Fibre Channel Consortium

FC-BB-5 (FCoE) Encapsulation
Test Suite
Version 1.1

Technical Document

Last Updated: January 6, 2009

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Modification Record

1. December 15, 2008   Initial Version (mhagen)
2. January 6, 2009   Some corrections to several tests (mhagen)

Acknowledgments

The University of New Hampshire would like to acknowledge the efforts of the following individuals in the development of this test suite.

Introduction

Overview

The University of New Hampshire's InterOperability Laboratory (IOL) is an institution designed to improve the interoperability of standards based products by providing an environment where a product can be tested against other implementations of a standard. These tests are designed to determine if a FCoE product conforms to specifications defined in ***Fibre Channel Backbone 5 (FC-BB-5) Rev 1.03 standard T11/Project 1871-D, Rev1.03*** (hereafter referred to as "FC-BB-5"). This suite of tests has been developed to help implementers evaluate the functioning of their Fibre Channel over Ethernet based products. The tests do not determine if a product conforms to the Fibre Channel standard, nor are they purely interoperability tests. Rather, they provide one method to isolate problems within a Fibre Channel device. Successful completion of all tests contained in this suite does not guarantee that the tested device will operate with other Fibre Channel devices. However, combined with satisfactory operation in the IOL's semi-production environment, these tests provide a reasonable level of confidence that the Device Under Test (DUT) will function well in most multivendor Fibre Channel environments.

Organization of Tests

The tests contained in this document are organized to simplify the identification of information related to a test and to facilitate in the actual testing process. Each test contains an identification section that describes the test and provides cross-reference information. The detailed section discusses the background information and specifies how the test is to be performed. Tests are grouped in order to reduce setup time in the lab environment. Each test contains the following information:

Test Number

The Test Number associated with each test follows a simple grouping structure. Listed first is the Clause followed by the Test Group Number followed by the test's number within the group. This allows for the addition of future tests to the appropriate groups of the test suite without requiring the renumbering of the subsequent tests.

Purpose

The purpose is a short statement describing what the test attempts to achieve. The test is written at the functional level.

References

The references section lists cross-references to the Fibre Channel standards and other documentation that might be helpful in understanding and evaluating the test and results.

Resource Requirements

The requirements section specifies the software, hardware, and test equipment that will be needed to perform the test. The items contained in this section are special test devices, software that must reside on the DUT, or other facilities, which may not be available on all devices.

Last Modification

This specifies the date of the last modification to this test.

Discussion

The discussion covers the assumptions made in the design or implementation of the test as well as known limitations. Other items specific to the test are covered here.

Test Setup
The setup section describes in detail the configuration of the test environment and includes a block diagram for clarification as well as information such as the interconnection of devices, what monitoring equipment should capture, what the generation equipment should send, and any other configuration information vital to carrying out the test. Small changes in the configuration should be included in the test procedure.

Procedure
The procedure section of the test description contains the step-by-step instructions for carrying out the test. It provides a cookbook approach to testing, and will often be interspersed with observable results.

Observable Results
The observable results section lists observables that can be examined by the tester to verify that the DUT is operating properly. When multiple values are possible for an observable, this section provides a short discussion on how to interpret them. Note that complete delineation between the observables in the **Procedure** and **Observable Results** is virtually impossible. As such a careful note should be made of the requirements in both sections. In certain cases, it may be necessary to modify certain steps in the **Procedure** section while doing the actual tests so as to be able to perform the tests. In such cases, the modifications will be noted in the summary report.

Possible Problems
This section provides some clues to look for if the test does not yield the expected results.

Legend
For reasons of brevity, the following abbreviation has been used in the Test Suite:

DUT	Device Under Test
FIP	FCoE Initialization Protocol
TS	Testing Station

In the Test Suite, state transitions have been described using the notations used in the **FC-BB-5** document. Any underlined set of transitions implies that that transition is repeated continuously.

References

The following documents are referenced in this text:

- ANSI X3T11/Project 1871D/Rev 1.03, Fibre Channel Backbone 5 FC-BB-5 (hereafter referred to as "FC-BB-5")

Test Setup

The following test setup is used in this test suite:

Test Setup 1:

| Testing Station | Monitor | DUT |
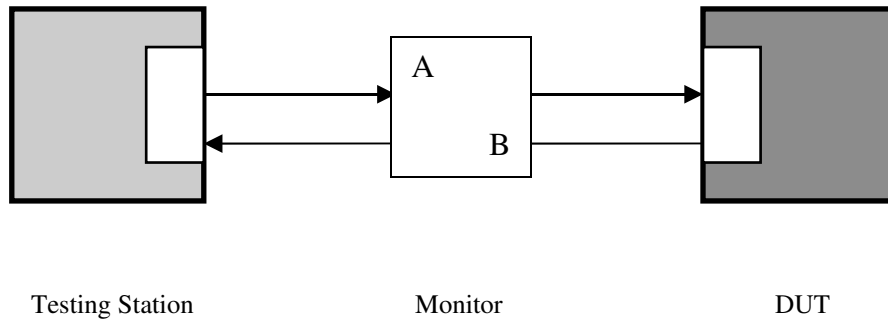
Group 1: FCoE Encapsulation

Overview: Encapsulation serves the purpose of wrapping a Fibre Channel frame in an Ethernet frame. This group tests the proper FCoE encapsulation of the DUT, verifying frame fields contain proper values within a properly formatted frame.

Test #7.1.1: FCoE_TYPE Field

Purpose: To verify that the DUT places the correct FCoE_TYPE field value in the proper place of all frames.

References:
      [1] FC-BB-5 – Clause 7.6 – page 89
      [2] FC-BB-5 – Table 45 – page 108

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      The only type field value currently supported by FCoE is 8906h.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown. The DUT has completed the FIP protocol and has completed login.

Procedure:

1. The DUT is instructed to transmit a large number of valid frames.
2. The activity is captured and observed.

Observable Results:

    On the Monitor, verify that the DUT places the value 8906h in Word 0, Bits 16-31 in all non-FIP frames observed.

Possible Problems: None

Test #7.1.2: Version Field

Purpose: To verify that the DUT places the correct Version field value in the proper place of all frames.

References:
      [1] FC-BB-5 – Clause 7.6 – page 89
      [2] FC-BB-5 – Table 45 – page 108

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

    The only version field value currently supported by FCoE is 0000b.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown. The DUT has completed the FIP protocol and has completed login.

Procedure:

1. The DUT is instructed to transmit a large number of valid frames.
2. The activity is captured and observed.

Observable Results:

    On the Monitor, verify that the DUT places the value 0000b in Word 0, Bits 12-15 in all non-FIP frames observed.

Possible Problems: None

Test #7.1.3: SOF Field

Purpose: To verify that the DUT places the correct SOF field in the proper place of all frames.

References:
      [1] FC-BB-5 – Clause 7.6 – page 89
      [2] FC-BB-5 – Table 22 – page 90

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      The only SOF field values currently supported by FCoE are 28h, 2Dh, 35h, 2Eh and 36h.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown. The DUT has completed the FIP protocol and has completed login.

Procedure:

1. The DUT is instructed to transmit a large number of valid frames.
2. The activity is captured and observed.

Observable Results:

      On the Monitor, verify that the DUT only places supported values in Word 3, Bits 0-7 in all non-FIP frames observed.

Possible Problems: None

Test #7.1.4: EOF Field

Purpose: To verify that the DUT places the correct EOF field in the proper place of all frames.

References:
      [1] FC-BB-5 – Clause 7.6 – page 89
      [2] FC-BB-5 – Table 23 – page 90

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      The only EOF field values currently supported by FCoE are 41h, 42h, 49h and 50h.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown. The DUT has completed the FIP protocol and has completed login.

Procedure:

1. The DUT is instructed to transmit a large number of valid frames.
2. The activity is captured and observed.

Observable Results:

On the Monitor, verify that the DUT only places supported values in the last Word, Bits 24-31 in all non-FIP frames observed.

Possible Problems: None

Test #7.1.5: Reserved Fields

Purpose: To verify that the DUT places 0s in all Reserved fields in the proper places of all frames.

References:
      [1] FC-BB-5 – Clause 7.6 – page 89
      [2] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      Reserved is a keyword referring to bits, bytes, words, fields and code values that are set aside for future standardization. A reserved bit, byte, word or field shall be set to zero, or in accordance with a future extension to this standard. Recipients are not required to check reserved bits, bytes, words or fields for zero values. Receipt of reserved code values in defined fields shall be reported as an error.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown. The DUT has completed the FIP protocol and has completed login.

Procedure:

1. The DUT is instructed to transmit a large number of valid frames.
2. The activity is captured and observed.

Observable Results:

      On the Monitor, verify that the DUT places 0s in the following reserved fields: Word 0, Bits 0-11; Word 1; Word 2; Word 3, Bits 8-31; last Word, Bits 0-23 in all non-FIP frames observed.

Possible Problems: None

Group 2: FIP Encapsulation

Overview: Encapsulation serves the purpose of wrapping a Fibre Channel frame in an Ethernet frame. This group tests the proper FIP encapsulation of the DUT, verifying frame fields contain proper values within a properly formatted frame.

Test #7.2.1: FIP_TYPE Field

Purpose: To verify that the DUT places the correct FIP_TYPE value in the proper places of all frames.

References:
    [1] FC-BB-5 – Clause 7.7.5.1 – page 94
    [2] FC-BB-5 – Table 45 – page 108

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

The only supported value allowed in the FIP_TYPE field is 8914h.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. The activity is captured and observed.

Observable Results:

On the Monitor, verify that the DUT places 8914h in Word 0, Bits 16-31 in all FIP frames observed.

Possible Problems: None

Test #7.2.2: Version Field

Purpose: To verify that the DUT places the correct Version value in the proper places of all frames.

References:
       [1] FC-BB-5 – Clause 7.7.5.1 – page 94
       [2] FC-BB-5 – Table 45 – page 108

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      The only supported value allowed in the Version field is 0001b.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. The activity is captured and observed.

Observable Results:

    On the Monitor, verify that the DUT places 0001b in Word 0, Bits 12-15 in all FIP frames observed.

Possible Problems: None

Test #7.2.3: Reserved Field

Purpose: To verify that the DUT places 0s in the Reserved field in the proper places of all frames.

References:
     [1] FC-BB-5 – Clause 7.7.5.1 – page 94
     [2] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

     Reserved is a keyword referring to bits, bytes, words, fields and code values that are set aside for future standardization. A reserved bit, byte, word or field shall be set to zero, or in accordance with a future extension to this standard. Recipients are not required to check reserved bits, bytes, words or fields for zero values. Receipt of reserved code values in defined fields shall be reported as an error.

Test Setup: *Test Setup 1*. Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. The activity is captured and observed.

Observable Results:

    On the Monitor, verify that the DUT places 0s in Word 0, Bits 0-11 in all FIP frames observed.

Possible Problems: None

Group 3: Encapsulated FIP Operation Encapsulation

Overview: Encapsulation serves the purpose of wrapping a Fibre Channel frame in an Ethernet frame. This group tests the proper Encapsulated FIP Operation encapsulation of the DUT, verifying frame fields contain proper values within a properly formatted frame.

Test #7.3.1: FIP Operation Code Field

Purpose: To verify that the DUT places the correct FIP Operation Code value in the proper places of all frames.

References:
   [1] FC-BB-5 – Clause 7.7.5.2 – page 94
   [2] FC-BB-5 – Table 26 – page 95

Resource Requirements:
   - Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
   - Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

   The only supported, non-reserved values allowed in the FIP Operation Code field are: 0001h, 0002h, 0003h, FFF8h-FFFEh.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

   1. The DUT is instructed to begin and finish the FIP process and login.
   2. Instruct the Testing Station to wait and ignore at least three Keep Alive and Discovery Solicitation messages to be sent in order to generate a Clear Virtual Link message.
   3. The activity is captured and observed.

Observable Results:

   On the Monitor, verify that the DUT places only valid FIP Operation Code values in Word 0, Bits 16-31 in all Encapsulated FIP Operation frames observed.   Verify that all Discovery Solicitation and Discovery Advertisement messages only use the value 0001h. Verify that all Virtual Link Instantiation Request and Virtual Link Instantiation Reply messages only use the value 0002h. Finally verify that all FIP Keep Alive and FIP Clear Virtual Links messages only use the value 0003h.

Possible Problems: None

Test #7.3.2: FIP Subcode Field

Purpose: To verify that the DUT places the correct FIP Subcode value in the proper places of all frames.

References:
    [1] FC-BB-5 – Clause 7.7.5.2 – page 94
    [2] FC-BB-5 – Table 26 – page 95

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

The only non-reserved, non-vendor specific values allowed in the FIP Subcode field are: 01h, 02h.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. Instruct the Testing Station to wait and ignore at least three Keep Alive and Discovery Solicitation messages to be sent in order to generate a Clear Virtual Link message.
3. The activity is captured and observed.

Observable Results:

On the Monitor, verify that all Discovery Solicitation, Virtual Link Instantiation Request, FIP Keep Alive messages only use the value 01h. Also, verify that all Discovery Advertisement, Virtual Link Instantiation Reply, FIP Clear Virtual Links messages only use the value 02h.

Possible Problems: None

Test #7.3.3: FIP Descriptor List Length Field

Purpose: To verify that the DUT places the correct FIP Descriptor List Length value in the proper places of all frames.

References:
      [1] FC-BB-5 – Clause 7.7.5.2 – page 94

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      The FIP Descriptor List Length field shall be set to the length in words of all FIP descriptor(s) that follow.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
3. The activity is captured and observed.

Observable Results:

On the Monitor, verify that all Encapsulated FIP Operation messages contain the correct FIP Descriptor List Length field value in Word 1, Bits 16-31.

Possible Problems: None

Test #7.3.4: Fabric Provided Bit Field

Purpose: To verify that the DUT places the correct Fabric Provided Bit value in the proper places of all frames.

References:
       [1] FC-BB-5 – Clause 7.7.5.2 – page 94
       [2] FC-BB-5 – Table 27 – page 95

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

       The Fabric Provided Bit is used to indicate when a Fabric Provided MAC Address (FPMA) is supported and will be used.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:
   Part A:
     1. The Testing Station is instructed to begin and finish the FIP process and login with the FP bit set to 1 in all valid exchanges.
     2. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
     3. The activity is captured and observed.
   Part B:
     1. The Testing Station is instructed to begin and finish the FIP process and login with the FP bit set to 0 in all valid exchanges.
     2. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
     3. The activity is captured and observed.

Observable Results:

On the Monitor, verify that for all Discovery Solicitation and Discovery Advertisement messages Word 1, Bit 15 is set to 1 if the DUT supports FPMA, otherwise it shall be set to 0. Verify that in all FLOGI Request and FDISC_NPIV Request messages that the bit is set to 1 if the DUT is requesting FPMA, otherwise it shall be set to 0. Finally, verify that in all FLOGI LS_ACC and FDISC_NPIV LS_ACC messages that the bit is set to 1 if the DUT can grant FPMA, otherwise it shall be set to 0.

Possible Problems: None

Test #7.3.5: Server Provided Bit Field

Purpose: To verify that the DUT places the correct Server Provided Bit value in the proper places of all frames.

References:
    [1] FC-BB-5 – Clause 7.7.5.2 – page 94
    [2] FC-BB-5 – Table 27 – page 95

Resource Requirements:
    •   Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
    •   Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

        The Server Provided Bit is used to indicate when a Server Provided MAC Address (SPMA) is supported and will be used.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:
    Part A:
        1.   The Testing Station is instructed to begin and finish the FIP process and login with the SP bit set to 1 in all valid exchanges.
        2.   Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
        3.   The activity is captured and observed.
    Part B:
        1.   The Testing Station is instructed to begin and finish the FIP process and login with the SP bit set to 0 in all valid exchanges.
        2.   Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
        3.   The activity is captured and observed.

Observable Results:

    On the Monitor, verify that for all Discovery Solicitation and Discovery Advertisement messages Word 1, Bit 14 is set to 1 if the DUT supports SPMA, otherwise it shall be set to 0. Verify that in all FLOGI Request and FDISC_NPIV Request messages that the bit is set to 1 if the DUT is requesting SPMA, otherwise it shall be set to 0. Finally, verify that in all FLOGI LS_ACC and FDISC_NPIV LS_ACC messages that the bit is set to 1 if the DUT can grant SPMA, otherwise it shall be set to 0.

Possible Problems: None

Test #7.3.6: Available for Login Bit Field

Purpose: To verify that the DUT places the correct Available for Login Bit value in the proper places of all frames.

References:
        [1] FC-BB-5 – Clause 7.7.5.2 – page 94
        [2] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

        The Available for Login Bit is used to indicate whether an FCF is ready to receive Virtual Link Instantiation requests. In all other cases, the Available for Login Bit is reserved and shall be set to 0.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. If the DUT is an FCF port, the Test Station is instructed to issue several proper Discovery Solicitation messages to the DUT.
3. If the DUT is an FCF port, the Test Station is instructed to continue to login and generate Virtual Links and Discovery Solicitation messages until the DUT can no longer process requests.
4. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
5. The activity is captured and observed.

Observable Results:

On the Monitor, verify that if the DUT is an FCF and can process Virtual Link Instantiation requests, then all Discovery Advertisement messages had Word 1, Bit 2 set to 1. If the DUT is an FCF, when it can no longer process Virtual Link Instantiation requests verify that Word 1, Bit 2 is set to 0. Also, verify that in all other cases and for any DUT that is not an FCF that the bit was set to 0 in all FIP messages.

Possible Problems: None

Test #7.3.7: Solicited Bit Field

Purpose: To verify that the DUT places the correct Solicited Bit value in the proper places of all frames.

References:
    [1] FC-BB-5 – Clause 7.7.5.2 – page 94
    [2] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

        The Solicited Bit is used to indicate whether a Discovery Advertisement message was solicited by another port. In all other cases, the Solicited Bit is reserved and shall be set to 0.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. The Test Station is instructed to issue several proper Discovery Solicitation messages to the DUT.
3. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
4. The activity is captured and observed.

Observable Results:

    On the Monitor, verify that if the DUT is an FCF the solicited Discovery Advertisement messages all had Word 1, Bit 1 set to 1. Also, verify that if the DUT is not an FCF the Discovery Solicitation messages are discarded. Finally, verify that in all other cases and for any DUT that is not an FCF that the bit was set to 0 in all FIP messages.

Possible Problems: None

Test #7.3.8: FCF Bit Field

Purpose: To verify that the DUT places the correct FCF Bit value in the proper places of all frames.

References:
      [1] FC-BB-5 – Clause 7.7.5.2 – page 94
      [2] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

      The FCF bit is used to indicate whether Discovery messages originate from an FCF port. In all other cases, the FCF bit is reserved and shall be set to 0.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
3. The activity is captured and observed.

Observable Results:

On the Monitor, verify that for all Discovery Solicitation and Discovery Advertisement messages if the DUT is an FCF then Word 1, Bit 0 is set to 1, otherwise the bit is set to 0. Also verify that for all other messages transmitted from the DUT the bit is set to 0 regardless of whether the DUT is an FCF or not.

Possible Problems: None

Test #7.3.9: FIP Descriptor Field

Purpose: To verify that the DUT places the correct FIP Descriptor values in the proper places of all frames.

References:
  [1] FC-BB-5 – Clause 7.7.5.2 – page 94
  [2] FC-BB-5 – Table 29 – page 97
  [3] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
  • Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
  • Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: January 6, 2009.

Discussion:

The FIP Descriptor field is a type, length, value field that is used to provide additional information required in FIP services. Multiple FIP Descriptors may be included in a single FIP frame. The only supported Type values are 1-13 and 241-254, all other values are reserved and shall be set to 0.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

  1. The DUT is instructed to begin and finish the FIP process and login.
  2. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
  3. The activity is captured and observed.

Observable Results:

On the Monitor, starting at Word 2 of each message verify that the Type field of each FIP Descriptor contains either 1-13 or 241-254.

Possible Problems: None

Test #7.3.10: FIP_Pad Field

Purpose: To verify that the DUT places the correct FIP_Pad value in the proper places of all frames.

References:
[1] FC-BB-5 – Clause 7.7.5.2 – page 94

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

The FIP_Pad field is used in solicited Discovery Advertisements to extend the frame length to indicate the maximum frame length supported by the originator. *This test only applies to VF_Ports and VE_Ports.*

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown. The DUT has completed FIP and login process.

Procedure:

1. The Test Station is instructed to issue proper Discovery Solicitation messages to the DUT.
2. The DUT is expected to issue a solicited Discovery Advertisement message for each Discovery Solicitation message received.
3. The activity is captured and observed.

Observable Results:

On the Monitor, verify that all solicited Discovery Advertisement messages from the DUT fill the FIP_Pad field with the proper number of words to extend the frame to the maximum supported frame length of the DUT.

Possible Problems: None

Test #7.3.11: Reserved Fields

Purpose: To verify that the DUT places 0s in all Reserved fields in the proper places of all frames.

References:
      [1] FC-BB-5 – Clause 7.7.5.2 – page 94
      [2] FC-BB-5 – Clause 3.9.7 – page 17

Resource Requirements:
- Testing Station capable of transmitting user defined Fibre Channel over Ethernet frames.
- Monitor capable of capturing Fibre Channel over Ethernet traffic.

Last Modification: December 15, 2008.

Discussion:

Reserved is a keyword referring to bits, bytes, words, fields and code values that are set aside for future standardization. A reserved bit, byte, word or field shall be set to zero, or in accordance with a future extension to this standard. Recipients are not required to check reserved bits, bytes, words or fields for zero values. Receipt of reserved code values in defined fields shall be reported as an error.

Test Setup: *Test Setup 1.* Connect the Testing Station, the DUT and the Monitor as shown.

Procedure:

1. The DUT is instructed to begin and finish the FIP process and login.
2. Wait at least 5 minutes to allow for several Keep Alive and Discovery Solicitation messages to be sent.
3. The activity is captured and observed.

Observable Results:

On the Monitor, verify that the DUT places 0s in Word 0, Bits 8-15 and Word 1, Bits 3-13 in all FIP frames observed.

Possible Problems: None