Date: October 27, 1999 Document number T10/99-317r0

Comments against SPI-3 rev 10

Comment 1 technical

Section 6.3.1 Change:

The requirements in this clause apply to uniform cable media. Uniform media is media that is not designed to be non-uniform for the purposes of enabling connector attachment. These non-uniformities (e.g., a planar section created for connector attachment within a normally round cable media) is considered to be part of a cable assembly or harness whose performance is affected by the attached (sometimes unused) connectors as well as by the non-uniformity in the media.

To:

The requirements in this clause apply to uniform cable media. Non-uniform media is media that contains dissimilar sections for purposes of enabling connector attachment.

Non-uniformities (for example a planar section created for connector attachment) are considered to be part of a cable assembly or harness whose performance is affected by the attached (sometimes unused) connectors as well as by the non-uniformity in the media.

Implementers using non-uniform media may construct special uniform test media using manufacturing processes similar to that used for the non-uniform media for purposes of measuring the properties of the media between the connector attachment areas (e.g. the twisted regions in a twisted/flat planar construction).

For length dependent parameters both total and per unit length requirements are specified. This ensures performance compliance when concatenating cables in the same SCSI bus segment. Implementers have the practical option to use only the total requirements and to loosen the per unit length requirements in non-concatenated applications; however, this practice will create non conforming cables. Any cable media not meeting the per unit length requirements shall be labeled in a manner indicating that it is not suitable for use in cable assemblies that might be used in a concatenated manner.

Comment 2 editorial

The term “flat” needs to be replaced with the word “planar” in all usage that refers to the physical construction of cable media except in the cases where clarifying of the meaning of the word “flat” in the context of cable media. (This change is needed to avoid confusion between unbalanced planar, the usual “flat” construction, and balanced planar, the twisted flat construction).

Comment 3 technical

Remove Table 9.:recommended minimum conductor size.

(information is now contained in new table 12)

Comment 4 technical

Change Table 10 to:

Cable construction	**Local SE transmission line impedance ****		**Local DIFF transmission line impedance ****	
	Min	Max	Min	Max
All	84 (78*)	96	110	135

All values are measured by time domain reflectometry
* If SCSI loads attached to the cable media are separated by more than 1.0 m use the value of 78 Ohms
** Ideally one design will meet both SE and DIFF criteria
Lower impedance values may be desirable when attaching directly to a backplane or other heavily loaded environments

Comment 5 technical

Change:

6.3.4 Extended distance transmission line impedance

The swept frequency (extended distance) differential impedance limits shall be a maximum peak to peak variation of 30 ohms over the frequency range 1 MHz to 1 GHz on a 30 meter cable.

To:
6.3.4 Extended distance transmission line impedance

Swept frequency (extended distance) differential impedance limits: max peak to peak variation of 60 ohms over the frequency range 30 MHz to 600 MHz on a 30 meter cable.

Comment 6 technical

6.3.8 SE attenuation

Change from:
The maximum sine wave signal attenuation shall be 0,095 dB maximum per meter at 5 MHz, measured differentially or a maximum sine wave signal attenuation of 1,41 dB at 5 MHz for the entire bus measured differentially.

To:

SE attenuation requirements are not separately specified. SE attenuation requirements are indirectly specified through the differential requirements in section 6.3.9.

Comment 7 technical

Change Table 12 to:

Table 12 - Attenuation requirements for SCSI cable media

Distance between SCSI bus terminators (meters)	Attenuation per meter max (dB) @ 200 MHz	Attenuation of length equivalent to terminator to terminator distance max (dB) @ 200 MHz	Distances are consistent with these minimum size conductors when used with high quality dielectrics:	Notes:
0 to 9	0.63	6	32 AWG solid/ 30 AWG stranded	multiple loads allowed
0 to 12	0.48	6	30 AWG solid/ 28 AWG stranded	multiple loads allowed
>12 to 25	0.48	12	30 AWG solid/ 28 AWG stranded	point to point only
Both the per meter and the length equivalent to the terminator to terminator spacing requirements shall be simultaneously met				

Comment 8 technical

Change note 17 to read as follows:

NOTE 17 - SCSI devices connected with a maximum length SE A cable (table 3) are not able to meet the source current requirements in table 27 unless the TERMPWR conductor size is 0,080 98 mm 2 (28 AWG) minimum because the SE A cable contains only one TERMPWR line.

Comment 9 technical

Change Table 11 to include the requirement of minimum as well as maximum values of capacitance and rewording of the dielectric constant requirements. The contents of table 11 should be:

Capacitance limits: SE 30 min to 66 pF/m max at 100 kHz and 1 MHz

DIFF 26 min to 46 pF/m max at 100 kHz and 1 MHz

Comment 10 technical

In 6.3.5

Change:

To calculate the allowable dielectric constant variation between 100 kHz and 1 GHz the maximum dielectric constant in the frequency range minus the minimum dielectric constant in the frequency range shall be less than 5% of the maximum dielectric constant in the frequency range.

To:

Dielectric constant variation in the material forming the insulation directly in contact with the conductors in the cable media between 300 kHz and 600 MHz: max dielectric constant in the frequency range divided by the min dielectric constant in the frequency range is less than 1.10.

Comment 11 technical

Change 6.3.6 to:

SE propagation time requirements are not separately specified. SE propagation time requirements are indirectly specified through the differential requirements in section 6.3.7.

Comment 12 technical

Section 6.2

Change:

Interconnection of SCSI devices by means other than cables is allowed (e.g., by backplanes using printed wiring boards) (see annex J). Detailed descriptions of these other means are not part of this standard; however, they are subject to the electrical characteristics presented in this standard. Examples of these electrical characteristics are:
a) transmission line impedance (see 6.3);
b) propagation delay (see 6.3);
c) cumulative length (see 6.6 and 6.7); and
d) signal attenuation (see 6.3).

To:

Interconnection of SCSI devices by means other than cables is allowed (e.g., by backplanes using printed wiring boards) (see annex J). Detailed descriptions of these other means are not part of this standard; however, they are subject to the electrical requirements in sections 6.3.

Comment 13 editorial

Change:
NOTE 6 - Use of non-twisted flat cables causes cross-talk problems.

To:

NOTE 6 - Use of unbalanced media such as planar untwisted construction typically produces higher cross talk than balanced constructions but may be used if all performance requirements are met.

Comment 14 Technical

Table 15

Change:

Note: Media capacitance with no SCSI devices attached measured between a signal conductor and ground when all other conductors in the path are connected to ground.

To:

Note: SE media capacitance with no SCSI devices attached measured per Annex E.

Comment 15 Technical

Annex E-1

Change

This annex defines the electrical performance requirements for shielded and unshielded cable media and specifies the details of a measurement methodology to minimize the error between measurements executed in different laboratories.

Several parameters are required to specify the electrical requirements:

To:

This annex defines the electrical measurement methodology requirements to be used for both shielded and unshielded cable media. These methods are required to minimize the error between measurements executed in different laboratories.

The methodologies are specified to extract parameters in each of the following performance requirements:

Comment 16 technical

Annex E-1

Change: This annex also specifies methods for testing for these parameters. Table E.1 summarizes the testing requirements.

To: Table E.1 summarizes the measurement methodology requirements.

Comment 17 editorial

Remove the wording just before E-2: The test methods defined in this annex may or may not be applicable to complete SCSI bus segment performance. This annex does not address performance other than that of media designed to be uniform.

Comment 18 technical

Change:

E.2.1.2.2 Measurement system (with test fixture) calibration
Connect the 50 Ω cable to the test fixture. In place of “B” in figure E.1, connect a 100 Ω 0,1% (preferred) low inductance chip resistor. Use an unfiltered trace and the TDR cursors to measure the resistance value, R100, approximately 4 ns (displayed) after the resistor discontinuity. See figure E.2.

In a similar manner, in place of “B” in figure E.1, connect a 50 Ω 0,1% (preferred) low inductance chip resistor. Use an unfiltered trace and use the TDR cursors to measure the resistance value, R50, approximately 4 ns (displayed) after the resistor discontinuity.

To:

E.2.1.2.2 Measurement system (with test fixture) calibration
Connect the 50 Ω cables to the test fixture. In place of “B” in figure E.1, connect a 100 Ω ±0,1% (preferred) low inductance chip resistor (IMS style TPI-1206 or equivalent). Use an unfiltered trace and the TDR cursors to measure the resistance value, R100, approximately 4 ns (displayed) after the resistor discontinuity. See figure E.2.

In a similar manner, in place of “B” in figure E.1, connect a 75Ω ± 0,1% (preferred) low inductance chip resistor. Use an unfiltered trace and use the TDR cursors to measure the resistance value, R75, approximately 4 ns (displayed) after the resistor discontinuity.

Comment 19 technical

Immediately before sections E.2.1.2.3

Change:

Subtract R50 from R100 producing Delta R.
Correction factor for vertical scale and cursor readings = (Delta R) / 50

To:

For R100 and R75 the equation for determining the corrected (actual) impedance is:

$Z_{corrected} = 25(4*X_1 - 3*X_2 - Z_{measured})/(X_1-X_2)$

Where:

X_1 is the measured value using the 75Ω resistor
X_2 is the measured value using the 100Ω resistor

Comment 20 technical

In E.2.1.3 change:

f) With the filter turned on to 3ns connect the DUT.
g) DUT shall be suspended in air. No metallic supports should be used.
h) Set the TDR cursor to measure minimum, mean, and maximum ohms with cursors set on the trace as it crosses the 5th and 6th times divisions.

To:

f) With the rise time filter adjusted to achieve 3ns connect the DUT.
g) Note: unshielded DUT's shall be suspended in air. No metallic supports should be used.
h) Set the TDR cursor to measure minimum and maximum ohms with cursors set on the trace as it crosses the 5th and 6th times divisions.

Comment 21 technical

change:

E.2.2.2.3 Measurement system (with test fixture) calibration
Connect the 50 Ω cable to the test fixture. In place of "B" in Figure E.1, connect a 100Ω ±0,1% (preferred) low inductance chip resistor across the pair. Use a differential unfiltered trace and use TDR cursors to measure the resistance value, R100, approximately 4 ns (displayed) after the resistor discontinuity. See figure E.2. The method shown in figure E.2 applies to differential except a 100 Ω level from the test fixture will be seen and differential signals are displayed.
In a similar manner, in place of "B" in figure E.1, connect a 50Ω ±0,1% (preferred) low inductance chip resistor across the pair. Use a differential unfiltered trace and use the TDR cursors to measure the resistance value, R50, approximately 4 ns (displayed) after the resistor discontinuity.
Subtract R50 from R100 producing Delta R.
Correction factor for vertical scale and cursor readings = (Delta R) / 50

To:

E.2.2.2.3 Measurement system (with test fixture) calibration
Connect the 50 Ω cables to the test fixture. In place of "B" in Figure E.1, connect a 137Ω ±0,1% (preferred) low inductance chip resistor (IMS style TPI-1206 or equivalent) across the pair. Use a differential unfiltered trace and use TDR cursors to measure the resistance value, R137, approximately 4 ns (displayed) after the resistor discontinuity. See figure E.2. The method shown in figure E.2 applies to differential

except a 100 Ω level from the test fixture will be seen and differential signals are displayed.

In a similar manner, in place of “B” in figure E.1, connect a 100Ω ±0,1% (preferred) low inductance chip resistor (IMS style TPI-1206 or equivalent) across the pair. Use a differential unfiltered trace and use the TDR cursors to measure the resistance value, R100, approximately 4 ns (displayed) after the resistor discontinuity.

For R137 and R100 the equation for determining the corrected (actual) impedance is:

$Z_{corrected} = 25(1.37*X_1 - X_2 - 0.37*Z_{measured})/(X_1-X_2)$

Where:

X_1 is the measured value using the 100Ω resistor
X_2 is the measured value using the 137Ω resistor

Comment 22 technical

A figure is needed in section E.2.2.3 to illustrate the differential measurements.

This new figure is not available as of the date of these comments but will be available in time for the comments resolution working group.

Comment 23 technical

In E.2.2.2.4 move the 6th item in the list to its own paragraph following the list.

Comment 24 technical

In section E.2.2.3

Change:

f) With the filter turned on to 1ns connect the DUT.
g) DUT shall be suspended in air. No metallic supports should be used.
h) Set the TDR cursor to measure minimum, mean, and maximum ohms with cursors set on the trace as it crosses the 5th and 6th times divisions.
i) Set the filter to 3 ns.
j) Set the TDR cursor to measure minimum, mean, and maximum ohms with cursors set on the trace as it crosses the 5 th and 6 th times divisions.

To:

f) With the rise time filter adjusted to achieve 3ns connect the DUT.
g) Note: unshielded DUT’s shall be suspended in air. No metallic supports should be used.
h) Set the TDR cursor to measure minimum and maximum ohms with cursors set on the trace as it crosses the 5 th and 6 th times divisions.

i) Set the filter to 3 ns.
j) Set the TDR cursor to measure minimum and maximum ohms with cursors set on the trace as it crosses the 5 th and 6 th time divisions.

Comment 25 technical

In section E.2.3.1

Change bullet item 2 to read: Remove 5,0 cm of outer jacket from both ends

and add a bullet item 6 to read: Attach a 122 Ω resistor to the far end of the pair under test.

Comment 26 technical

In section E.2.3.2.1

Change:
The first type is constructed using two baluns mounted on aluminum base and electrically isolated from each other by aluminum screen **(**test fixture 1 figure E.6).
The second type uses high speed PCB with microstrip construction. Two baluns are mounted at one edge of the board with sufficient separation to reduce mutual coupling by a minimum of 20 dB. The interconnect traces of the signal pairs are further separated from each other in a radial form and the signal traces run at 61Ω to ground for each differential line (test fixture 2 figure E.6).

To:

The first type is constructed using two baluns mounted on a metallic base and electrically isolated from each other by a metallic screen **(**test fixture 1 figure E.6).
The second type uses high speed PCB with microstrip construction. Two baluns are mounted at one edge of the board with sufficient separation to reduce mutual coupling by a minimum of 20 dB. The interconnect traces of the signal pairs are further separated from each other in a radial form and the signal traces run at 61Ω nominal to ground for each differential line (test fixture 2 figure E.6).

Comment 27 technical and editorial

Change the existing sections E.2.3.2.3 and E.2.3.2.4 to the following:

E.2.3.2.3 Test Fixtures
For the metallic base test fixture (test fixture 1), the transmission line is provided by the baluns as the signal paths and the metallic base as the current return path. The baluns provide a 50 to 61 Ω impedance matching between the test instrument system and the DUT, as well as

provide differential signals. The metallic screen provides electric field isolation between the two baluns. The DUT connects to the fixture via a mechanical clamp system. The DUT should self terminate given its length.

E.2.3.2.4 Fixture board design requirements (test fixture 2 figure E.6):

For the PCB test fixture, the test fixture consists of a printed circuit board incorporating controlled impedance trace construction of 61 Ω (refer to test fixture 2 figure E.6). The transmission line is provided by the connected baluns and PCB traces for the signal paths and the ground plane of the board for the return current path. A coaxial cable (same transmission line impedance as the test instrument) connects one end of the cable to the instrument test port through the baluns and the PCB fixture trace combination. The baluns provide a 50 to 61 Ω impedance matching between the test instrument system and the DUT, as well as provide differential signals. The separation of the baluns and the signal lines provide electric field isolation between the two baluns and the signal lines. The DUT connects to the fixture via a mechanical clamp system. The DUT should self terminate given its length.

NOTE 54 - The baluns required for this test are high frequency (650 MHz or greater) precision types.

A stand is recommended for mounting fixture board and to support the DUT. It is recommended that the stand keep the fixture board at least 7 cm from the top of the lab bench to minimize coupling.

Traces are constructed on the PCB to conform with the differential transmission scheme. The fixture shall be through hole or surface mount PCB. The signal traces are connected to the balun's differential pins using microstrip construction with controlled transmission line impedance of 61 _. The length of the connections shall permit the board to operate at the desired frequencies and accommodate the required number of signal lines, including sufficient separation to reduce mutual coupling by a minimum of 20 dB. It is recommended that the bandwidth of the board be at least 650 MHz. Board impedance shall be tightly controlled to within 5% of the impedance of the environment.

The fixture board shall include calibration traces for measuring the effects of the test fixturing on the measured data. This board construction is useful for other frequency domain measurements but is not designed to accommodate time domain.

Comment 28 technical

In section E.2.3.4 add the statement:

Note: unshielded DUT's shall be suspended in air. No metallic supports should be used.

Immediately before the existing wording:

Connect the near end of the sample to the output balun on the test fixture, keeping the leads as short as….

Comment 29 technical

Delete the following from section E.3.1.1

For round cables shield floating:
1) Cut sample length to 3 m.
2) Remove 5,0 cm of outer jacket from one end.
3) Cut braid wire back to jacket.
4) Trim filler and tape materials to the base of braid wire.
5) Strip 0,5 cm insulation from all conductors.

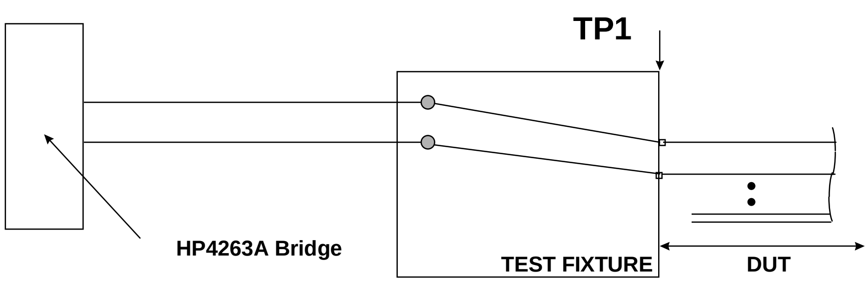
Comment 30 technical

In section E.3.1.2

change: See E.2.2.2 for appropriate test fixtures.

To: Figure x shows the configuration to use for this measurement procedure.

Add the following figure x describing the test fixture to section E.3.1.2 with the title "Test fixture for single ended capacitance measurement".



TEST FIXTURE / MEASUREMENT PROCESS IS CALIBRATED TO REPORT AT TP1

Comment 31 technical

In section E.3.1.3

Change the second bullet to:

2) Connect a wire (short) to the sockets of the test fixture and perform a “short” calibration as
specified by HP.

Comment 32 technical

Remove the following section:

E.3.1.4.1 Flat cables - G-S
With the bridge set at the desired frequency, connect the pair to the test fixture and record the capacitance.

Comment 33 technical

Change:

E.3.1.4.3 Round cables - shielded
With the bridge set at the desired frequency, connect one half of the twisted pair to one side of the test fixture and the other half of the twisted pair to the shield and to the other side of the test fixture. Record the capacitance.

To:

E.3.1.4.3 Round cables - shielded
With the bridge set at the desired frequency, connect one conductor of the twisted pair to one side of the test fixture. Connect the commoned conductors and shield to the other side of the test fixture (ground). Record the capacitance.

Comment 34 technical

Remove the following section:

E.3.1.4.4 Round Cables - floating shield
With the bridge set at the desired frequency, connect the twisted pair to the test fixture. Record the capacitance.

Comment 35 technical

Remove the following material:

For round cables shield connected:
1) Cut sample to a length that eliminates resonance.
2) Remove 5,0 cm of outer jacket from both end.
3) Comb out braid wire strands to form a pig tail.
4) Trim filler and tape materials to the base of braid wire.
5) Strip 0,5 cm insulation from all conductors.
6) Connect one (1) conductor of each pair to the shield.

Comment 36 technical

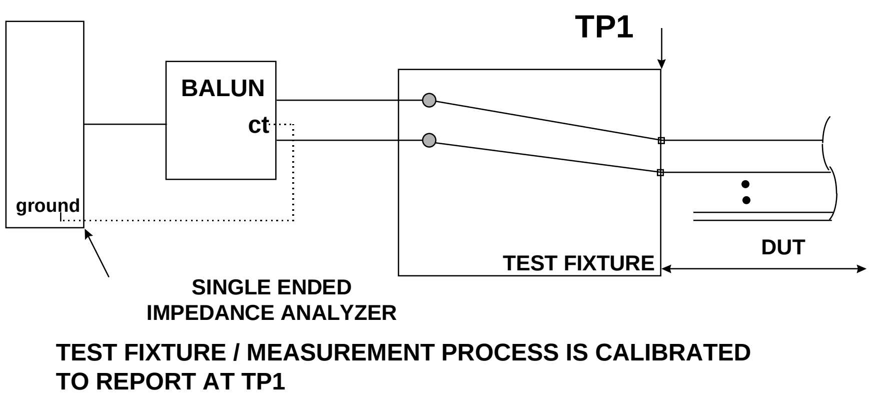
In section E.3.2.2

Change:

See E.2.2.2 for appropriate test fixtures.

To:

Refer to Figure x for the proper test configuration.
[Add a new Figure x shown below titled “Test fixture for differential capacitance measurements”].



Comment 37 editorial

In E.3.2.3.1 change bullet 6 to:

6) Record the linear measurement

Comment 38 editorial

In E.3.2.3.2 change:

For other manufacture’s equipment, follow the calibration procedures specified by the manufacturer for reliable results.

To:

For other instruments follow the calibration procedures specified by the manufacturer for reliable results.

Comment 39 technical

In Section E.3.3

Change:

Selection of this test method is on underway.

To:

This measurement procedure is not specified in this document.

Comment 40 technical

In E.4.1 remove bullet 6):

6) Each pair under test shall be terminated with a 100 Ω resistor at the far end of the cable.

Comment 41 technical

In section E.4.2

Change:

See E.2.2.2 for appropriate test fixtures.

To: See Figure E-14 for appropriate test fixture.

Comment 42 technical

In section E.4.3 Change:

The analyzer shall be set to perform a S12 measurement with the power set at a minimum of 6 dbm, the number of points set to a minimum of 401, the band width at a maximum of 200 Hz, averaging at a minimum of 2 averages, and the start/stop frequencies per the table. Perform a transmission calibration using a sample of the cable to be tested keeping the sample as short as possible.

To:

The analyzer shall be set to perform an S12 measurement with the power set at a minimum of 6 dBm, the number of points set to a minimum of 401, the resolution bandwidth at a maximum of 200 Hz, averaging at a minimum of 2 averages, and the start/stop frequencies per Table E.1. Perform a transmission calibration using a sample of the cable to be tested keeping the sample as short as possible.

Comment 43 editorial

In E.4.4 change:

With the analyzer set up in the delay mode, connect one end of the sample to the balun on the output port and the opposite end to the balun on the input port with the markers turned on record the minimum and maximum delay across the band width as listed in table E.1.

To:

With the analyzer set up in the delay mode, connect one end of the sample to the balun on the output port and the opposite end to the balun on the input port. With the markers turned on record the minimum and maximum delay across the bandwidth as listed in table E.1.

Comment 44 technical

In section E.5.1 change:

This test requires type D sample (see table E.1) prepared in the following way:

To:

This test requires type H sample (see table E.1) prepared in the following way:

Comment 45 technical

In section E.5.1 change:

For round cables shield connected:

To:

For round cables shield floating:

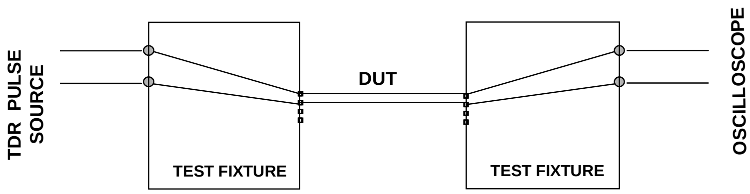
Comment 46 technical

In section E.5.2 change:

See E.2.2.2 for appropriate test fixtures.

To: See Figure x for appropriate test fixture.

Add new figure x given below showing the test fixture with the title "Propagation time measurement setup".



TEST FIXTURE TO MEASURE PROPAGATION TIME

Comment 47 technical

In Table E-1 under Diff propagation time (frequency) change:

An S12 measurement

To: An S12 measurement swept from 10 MHz to 650 MHz (normative measurement with no pass/fail levels

Comment 48 technical

In Table E-1 under Diff propagation time (time) change:

(G) Modified to 3 m

To: Sample 6m

Comment 49 editorial

In Table E-1 under Diff attenuation change:

(H) Sample leave all other lines open -long enough to produce at least 1dB at the low frequency shelf (note 3) (typically> 30 m)

To:

(I) Sample leave all other lines open -long enough to produce at least 1dB at the low frequency shelf (note 3) (typically> 30 m)

Comment 50 editorial

Under E.5.3 change: For other manufacture's equipment, use the same procedure adapted for that instrument.

To: For other instruments, use the same procedure adapted for that instrument.

Comment 51 technical

Under E.6.1 change: Maximum propagation time minus the minimum propagation time renders the overall propagation time skew of the pair under test.

To: Using the time domain (through) measurement, maximum propagation time minus the minimum propagation time renders the overall propagation time skew of the pair under test.

Comment 52 technical

In section E.7.1 change:

Attenuation (dB) = 20 $\log_{10}$ (input signal / output signal). and
Gain (dB) = 20 $\log_{10}$ (output signal / input signal)

To:

Attenuation (dB) = 20 $\log_{10}$ (input voltage / output voltage). and
Gain (dB) = 20 $\log_{10}$ (output voltage / input voltage)

Comment 53 technical

In section E.7.1 change:

At higher frequencies, the conductor loss increases due to skin effect. Skin effect is where the current become increasing confined in the outer “skin” of the conductor as the frequency increases. This effectively reduces the conductor area available for current flow. The attenuation for a given balanced transmission line will be affected by the conductor metal composition and size, and the composition, uniformity, and thickness of the dielectric that surrounds the conductors.

To:

At higher frequencies, the conductor loss increases due to skin effect. Skin effect is where the current becomes increasingly confined to the outer “skin” of the conductor as the frequency increases. This effectively reduces the conductor area available for current flow. The attenuation for a given transmission line will be affected by the conductor metal composition and size, and the composition, uniformity, and thickness of the dielectric that surrounds the conductors.

Comment 54 technical

Insert the following new section in front of the present section E.7.1.1:

E.7.1.1 Sample preparation

1) Cut sample to a length that produces at least 1 dB attenuation at the low frequency shelf (typically at least 30 meters).
2) Remove 5,0 cm of outer jacket from both ends.
3) Cut braid wire back to jacket.
4) Trim filler and tape materials to the base of braid wire.
5) Strip 0,5 cm insulation from all conductors.

Comment 55 technical

In section E.7.1.1 change

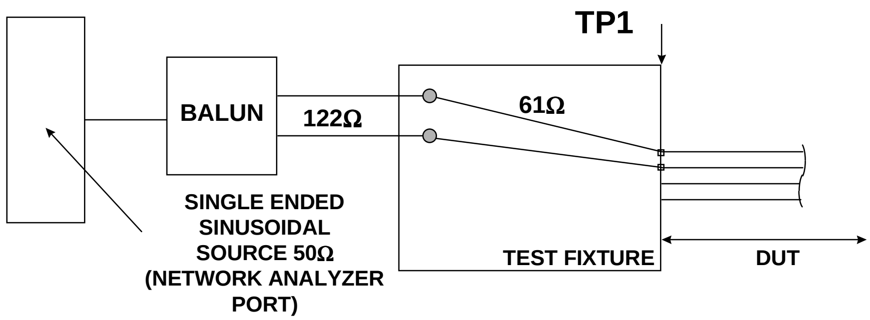
A test fixture having 75 Ω single ended paths for each signal line is used for the measurement as shown in

To:

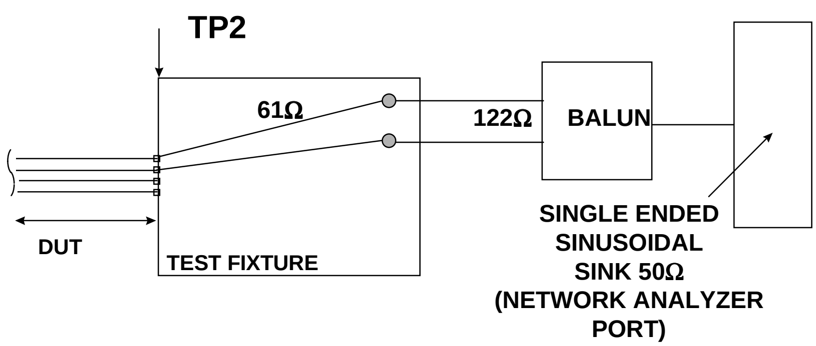
A test fixture having 61 Ω single ended paths for each signal line is used for the measurement as shown in

Comment 56 technical

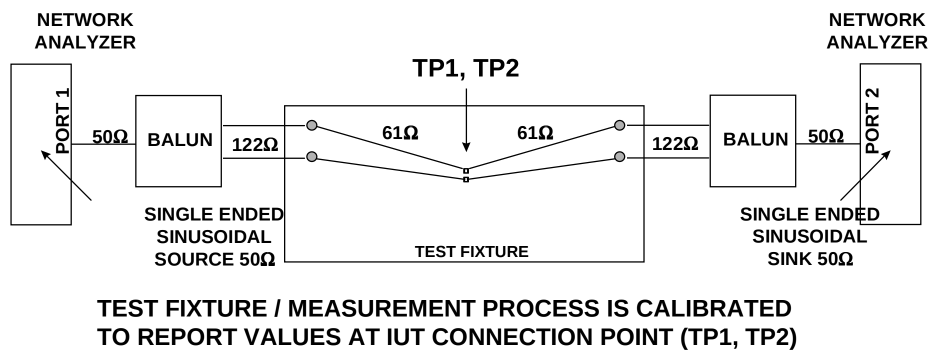
In section E.7.1.1 replace Figures E.12, E.13, and E.14 with the following respective figures: (same figure titles)



TEST FIXTURE / MEASUREMENT PROCESS IS CALIBRATED
TO REPORT AT TP1



TEST FIXTURE / MEASUREMENT PROCESS IS CALIBRATED
TO REPORT VALUES AT TP2



Comment 57 editorial

Change the last sentence in E.7.1.3: The separable DUT is connected between the source and sink test fixtures.

To: The DUT is connected between the source and sink test fixtures.

Comment 58 editorial

In the last sentence in E.7.1.4 change “from” to “for”.

Comment 59 editorial

In E.7.1.5

Change:
The instrument automatically accounts for the attenuation found in the calibration scan.

To: The instrument automatically compensates for the attenuation found in the calibration scan.

Comment 60

In E.7.1.5 change: When the attenuation of the cable exceeds ~ 50 dB or

To: When the attenuation of the cable exceeds approximately 50 dB or

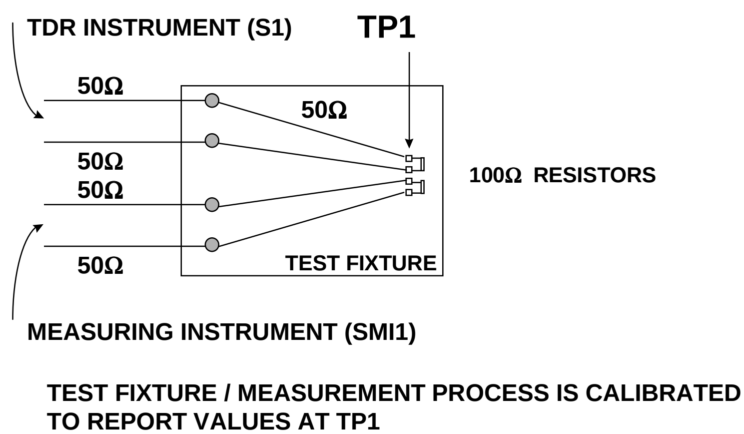
Comment 61 technical

In E.8 change: Single pulse tests eliminate the effects of resonance, are very deterministic

To: Single pulse tests that eliminate the effects of resonance, are very deterministic

Comment 62 technical

In section E.8.3 change Figure E.17 to:



Comment 63 technical

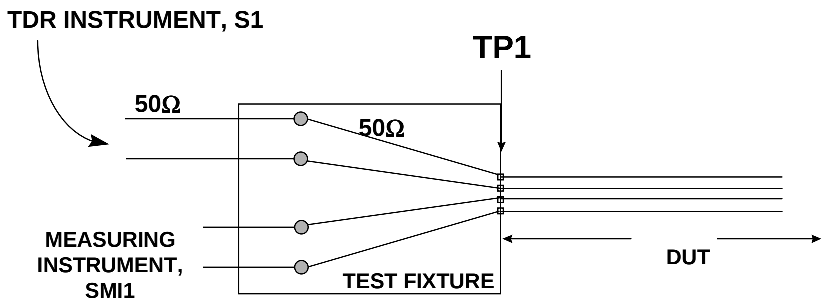
In E.8.3 change:

Use the 100% differential amplitude.

To: Use the 100% differential amplitude as defined in Figure E.3

Comment 64 technical

In E.8.4 change: Figure E.18 to:



TEST FIXTURE / MEASUREMENT PROCESS IS CALIBRATED TO REPORT VALUES AT TP1