvr assym			
	169	**193**	**225**	**257**	**289**	10% connector/terminator/DC loss/cable			
This box contains worst case numbers after everything is included									
Trans fb 40% roll off to 71%	**219**	**250**	**293**	**336**	**379**	mV signal at the receiver minus cable loss+drvr assym			
	197	**225**	**264**	**303**	**341**	10% connector/terminator/DC loss/cable			
Drive tolerance calculation			**((0.85*V)+50+Vfb)*0.71)-Vfb**				Signal at the receiver		

How much cable loss is acceptable?

Driver Precomp Proposal, Review[2]			Seagate Proposal & Data								
00-227r0											
Paul Aloisi - TI/ABM-Seagate			427	500	600	700	800	Millivolt drive			
Nominal Voltage											
No driver imbalance, matched assertion and negation											
Driver fall back 15%			363	425	510	595	680	376	mV		
Driver fall back 25%			320	375	450	525	600	427	mV		
Driver Fall back 33%			282	330	396	462	528	485	mV		
Driver Fall Back 40%			256	300	360	420	480	533	mV		
Worst case								Min high drive, for 320 mV			
Cable roll off to 65% signal											
Trans FB 15% roll off to 65%			**151**	**194**	**233**	**271**	**310**	mV signal at the receiver minus cable loss			
			135	**174**	**209**	**244**	**279**	10% connector/terminator/DC loss/cable			
Trans FB 40% roll off to 65%			**188**	**220**	**264**	**308**	**352**	mV signal at the receiver minus cable loss			
			169	**198**	**238**	**277**	**317**	10% connector/terminator/DC loss/cable			
80 mV @ receiver	**Blue 80 mV receiver**										
60 mV noise+crosstalk			**140**	**140**	**140**	**140**	**140 mV**	Signal required with Noise + Crosstalk			
Tolerance driver											
Cable roll off to 65% signal										drvr assym	
Trans fb 25% roll off to 65%			**141**	**161**	**187**	**213**	**239**	mV signal at the receiver minus cable loss+			
			127	**145**	**168**	**191**	**215**	10% connector/terminator/DC loss/cable			
This box contains worst case numbers after everything is included										drve assym	
Trans fb 40% roll off to 65%			**179**	**204**	**238**	**272**	**307**	mV signal at the receiver minus cable loss+			
			161	**183**	**214**	**245**	**276**	10% connector/terminator/DC loss/cable			
Drive tolerance calculation					**((0.85*V)+50+Vfb)*0.65)-Vfb**				Signal at the receiver		

T10/00 - 276r0

Proposal for TBDs

- Figure 49
  - Delete the TBDs as they are covered in the Receiver masks #1 and #2
  - Delete the paragraph below figure 49 as redundant to data in Figures 51 and 52
- Figure 51
  - 130 mv/30 mv threshold for 2 nsec duration

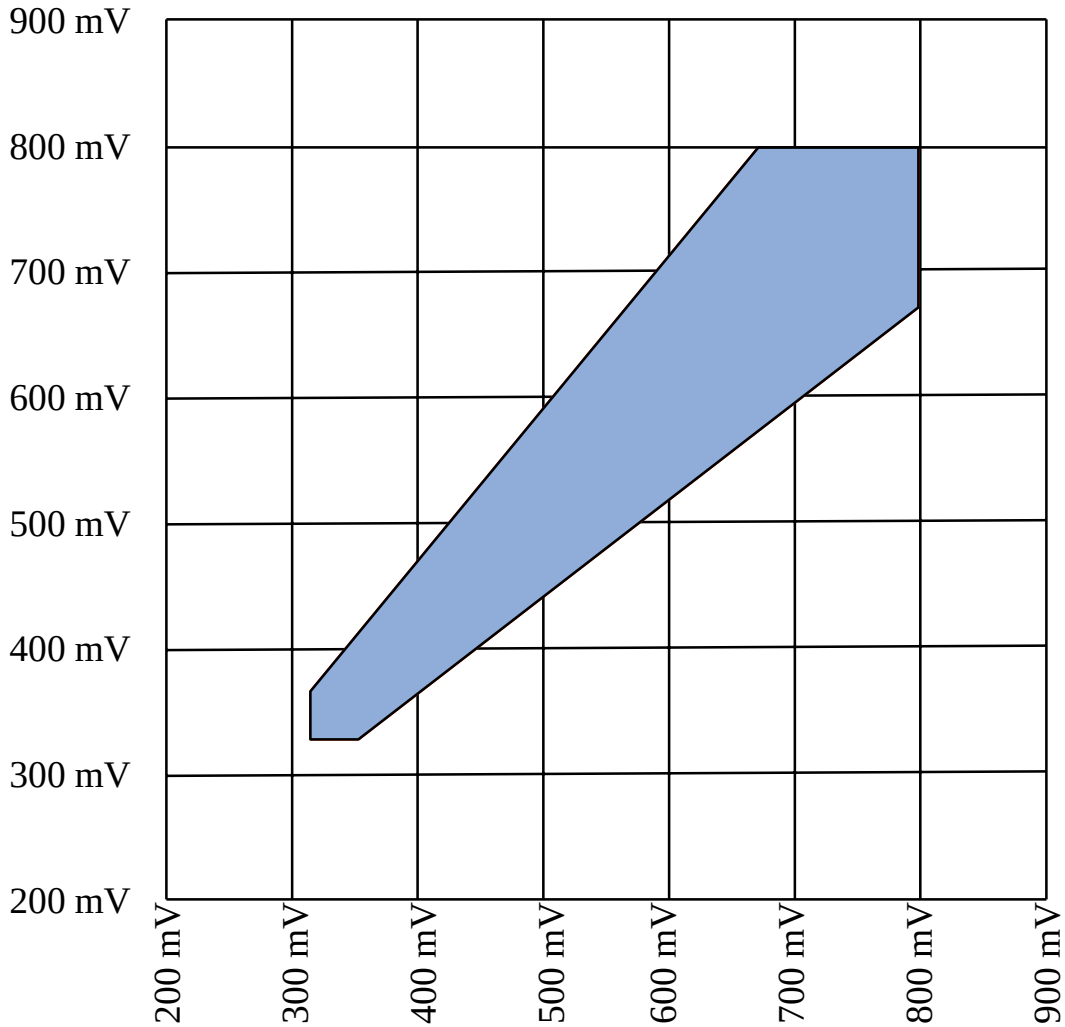
Proposal for TBDs (cont'd)

- Figure 52
  - 80 mv/30 mv threshold at 3 nsec duration
- Table A.1
  - V_A (Max) = -80 mv (new threshold at increased duration)
  - V_N (Min) = 80 mV (as above)
  - V_A (Max) (or-tied) = -100 mV (as in SPI-3)
  - Attenuation (fast-160) (Max) = 40 %

Proposal for TBDs (cont'd)

- Table A.2
  - Minimum (mV) should be 320 mV including (after) fall back signal level (unchanged)
  - Diff output volt Mag. = 0.85 x $|V_N|$ + 50 min
  - Diff output volt Mag. = 1.15 x $|V_N|$ - 57 max

V_N Vs. V_A



T10/00 - 276r0