SAS TCTF update T10/04-150r3

Date: ~~May 4~~June ~~17~~July 14, 2004
To: T10 Technical Committee
From: Alvin Cox (alvin.cox@seagate.com), Mike Jenkins (jenkins@lsil.com)
Subject: SAS TCFF update

The following proposed change to 5.3.11 removes the mathematical processing option from the verification of transmitter performance, only allowing the physical TCTF for verification as done by other specifications incorporating TCTF methodology. The CT TCTF equations are updated to reflect actual cable measured characteristics and to be in compliance with the equations adopted by SATA. Reference T10/04-147r0 and T10/04-~~147r0~~148r0.

Rev 1: Changed "for 1,5 GHz < f < 5,0 GHz" under 3,0 Gbps to "for 3,0 GHz < f < 5,0 GHz".
Rev 2: Changed "for 50 MHz < f < 1,5 GHz, and:" under 3,0 Gbps to "for 50 MHz < f < 3,0 GHz, and:".
Rev 3: changed reference number from 04-147 to 04-148, deleted sentence that references dual compliance.

5.3.11 Transmitter characteristics

Revise the text and figures as indicated below:

The TCTF is the mathematical statement of the limiting transfer function through which the transmitter shall be capable of producing acceptable signals as defined by a receive mask. The transmission magnitude response of the TCTF in dB for IT and XT is given by the following equation for 1,5 Gbps:

$| S_{21} | \leq -20 \times \log_{10}(e) \times ((6{,}5 \times 10^{-6} \times f^{0,5}) + (2{,}0 \times 10^{-10} \times f) + (3{,}3 \times 10^{-20} \times f^{2}))$ dB

for 50 MHz < f < 1,5 GHz, and:

$| S_{21} | = -5{,}437$ dB

for 1,5 GHz < f < 5,0 GHz,
where:

f is the signal frequency in hertz.

The transmission magnitude response of the TCTF in dB for CT is given by the following equation for 1,5 Gbps:

$| S_{21} | \leq -20 \times \log_{10}(e) \times ((1{,}7 \times 10^{-5} \times f^{0,5}) + (1{,}0 \times 10^{-10} \times f))$ dB

for 50 MHz < f < 1,5 GHz, and:

$| S_{21} | = -7{,}022$ dB

for 1,5 GHz < f < 5,0 GHz,
where:

f is the signal frequency in hertz.

The transmission magnitude response of the TCTF in dB for IT and XT is given by the following equation for 3,0 Gbps:

$| S_{21} | \leq -20 \times \log_{10}(e) \times ((6{,}5 \times 10^{-6} \times f^{0,5}) + (2{,}0 \times 10^{-10} \times f) + (3{,}3 \times 10^{-20} \times f^{2}))$ dB

for 50 MHz < f < 3,0 GHz, and:

$| S_{21} | = -10{,}884$ dB

for 3,0 GHz < f < 5,0 GHz,
where:

f is the signal frequency in hertz.

The transmission magnitude response of the TCTF in dB for CT is given by the following equation for 3,0 Gbps:

$| S_{21} | \leq -20 \times \log_{10}(e) \times ((1{,}7 \times 10^{-5} \times f^{0,5}) + (1{,}0 \times 10^{-10} \times f))$ dB

for 50 MHz < f < 3,0 GHz, and:

$| S_{21} |$ = -10,694 dB

for 3,0 GHz < f < 5,0 GHz,

where:

f is the signal frequency in hertz.

The TCTF is used to specify the requirements on transmitters that may or may not incorporate pre-emphasis or other forms of compensation. A compliance interconnect is any physical interconnect with loss equal to or greater than that of the TCTF at the above frequencies that also meets the ISI loss requirements shown in figure 53 and figure 54. ~~Transmitters compliant to the CT requirements are also deemed compliant to the IT and XT requirements.~~

Compliance with the TCTF test load requirement shall be determined ~~either:~~

~~a)~~ by measuring the signal produced by the transmitter through a physical compliance interconnect attached to the transmitter~~; or~~

~~b) by mathematically processing through the TCTF the signal captured using a zero-length test load~~.

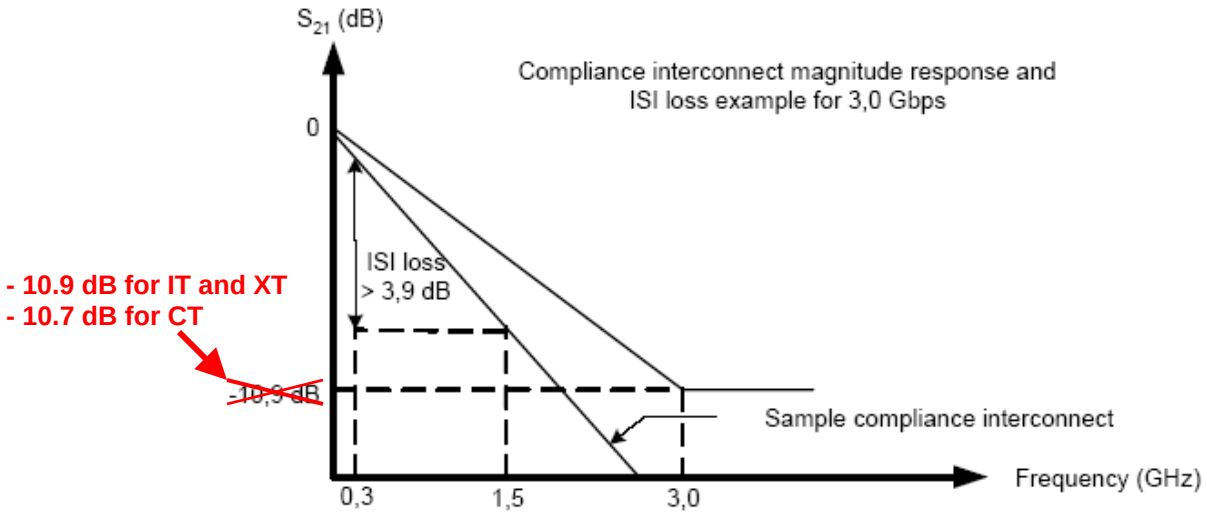

Figure 53 — ISI loss example at 3,0 Gbps

Figure 54 shows an ISI loss example at 1,5 Gbps.

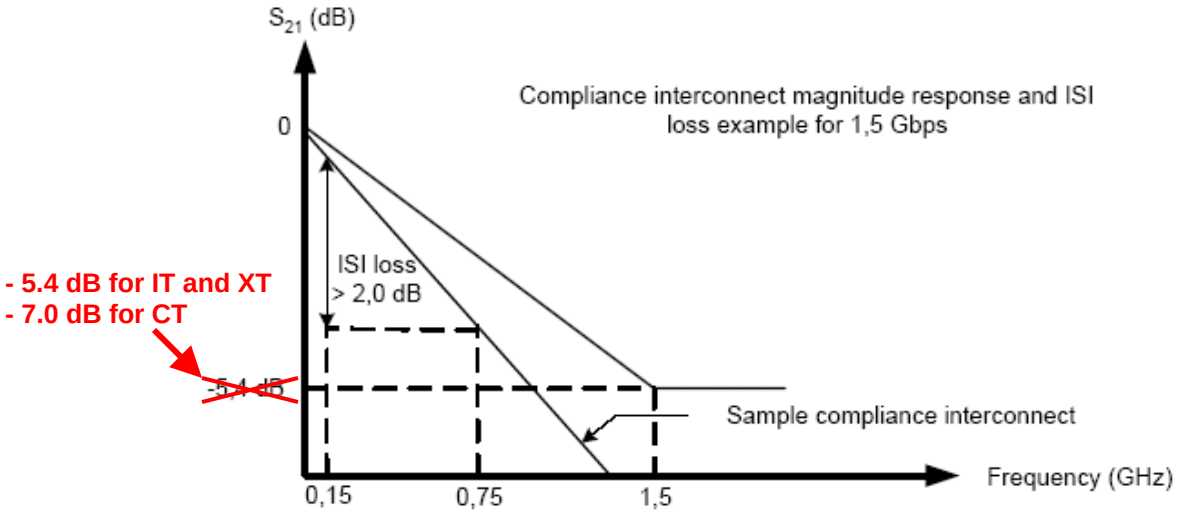

Figure 54 — ISI loss example at 1,5 Gbps