ATTEST™

Conformance Test Suite
White Rabbit Precision Time Protocol
Version 1.1

Test Plan

Part Number: T / TP WRPTP 0419/1.3

Table of Contents

Introduction 1

Test Plans 2

1. Message Format Group (MFG) 2

1.1. tc_conf_wrptp_mfg_001 2

1.2. tc_conf_wrptp_mfg_002 4

1.3. tc_conf_wrptp_mfg_003 11

1.4. tc_conf_wrptp_mfg_004 17

1.5. tc_conf_wrptp_mfg_005 20

1.6. tc_conf_wrptp_mfg_006 27

2. WRPTP State Machine Group (WSMG) 33

2.1. tc_conf_wrptp_wsmg_001 33

2.2. tc_conf_wrptp_wsmg_002 35

2.3. tc_conf_wrptp_wsmg_003 38

2.4. tc_conf_wrptp_wsmg_004 42

2.5. tc_conf_wrptp_wsmg_005 45

2.6. tc_conf_wrptp_wsmg_006 48

2.7. tc_conf_wrptp_wsmg_007 52

2.8. tc_conf_wrptp_wsmg_008 56

2.9. tc_conf_wrptp_wsmg_009 60

2.10. tc_conf_wrptp_wsmg_010 64

2.11. tc_conf_wrptp_wsmg_011 68

2.12. tc_conf_wrptp_wsmg_012 72

2.13. tc_conf_wrptp_wsmg_013 77

2.14. tc_conf_wrptp_wsmg_014 82

2.15. tc_conf_wrptp_wsmg_015 86

2.16. tc_conf_wrptp_wsmg_016 91

2.17. tc_conf_wrptp_wsmg_017 96

2.18. tc_conf_wrptp_wsmg_018 103

2.19. tc_conf_wrptp_wsmg_019 105

2.20. tc_conf_wrptp_wsmg_020 109

2.21. tc_conf_wrptp_wsmg_021 112

2.22. tc_conf_wrptp_wsmg_022 115
2.23. tc_conf_wrptp_wsmg_023 118
2.24. tc_conf_wrptp_wsmg_024 122
2.25. tc_conf_wrptp_wsmg_025 126
2.26. tc_conf_wrptp_wsmg_026 129
2.27. tc_conf_wrptp_wsmg_027 133
2.28. tc_conf_wrptp_wsmg_028 138
2.29. tc_conf_wrptp_wsmg_029 142
2.30. tc_conf_wrptp_wsmg_030 146
2.31. tc_conf_wrptp_wsmg_031 150
2.32. tc_conf_wrptp_wsmg_032 154
2.33. tc_conf_wrptp_wsmg_033 159
2.34. tc_conf_wrptp_wsmg_034 164
2.35. tc_conf_wrptp_wsmg_035 169
3. WRPTP Configuration Group (WCG) 177
3.1. tc_conf_wrptp_wcg_001 177
3.2. tc_conf_wrptp_wcg_002 198
3.3. tc_conf_wrptp_wcg_003 205
3.4. tc_conf_wrptp_wcg_004 212
3.5. tc_conf_wrptp_wcg_005 222
3.6. tc_conf_wrptp_wcg_006 229
4. Inter-operability Group (IOG) 239
4.1. tc_conf_wrptp_iog_001 239
4.2. tc_conf_wrptp_iog_002 242

Introduction

The ATTEST™ White Rabbit Precision Time Protocol Conformance test suite consists of following test groups:

S. No.	Group	Test cases
1	Message Format Group (MFG)	6
2	WRPTP State Machine Group (WSMG)	35
3	WRPTP Configuration Group (WCG)	6
4	Inter-operability Group (IOG)	2
	Total	**49**

© Copyrights 2018 - 2019, CERN

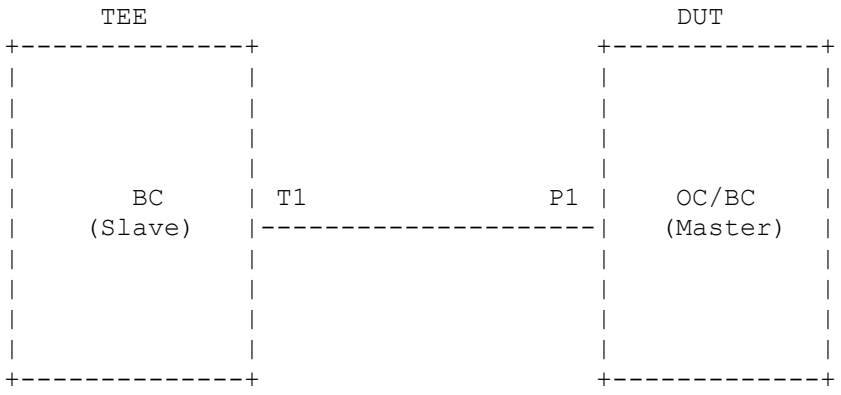
Test Plans

1. Message Format Group (MFG)

1.1. tc_conf_wrptp_mfg_001

```
Test Case         : tc_conf_wrptp_mfg_001
Test Case Version : 1.1
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : Message Format Group (MFG)

Title             : WRPTP Announce message - transport is over IEEE 802.3/
                    Ethernet

Purpose           : To verify that a WRPTP enabled device sends WRPTP
                    Announce message in correct format when transport is
                    over IEEE 802.3/Ethernet.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.5.2
                    Pages 27 and 28

Conformance Type  : MUST
```

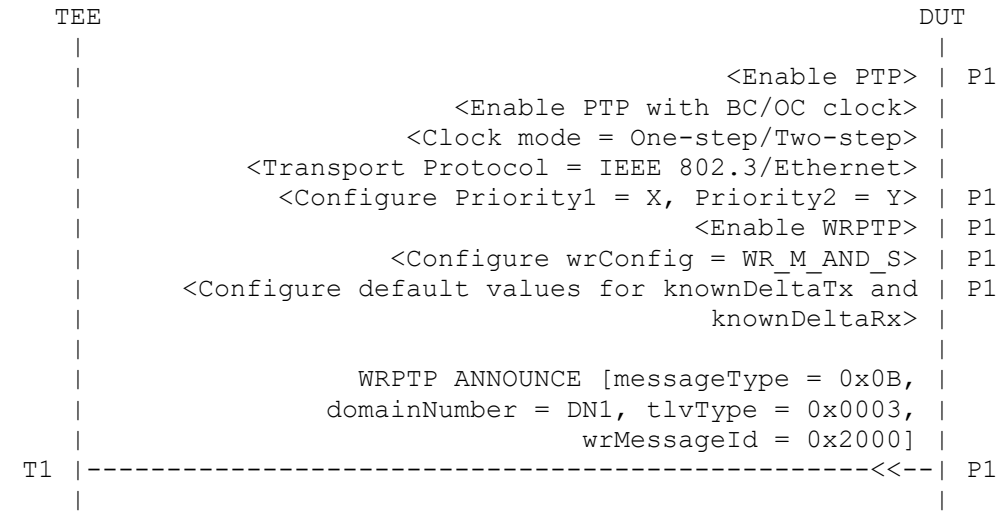
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Enable WRPTP on port P1.
- viii. Configure wrConfig = WR_M_AND_S.
- ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

Step 3 : Verify that DUT transmits WRPTP ANNOUNCE message on port P1 with following parameters.

Ethernet Header

© Copyrights 2018 - 2019, CERN

```
  1) Source MAC                = Unicast MAC
  2) Destination MAC           = Unicast MAC or
                                 01:1B:19:00:00:00
  3) EtherType                 = PTPv2 over Ethernet (0x88F7)
PTP Header
  4) transportSpecific         = 0 or 1, Reserved: 2-F
                                 (4 bits)
  5) messageType               = 0x0B (4 bits)
  6) Reserved Bits (1)         = 0 (4 bits)
  7) versionPTP                = 2 (4 bits)
  8) messageLength             = 64 (2 octets)
  9) domainNumber              = 0 - 255, Reserved: 128 - 255
 10) Reserved Bits (2)         = 0 (8 bits)
 11) flagField                 = 0x0000 - 0xFFFF
 12) correctionField           = 0 (8 octets)
 13) Reserved Bits (3)         = 0 (32 bits)
 14) sourcePortIdentity
      a)clockIdentity          = 8 octets
      b)portNumber             = 2 octets
 15) sequenceId                = 0 - 65535
 16) controlField              = 5
 17) logMessageInterval        = 0 - 4
 18) originTimestamp
      a)secondsField           = 6 octets
      a)nanosecondsField       = 4 octets
 19) currentUtcOffset          = -32768 to 32767
 20) Reserved Bits (4)         = 0 (8 bits)
 21) grandmasterPriority1      = 0 - 255
 22) grandmasterClockQuality
     a) clockClass             = 0 - 255
     b) clockAccuracy          = 0x00 - 0xFF
     c) clockVariance          = 0 - 65535
 23) grandmasterPriority2      = 0 - 255
 24) grandmasterIdentity       = 0x0000000000000000 -
                                 0xFFFFFFFFFFFFFFFF
 25) stepsRemoved              = 0 - 65535
 26) timeSource                = 0x00 - 0xFF
TLV Header
 27) tlvType                   = 0x0003
 28) lengthField               = 10 (2 octets)
 29) OrganizationId            = 0x080030
 30) magicNumber               = 0xDEAD
 31) versionNumber             = 0x01
 32) wrMessageId               = 0x2000
 33) wrFlags                   = 0x0000 - 0xFFFF
     a) wrConfig               = 0x3
     b) calibrated             = 1
     c) wrModeOn               = 0
```

1.2. tc_conf_wrptp_mfg_002

```
Test Case         : tc_conf_wrptp_mfg_002
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
```

© Copyrights 2018 - 2019, CERN

Module Name : Message Format Group (MFG)

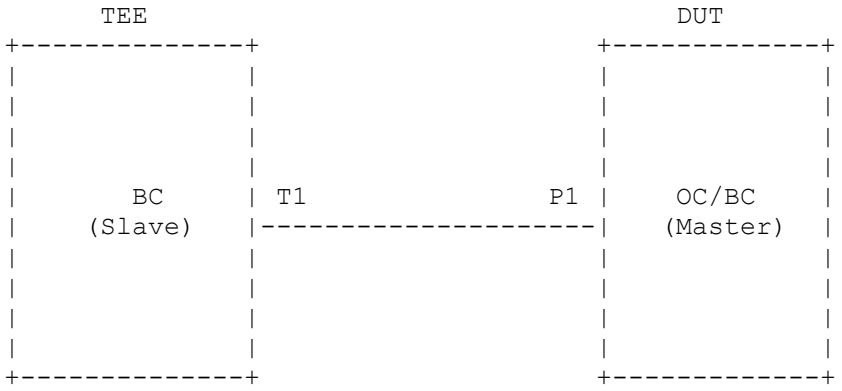
Title : WRPTP Signaling message - WR Master - transport is over IEEE 802.3/Ethernet

Purpose : To verify that a WRPTP enabled device sends WRPTP Signaling messages (LOCK, CALIBRATE, CALIBRATED and WR_MODE_ON) in correct format when its port is WR Master and transport is over IEEE 802.3/Ethernet.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.5.3 Pages 28 and 29

Conformance Type : MUST

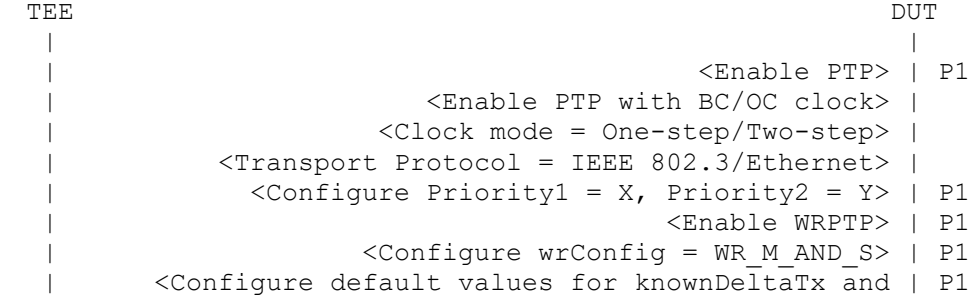
Topology



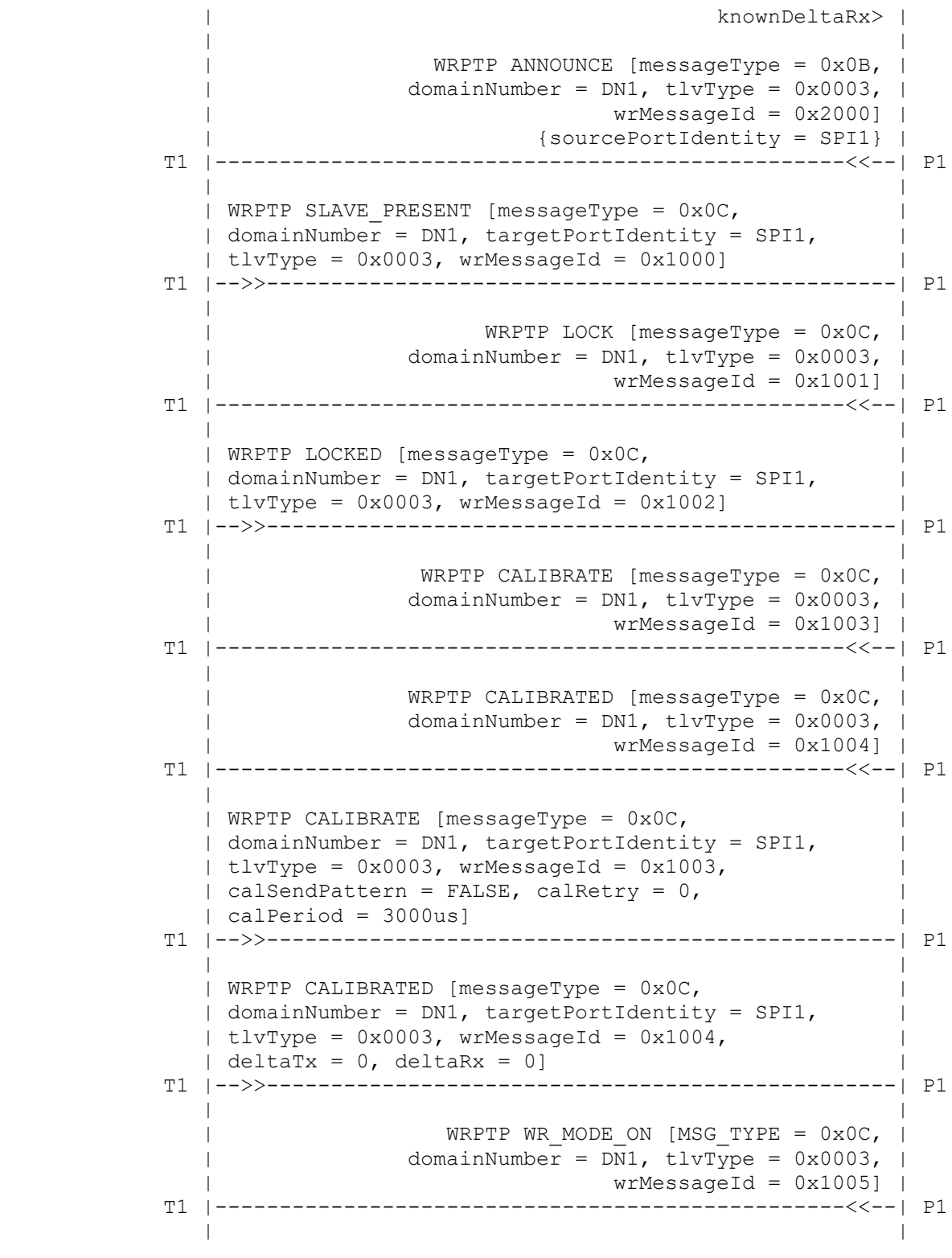
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE = Test Execution Engine
DUT = Device Under Test
T1 = TEE's port 1

© Copyrights 2018 - 2019, CERN

```
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1


Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Verify that DUT transmits WRPTP LOCK message on the port P1 with
         following parameters.

              Ethernet Header
                1) Source MAC               = Unicast MAC
                2) Destination MAC          = Unicast MAC or
                                              01:1B:19:00:00:00
```

© Copyrights 2018 - 2019, CERN

```
   3) EtherType                = PTPv2 over Ethernet (0x88F7)
 PTP Header
   4) transportSpecific        = 0 or 1, Reserved: 2-F
                                 (4 bits)
   5) messageType              = 0x0C (4 bits)
   6) Reserved Bits (1)        = 0 (4 bits)
   7) Version                  = 2 (4 bits)
   8) messageLength            = 56 (2 octets)
   9) domainNumber             = 0 - 255, Reserved: 128 - 255
  10) Reserved Bits (2)        = 0 (8 bits)
  11) flagField                = 0x0000 - 0xFFFF
  12) correctionField          = 0 (8 octets)
  13) Reserved Bits (3)        = 0 (32 bits)
  14) sourcePortIdentity
       a)clockIdentity         = 8 octets
       b)portNumber            = 2 octets
  15) sequenceId               = 0 - 65535
  16) controlField             = 5
  17) logMessageInterval       = 127
  18) targetPortIdentity       = non-zero (10 octets)
 TLV Header
  19) tlvType                  = 0x0003
  20) lengthField              = 8 (2 octets)
  21) OrganizationId           = 0x080030
  22) magicNumber              = 0xDEAD
  23) versionNumber            = 0x01
  24) wrMessageId              = 0x1001
```

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1002
```

Step 7 : Verify that DUT transmits WRPTP CALIBRATE message on the port P1 with following parameters.

```
 Ethernet Header
   1) Source MAC               = Unicast MAC
   2) Destination MAC          = Unicast MAC or
                                 01:1B:19:00:00:00
   3) EtherType                = PTPv2 over Ethernet (0x88F7)
 PTP Header
   4) transportSpecific        = 0 or 1, Reserved: 2-F
                                 (4 bits)
   5) messageType              = 0x0C (4 bits)
   6) Reserved Bits (1)        = 0 (4 bits)
   7) Version                  = 2 (4 bits)
   8) messageLength            = 62 (2 octets)
   9) domainNumber             = 0 - 255, Reserved: 128 - 255
  10) Reserved Bits (2)        = 0 (8 bits)
  11) flagField                = 0x0000 - 0xFFFF
  12) correctionField          = 0 (8 octets)
```

© Copyrights 2018 - 2019, CERN

```
 13) Reserved Bits (3)          = 0 (32 bits)
 14) sourcePortIdentity
      a)clockIdentity           = 8 octets
      b)portNumber              = 2 octets
 15) sequenceId                 = 0 - 65535
 16) controlField               = 5
 17) logMessageInterval         = 127
 18) targetPortIdentity         = non-zero (10 octets)
TLV Header
 19) tlvType                    = 0x0003
 20) lengthField                = 14 (2 octets)
 21) OrganizationId             = 0x080030
 22) magicNumber                = 0xDEAD
 23) versionNumber              = 0x01
 24) wrMessageId                = 0x1003
 25) calSendPattern             = 0x0 (Warning, if 0x1)
 26) calRetry                   = 1 octet
 26) calPeriod                  = 4 octets
```

Step 8 : Verify that DUT transmits WRPTP CALIBRATED message on the port P1 with following parameters.

```
Ethernet Header
  1) Source MAC                 = Unicast MAC
  2) Destination MAC            = Unicast MAC or
                                  01:1B:19:00:00:00
  3) EtherType                  = PTPv2 over Ethernet (0x88F7)
PTP Header
  4) transportSpecific          = 0 or 1, Reserved: 2-F
                                  (4 bits)
  5) messageType                = 0x0C (4 bits)
  6) Reserved Bits (1)          = 0 (4 bits)
  7) Version                    = 2 (4 bits)
  8) messageLength              = 72 (2 octets)
  9) domainNumber               = 0 - 255, Reserved: 128 - 255
 10) Reserved Bits (2)          = 0 (8 bits)
 11) flagField                  = 0x0000 - 0xFFFF
 12) correctionField            = 0 (8 octets)
 13) Reserved Bits (3)          = 0 (32 bits)
 14) sourcePortIdentity
      a)clockIdentity           = 8 octets
      b)portNumber              = 2 octets
 15) sequenceId                 = 0 - 65535
 16) controlField               = 5
 17) logMessageInterval         = 127
 18) targetPortIdentity         = non-zero (10 octets)
TLV Header
 19) tlvType                    = 0x0003
 20) lengthField                = 24 (2 octets)
 21) OrganizationId             = 0x080030
 22) magicNumber                = 0xDEAD
 23) versionNumber              = 0x01
 24) wrMessageId                = 0x1004
 25) deltaTx                    = 8 octets
 26) deltaRx                    = 8 octets
```

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 3000us

Step 10 : Send WRPTP CALIBRATED message on port T1 with following parameters

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 11 : Verify that DUT transmits WRPTP WR_MODE_ON message on the port P1
          with following parameters.

             Ethernet Header
               1) Source MAC               = Unicast MAC
               2) Destination MAC          = Unicast MAC or
                                             01:1B:19:00:00:00
               3) EtherType                = PTPv2 over Ethernet (0x88F7)
             PTP Header
               4) transportSpecific        = 0 or 1, Reserved: 2-F
                                             (4 bits)
               5) messageType              = 0x0C (4 bits)
               6) Reserved Bits (1)        = 0 (4 bits)
               7) Version                  = 2 (4 bits)
               8) messageLength            = 56 (2 octets)
               9) domainNumber             = 0 - 255, Reserved: 128 - 255
              10) Reserved Bits (2)        = 0 (8 bits)
              11) flagField                = 0x0000 - 0xFFFF
              12) correctionField          = 0 (8 octets)
              13) Reserved Bits (3)        = 0 (32 bits)
              14) sourcePortIdentity
                   a)clockIdentity         = 8 octets
                   b)portNumber            = 2 octets
              15) sequenceId               = 0 - 65535
              16) controlField             = 5
              17) logMessageInterval       = 127
              18) targetPortIdentity       = non-zero (10 octets)
             TLV Header
              19) tlvType                  = 0x0003
              20) lengthField              = 8 (2 octets)
              21) OrganizationId           = 0x080030
              22) magicNumber              = 0xDEAD
              23) versionNumber            = 0x01
```

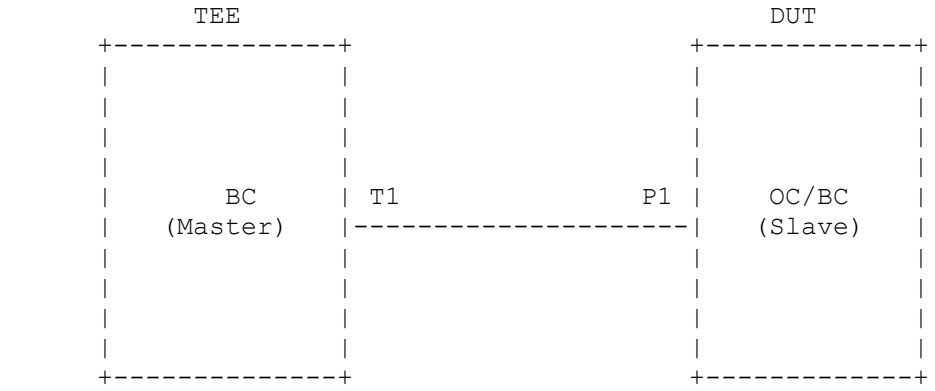
© Copyrights 2018 - 2019, CERN

```
            24) wrMessageId              = 0x1005
```

1.3. tc_conf_wrptp_mfg_003

```
Test Case         : tc_conf_wrptp_mfg_003
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : Message Format Group (MFG)

Title             : WRPTP Signaling message - WR Slave - transport is over
                    IEEE 802.3/Ethernet

Purpose           : To verify that a WRPTP enabled device sends WRPTP
                    Signaling messages (SLAVE_PRESENT, LOCKED, CALIBRATE
                    and CALIBRATED) in correct format when its port is WR
                    Slave and transport is over IEEE 802.3/Ethernet.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.5.3
                    Pages 28 and 29

Conformance Type  : MUST
```

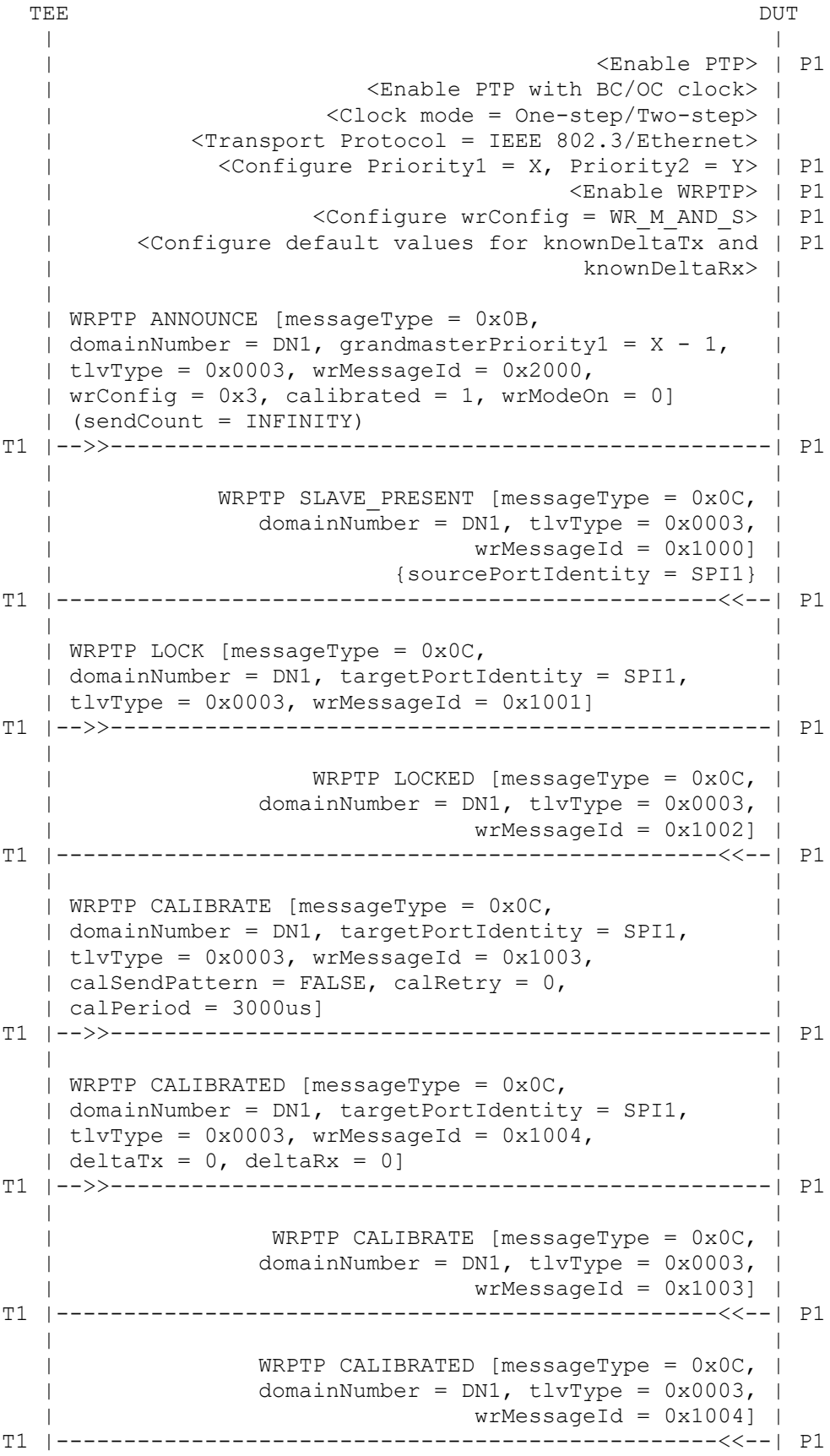
Topology



Legends:

```
    TEE     : Test Execution Engine
    DUT     : Device Under Test
    OC      : Ordinary Clock
    BC      : Boundary Clock
    T1      : Port 1 at TEE
    P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          |                                                       |

Legends           :

    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1



Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port P1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and verify that DUT transmits WRPTP
         SLAVE_PRESENT message on the port P1 with following parameters and
         store sourcePortIdentity as SPI1.

              Ethernet Header
                1) Source MAC               = Unicast MAC
                2) Destination MAC          = Unicast MAC or
```

© Copyrights 2018 - 2019, CERN

```
                                        01:1B:19:00:00:00
                3) EtherType                = PTPv2 over Ethernet (0x88F7)
              PTP Header
                4) transportSpecific        = 0 or 1, Reserved: 2-F
                                              (4 bits)
                5) messageType              = 0x0C (4 bits)
                6) Reserved Bits (1)        = 0 (4 bits)
                7) Version                  = 2 (4 bits)
                8) messageLength            = 56 (2 octets)
                9) domainNumber             = 0 - 255, Reserved: 128 - 255
               10) Reserved Bits (2)        = 0 (8 bits)
               11) flagField                = 0x0000 - 0xFFFF
               12) correctionField          = 0  (8 octets)
               13) Reserved Bits (3)        = 0 (32 bits)
               14) sourcePortIdentity
                    a)clockIdentity         = 8 octets
                    b)portNumber            = 2 octets
               15) sequenceId               = 0 - 65535
               16) controlField             = 5
               17) logMessageInterval       = 127
               18) targetPortIdentity       = non-zero (10 octets)
              TLV Header
               19) tlvType                  = 0x0003
               20) lengthField              = 8 (2 octets)
               21) OrganizationId           = 0x080030
               22) magicNumber              = 0xDEAD
               23) versionNumber            = 0x01
               24) wrMessageId              = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Verify that DUT transmits WRPTP LOCKED message on the port P1 with
         following parameters.

              Ethernet Header
                1) Source MAC               = Unicast MAC
                2) Destination MAC          = Unicast MAC or
                                              01:1B:19:00:00:00
                3) EtherType                = PTPv2 over Ethernet (0x88F7)
              PTP Header
                4) transportSpecific        = 0 or 1, Reserved: 2-F
                                              (4 bits)
                5) messageType              = 0x0C (4 bits)
                6) Reserved Bits (1)        = 0 (4 bits)
                7) Version                  = 2 (4 bits)
                8) messageLength            = 56 (2 octets)
                9) domainNumber             = 0 - 255, Reserved: 128 - 255
               10) Reserved Bits (2)        = 0 (8 bits)
               11) flagField                = 0x0000 - 0xFFFF
```

```
  12) correctionField           = 0 (8 octets)
  13) Reserved Bits (3)         = 0 (32 bits)
  14) sourcePortIdentity
       a)clockIdentity          = 8 octets
       b)portNumber             = 2 octets
  15) sequenceId                = 0 - 65535
  16) controlField              = 5
  17) logMessageInterval        = 127
  18) targetPortIdentity        = non-zero (10 octets)
 TLV Header
  19) tlvType                   = 0x0003
  20) lengthField               = 8 (2 octets)
  21) OrganizationId            = 0x080030
  22) magicNumber               = 0xDEAD
  23) versionNumber             = 0x01
  24) wrMessageId               = 0x1002
```

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

```
        PTP Header
            messageType         = 0x0C
            domainNumber        = DN1
            targetPortIdentity  = SPI1
        TLV
            tlvType             = 0x0003
            wrMessageId         = 0x1003
            calSendPattern      = FALSE
            calRetry            = 0
            calPeriod           = 3000us
```

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters

```
        PTP Header
            messageType         = 0x0C
            domainNumber        = DN1
            targetPortIdentity  = SPI1
        TLV
            tlvType             = 0x0003
            wrMessageId         = 0x1004
            deltaTx             = 0
            deltaRx             = 0
```

Step 9 : Verify that DUT transmits WRPTP CALIBRATE message on the port P1 with following parameters.

```
         Ethernet Header
           1) Source MAC              = Unicast MAC
           2) Destination MAC         = Unicast MAC or
                                        01:1B:19:00:00:00
           3) EtherType               = PTPv2 over Ethernet (0x88F7)
         PTP Header
           4) transportSpecific       = 0 or 1, Reserved: 2-F
                                        (4 bits)
           5) messageType             = 0x0C (4 bits)
           6) Reserved Bits (1)       = 0 (4 bits)
           7) Version                 = 2 (4 bits)
           8) messageLength           = 62 (2 octets)
```

© Copyrights 2018 - 2019, CERN

```
  9) domainNumber              = 0 - 255, Reserved: 128 - 255
 10) Reserved Bits (2)         = 0 (8 bits)
 11) flagField                 = 0x0000 - 0xFFFF
 12) correctionField           = 0 (8 octets)
 13) Reserved Bits (3)         = 0 (32 bits)
 14) sourcePortIdentity
      a)clockIdentity          = 8 octets
      b)portNumber             = 2 octets
 15) sequenceId                = 0 - 65535
 16) controlField              = 5
 17) logMessageInterval        = 127
 18) targetPortIdentity        = non-zero (10 octets)
TLV Header
 19) tlvType                   = 0x0003
 20) lengthField               = 14 (2 octets)
 21) OrganizationId            = 0x080030
 22) magicNumber               = 0xDEAD
 23) versionNumber             = 0x01
 24) wrMessageId               = 0x1003
 25) calSendPattern            = 0x0 (Warning, if 0x1)
 26) calRetry                  = 1 octet
 26) calPeriod                 = 4 octets
```

Step 10 : Verify that DUT transmits WRPTP CALIBRATED message on the port P1 with following parameters.

```
Ethernet Header
  1) Source MAC                = Unicast MAC
  2) Destination MAC           = Unicast MAC or
                                 01:1B:19:00:00:00
  3) EtherType                 = PTPv2 over Ethernet (0x88F7)
PTP Header
  4) transportSpecific         = 0 or 1, Reserved: 2-F
                                 (4 bits)
  5) messageType               = 0x0C (4 bits)
  6) Reserved Bits (1)         = 0 (4 bits)
  7) Version                   = 2 (4 bits)
  8) messageLength             = 72 (2 octets)
  9) domainNumber              = 0 - 255, Reserved: 128 - 255
 10) Reserved Bits (2)         = 0 (8 bits)
 11) flagField                 = 0x0000 - 0xFFFF
 12) correctionField           = 0 (8 octets)
 13) Reserved Bits (3)         = 0 (32 bits)
 14) sourcePortIdentity
      a)clockIdentity          = 8 octets
      b)portNumber             = 2 octets
 15) sequenceId                = 0 - 65535
 16) controlField              = 5
 17) logMessageInterval        = 127
 18) targetPortIdentity        = non-zero (10 octets)
TLV Header
 19) tlvType                   = 0x0003
 20) lengthField               = 24 (2 octets)
 21) OrganizationId            = 0x080030
 22) magicNumber               = 0xDEAD
 23) versionNumber             = 0x01
 24) wrMessageId               = 0x1004
```

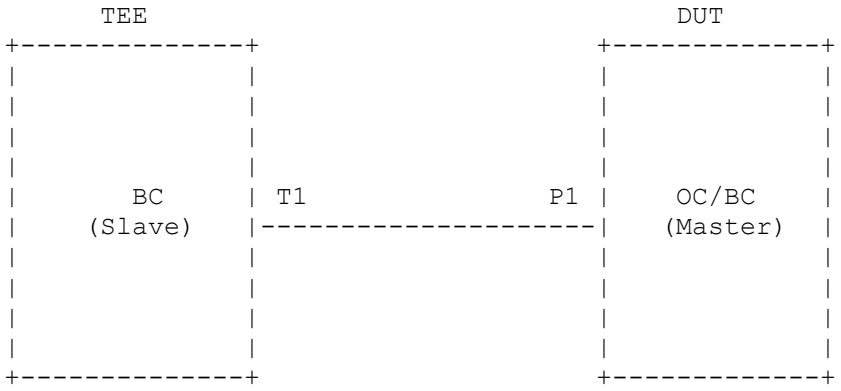
© Copyrights 2018 - 2019, CERN

```
              25) deltaTx                  = 8 octets
              26) deltaRx                  = 8 octets
```

1.4. tc_conf_wrptp_mfg_004

```
Test Case         : tc_conf_wrptp_mfg_004
Test Case Version : 1.0
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : Message Format Group (MFG)

Title             : WRPTP Announce message - transport is over IPv4/UDP

Purpose           : To verify that a WRPTP enabled device sends WRPTP
                    Announce message in correct format when transport is
                    over IPv4/UDP.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.5.2
                    Pages 27 and 28

Conformance Type  : MUST
```

Topology

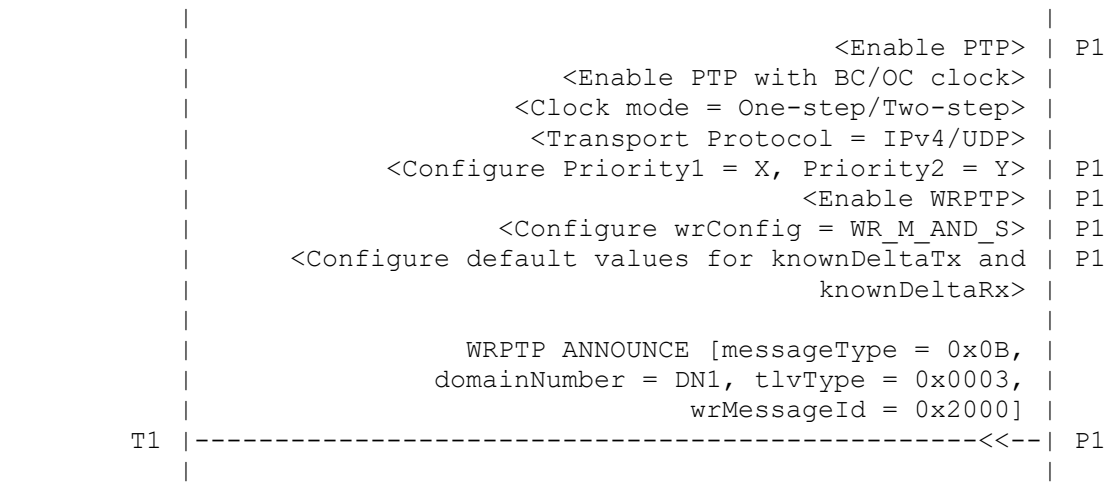


Legends:

```
    TEE     : Test Execution Engine
    DUT     : Device Under Test
    OC      : Ordinary Clock
    BC      : Boundary Clock
    T1      : Port 1 at TEE
    P1      : Port 1 at DUT
```

Ladder Diagram :

```
      TEE                                                    DUT
```



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IPv4/UDP.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Verify that DUT transmits WRPTP ANNOUNCE message on port P1 with following parameters.

Ethernet Header
1) Source MAC = Unicast MAC
2) Destination MAC = Unicast MAC or

© Copyrights 2018 - 2019, CERN

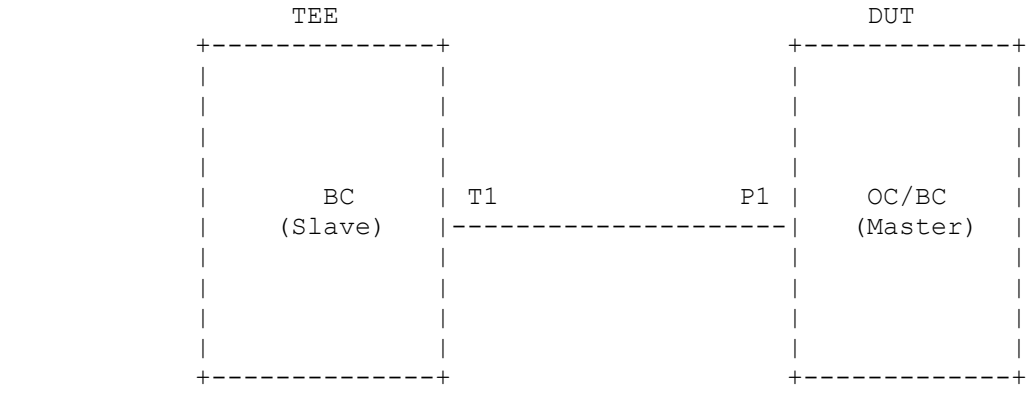
```
                                    01:00:5E:00:01:81
  3) EtherType                    = IPv4 (0x800)

IPv4 Fields
  4) IP Protocol = 17 (UDP)
  5) Destination IP = 224.0.1.129
  6) Source IP = Unicast IP
  7) Checksum = Valid

UDP Fields
  8) UDP Destination Port = 320 (General Message)
  9) Checksum = Valid

PTP Header
 10) transportSpecific            = 0 or 1, Reserved: 2-F
                                    (4 bits)
 11) messageType                  = 0x0B (4 bits)
 12) Reserved Bits (1)            = 0 (4 bits)
 13) versionPTP                   = 2 (4 bits)
 14) messageLength                = 64 (2 octets)
 15) domainNumber                 = 0 - 255, Reserved: 128 - 255
 16) Reserved Bits (2)            = 0 (8 bits)
 17) flagField                    = 0x0000 - 0xFFFF
 18) correctionField              = 0 (8 octets)
 19) Reserved Bits (3)            = 0 (32 bits)
 20) sourcePortIdentity
      a)clockIdentity             = 8 octets
      b)portNumber                = 2 octets
 21) sequenceId                   = 0 - 65535
 22) controlField                 = 5
 23) logMessageInterval           = 0 - 4
 24) originTimestamp
      a)secondsField              = 6 octets
      a)nanosecondsField          = 4 octets
 25) currentUtcOffset             = -32768 to 32767
 26) Reserved Bits (4)            = 0 (8 bits)
 27) grandmasterPriority1         = 0 - 255
 28) grandmasterClockQuality
     a) clockClass                = 0 - 255
     b) clockAccuracy             = 0x00 - 0xFF
     c) clockVariance             = 0 - 65535
 29) grandmasterPriority2         = 0 - 255
 30) grandmasterIdentity          = 0x0000000000000000 -
                                    0xFFFFFFFFFFFFFFFF
 31) stepsRemoved                 = 0 - 65535
 32) timeSource                   = 0x00 - 0xFF
TLV Header
 33) tlvType                      = 0x0003
 34) lengthField                  = 10 (2 octets)
 35) OrganizationId               = 0x080030
 36) magicNumber                  = 0xDEAD
 37) versionNumber                = 0x01
 38) wrMessageId                  = 0x2000
 39) wrFlags                      = 0x0000 - 0xFFFF
     a) wrConfig                  = 0x3
     b) calibrated                = 1
     c) wrModeOn                  = 0
```

© Copyrights 2018 - 2019, CERN

1.5. tc_conf_wrptp_mfg_005

```
Test Case          : tc_conf_wrptp_mfg_005
Test Case Version  : 1.1
Component Name     : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name        : Message Format Group (MFG)

Title              : WRPTP Signaling message – WR Master - transport is over
                     IPv4/UDP

Purpose            : To verify that a WRPTP enabled device sends WRPTP
                     Signaling messages (LOCK, CALIBRATE, CALIBRATED and
                     WR_MODE_ON) in correct format when its port is WR Master
                     and transport is over IPv4/UDP.

Reference          : White Rabbit Specification v2.0 July 2011, Clause 6.5.3
                     Pages 28 and 29

Conformance Type   : MUST
```

Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :

TEE DUT

```
    |                                                   |
    |                                      <Enable PTP> | P1
    |                      <Enable PTP with BC/OC clock> |
    |                   <Clock mode = One-step/Two-step> |
    |                    <Transport Protocol = IPv4/UDP> |
    |            <Configure Priority1 = X, Priority2 = Y> | P1
    |                                    <Enable WRPTP> | P1
    |                  <Configure wrConfig = WR_M_AND_S> | P1
    |      <Configure default values for knownDeltaTx and | P1
    |                                     knownDeltaRx> |
    |                                                   |
    |                WRPTP ANNOUNCE [messageType = 0x0B, |
    |              domainNumber = DN1, tlvType = 0x0003, |
    |                              wrMessageId = 0x2000] |
    |                        {sourcePortIdentity = SPI1} |
T1  |-------------------------------------------------<<--| P1
    |                                                   |
    | WRPTP SLAVE_PRESENT [messageType = 0x0C,            |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1000]             |
T1  |-->>-------------------------------------------------| P1
    |                                                   |
    |                    WRPTP LOCK [messageType = 0x0C, |
    |              domainNumber = DN1, tlvType = 0x0003, |
    |                              wrMessageId = 0x1001] |
T1  |-------------------------------------------------<<--| P1
    |                                                   |
    | WRPTP LOCKED [messageType = 0x0C,                   |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1002]             |
T1  |-->>-------------------------------------------------| P1
    |                                                   |
    |               WRPTP CALIBRATE [messageType = 0x0C, |
    |              domainNumber = DN1, tlvType = 0x0003, |
    |                              wrMessageId = 0x1003] |
T1  |-------------------------------------------------<<--| P1
    |                                                   |
    |              WRPTP CALIBRATED [messageType = 0x0C, |
    |              domainNumber = DN1, tlvType = 0x0003, |
    |                              wrMessageId = 0x1004] |
T1  |-------------------------------------------------<<--| P1
    |                                                   |
    | WRPTP CALIBRATE [messageType = 0x0C,                |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1003,             |
    | calSendPattern = FALSE, calRetry = 0,               |
    | calPeriod = 3000us]                                 |
T1  |-->>-------------------------------------------------| P1
    |                                                   |
    | WRPTP CALIBRATED [messageType = 0x0C,               |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1004,             |
    | deltaTx = 0, deltaRx = 0]                           |
T1  |-->>-------------------------------------------------| P1
    |                                                   |
    |                 WRPTP WR_MODE_ON [MSG_TYPE = 0x0C, |
    |              domainNumber = DN1, tlvType = 0x0003, |
```

```
          |                                wrMessageId = 0x1005] |
       T1 |-------------------------------------------------<<--| P1
          |                                                      |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IPv4/UDP.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header		
	messageType	= 0x0B
	domainNumber	= DN1
TLV		
	tlvType	= 0x0003
	wrMessageId	= 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

PTP Header		
	messageType	= 0x0C
	domainNumber	= DN1
	targetPortIdentity	= SPI1
TLV		
	tlvType	= 0x0003

© Copyrights 2018 - 2019, CERN

```
                wrMessageID          = 0x1000

Step 5 : Verify that DUT transmits WRPTP LOCK message on the port P1 with
         following parameters.

              Ethernet Header
                1) Source MAC                = Unicast MAC
                2) Destination MAC           = Unicast MAC or
                                               01:00:5E:00:01:81
                3) EtherType                 = IPv4 (0x800)

              IPv4 Fields
                4) IP Protocol = 17 (UDP)
                5) Destination IP = 224.0.1.129
                6) Source IP = Unicast IP
                7) Checksum = Valid

              UDP Fields
                8) UDP Destination Port = 320 (General Message)
                9) Checksum = Valid

              PTP Header
               10) transportSpecific         = 0 or 1, Reserved: 2-F
                                               (4 bits)
               11) messageType               = 0x0C (4 bits)
               12) Reserved Bits (1)         = 0 (4 bits)
               13) Version                   = 2 (4 bits)
               14) messageLength             = 56 (2 octets)
               15) domainNumber              = 0 - 255, Reserved: 128 - 255
               16) Reserved Bits (2)         = 0 (8 bits)
               17) flagField                 = 0x0000 - 0xFFFF
               18) correctionField           = 0 (8 octets)
               19) Reserved Bits (3)         = 0 (32 bits)
               20) sourcePortIdentity
                    a)clockIdentity          = 8 octets
                    b)portNumber             = 2 octets
               21) sequenceId                = 0 - 65535
               22) controlField              = 5
               23) logMessageInterval        = 127
               24) targetPortIdentity        = non-zero (10 octets)
              TLV Header
               25) tlvType                   = 0x0003
               26) lengthField               = 8 (2 octets)
               27) OrganizationId            = 0x080030
               28) magicNumber               = 0xDEAD
               29) versionNumber             = 0x01
               30) wrMessageId               = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002
```

© Copyrights 2018 - 2019, CERN

```
Step 7 : Verify that DUT transmits WRPTP CALIBRATE message on the port P1
         with following parameters.

              Ethernet Header
                1) Source MAC                = Unicast MAC
                2) Destination MAC           = Unicast MAC or
                                               01:00:5E:00:01:81
                3) EtherType                 = IPv4 (0x800)

              IPv4 Fields
                4) IP Protocol = 17 (UDP)
                5) Destination IP = 224.0.1.129
                6) Source IP = Unicast IP
                7) Checksum = Valid

              UDP Fields
                8) UDP Destination Port = 320 (General Message)
                9) Checksum = Valid

              PTP Header
               10) transportSpecific         = 0 or 1, Reserved: 2-F
                                               (4 bits)
               11) messageType               = 0x0C (4 bits)
               12) Reserved Bits (1)         = 0 (4 bits)
               13) Version                   = 2 (4 bits)
               14) messageLength             = 62 (2 octets)
               15) domainNumber              = 0 - 255, Reserved: 128 - 255
               16) Reserved Bits (2)         = 0 (8 bits)
               17) flagField                 = 0x0000 - 0xFFFF
               18) correctionField           = 0 (8 octets)
               19) Reserved Bits (3)         = 0 (32 bits)
               20) sourcePortIdentity
                    a)clockIdentity          = 8 octets
                    b)portNumber             = 2 octets
               21) sequenceId                = 0 - 65535
               22) controlField              = 5
               23) logMessageInterval        = 127
               24) targetPortIdentity        = non-zero (10 octets)
              TLV Header
               25) tlvType                   = 0x0003
               26) lengthField               = 14 (2 octets)
               27) OrganizationId            = 0x080030
               28) magicNumber               = 0xDEAD
               29) versionNumber             = 0x01
               30) wrMessageId               = 0x1003
               31) calSendPattern            = 0x0 (Warning, if 0x1)
               32) calRetry                  = 1 octet
               33) calPeriod                 = 4 octets

Step 8 : Verify that DUT transmits WRPTP CALIBRATED message on the port P1
         with following parameters.

              Ethernet Header
                1) Source MAC                = Unicast MAC
                2) Destination MAC           = Unicast MAC or
                                               01:00:5E:00:01:81
```

© Copyrights 2018 - 2019, CERN

```
   3) EtherType                 = IPv4 (0x800)

 IPv4 Fields
   4) IP Protocol = 17 (UDP)
   5) Destination IP = 224.0.1.129
   6) Source IP = Unicast IP
   7) Checksum = Valid

 UDP Fields
   8) UDP Destination Port = 320 (General Message)
   9) Checksum = Valid

 PTP Header
  10) transportSpecific         = 0 or 1, Reserved: 2-F
                                  (4 bits)
  11) messageType               = 0x0C (4 bits)
  12) Reserved Bits (1)         = 0 (4 bits)
  13) Version                   = 2 (4 bits)
  14) messageLength             = 72 (2 octets)
  15) domainNumber              = 0 - 255, Reserved: 128 - 255
  16) Reserved Bits (2)         = 0 (8 bits)
  17) flagField                 = 0x0000 - 0xFFFF
  18) correctionField           = 0 (8 octets)
  19) Reserved Bits (3)         = 0 (32 bits)
  20) sourcePortIdentity
       a)clockIdentity          = 8 octets
       b)portNumber             = 2 octets
  21) sequenceId                = 0 - 65535
  22) controlField              = 5
  23) logMessageInterval        = 127
  24) targetPortIdentity        = non-zero (10 octets)
 TLV Header
  25) tlvType                   = 0x0003
  26) lengthField               = 24 (2 octets)
  27) OrganizationId            = 0x080030
  28) magicNumber               = 0xDEAD
  29) versionNumber             = 0x01
  30) wrMessageId               = 0x1004
  31) deltaTx                   = 8 octets
  32) deltaRx                   = 8 octets
```

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1003
    calSendPattern       = FALSE
    calRetry             = 0
    calPeriod            = 3000us
```

Step 10 : Send WRPTP CALIBRATED message on port T1 with following parameters

```
PTP Header
```

© Copyrights 2018 - 2019, CERN

```
        messageType          = 0x0C
        domainNumber         = DN1
        targetPortIdentity   = SPI1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1004
        deltaTx              = 0
        deltaRx              = 0
```

Step 11 : Verify that DUT transmits WRPTP WR_MODE_ON message on the port P1 with following parameters.

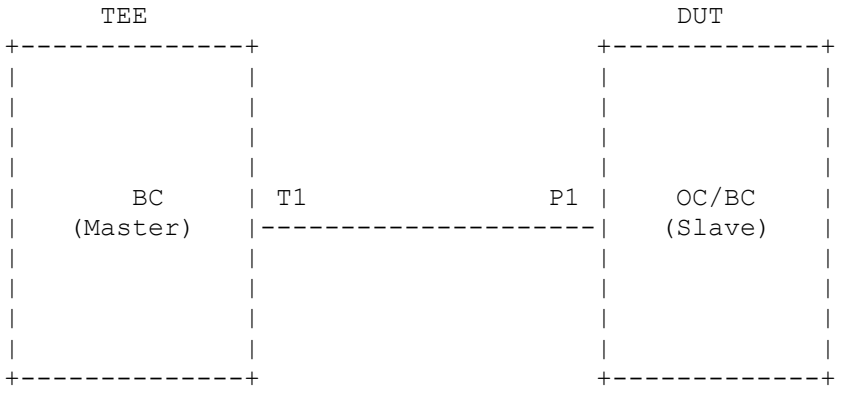
```
    Ethernet Header
      1) Source MAC               = Unicast MAC
      2) Destination MAC          = Unicast MAC or
                                    01:00:5E:00:01:81
      3) EtherType                = IPv4 (0x800)

    IPv4 Fields
      4) IP Protocol = 17 (UDP)
      5) Destination IP = 224.0.1.129
      6) Source IP = Unicast IP
      7) Checksum = Valid

    UDP Fields
      8) UDP Destination Port = 320 (General Message)
      9) Checksum = Valid

    PTP Header
     10) transportSpecific        = 0 or 1, Reserved: 2-F
                                    (4 bits)
     11) messageType              = 0x0C (4 bits)
     12) Reserved Bits (1)        = 0 (4 bits)
     13) Version                  = 2 (4 bits)
     14) messageLength            = 56 (2 octets)
     15) domainNumber             = 0 - 255, Reserved: 128 - 255
     16) Reserved Bits (2)        = 0 (8 bits)
     17) flagField                = 0x0000 - 0xFFFF
     18) correctionField          = 0 (8 octets)
     19) Reserved Bits (3)        = 0 (32 bits)
     20) sourcePortIdentity
          a)clockIdentity         = 8 octets
          b)portNumber            = 2 octets
     21) sequenceId               = 0 - 65535
     22) controlField             = 5
     23) logMessageInterval       = 127
     24) targetPortIdentity       = non-zero (10 octets)
    TLV Header
     25) tlvType                  = 0x0003
     26) lengthField              = 8 (2 octets)
     27) OrganizationId           = 0x080030
     28) magicNumber              = 0xDEAD
     29) versionNumber            = 0x01
     30) wrMessageId              = 0x1005
```

© Copyrights 2018 - 2019, CERN

1.6. tc_conf_wrptp_mfg_006

```
Test Case         : tc_conf_wrptp_mfg_006
Test Case Version : 1.1
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : Message Format Group (MFG)

Title             : WRPTP Signaling message - WR Slave - transport is over
                    IPv4/UDP.

Purpose           : To verify that a WRPTP enabled device sends WRPTP
                    Signaling messages (SLAVE_PRESENT, LOCKED, CALIBRATE
                    and CALIBRATED) in correct format when its port is WR
                    Slave and transport is over IPv4/UDP.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.5.3
                    Pages 28 and 29

Conformance Type  : MUST
```

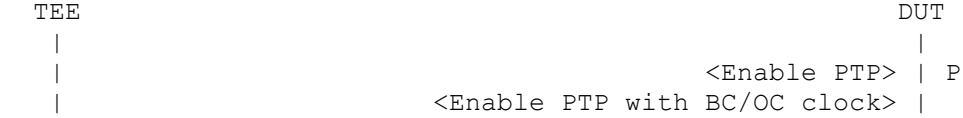
Topology



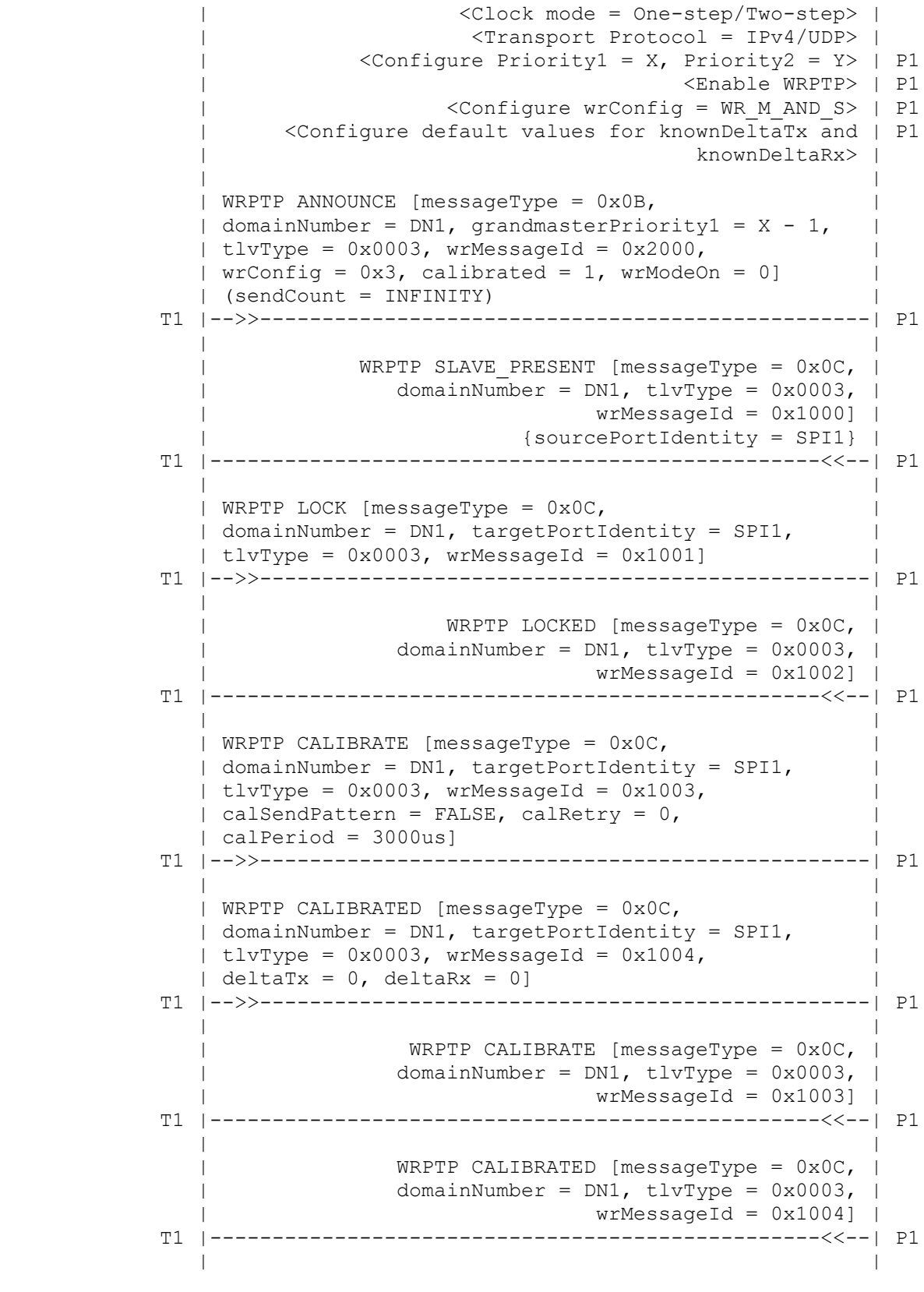
Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN


<Clock mode = One-step/Two-step>
<Transport Protocol = IPv4/UDP>
<Configure Priority1 = X, Priority2 = Y>
<Enable WRPTP>
<Configure wrConfig = WR_M_AND_S>
<Configure default values for knownDeltaTx and knownDeltaRx>
WRPTP ANNOUNCE [messageType = 0x0B, domainNumber = DN1, grandmasterPriority1 = X - 1, tlvType = 0x0003, wrMessageId = 0x2000, wrConfig = 0x3, calibrated = 1, wrModeOn = 0] (sendCount = INFINITY)
T1
P1
WRPTP SLAVE_PRESENT [messageType = 0x0C, domainNumber = DN1, tlvType = 0x0003, wrMessageId = 0x1000] {sourcePortIdentity = SPI1}
WRPTP LOCK [messageType = 0x0C, domainNumber = DN1, targetPortIdentity = SPI1, tlvType = 0x0003, wrMessageId = 0x1001]
WRPTP LOCKED [messageType = 0x0C, domainNumber = DN1, tlvType = 0x0003, wrMessageId = 0x1002]
WRPTP CALIBRATE [messageType = 0x0C, domainNumber = DN1, targetPortIdentity = SPI1, tlvType = 0x0003, wrMessageId = 0x1003, calSendPattern = FALSE, calRetry = 0, calPeriod = 3000us]
WRPTP CALIBRATED [messageType = 0x0C, domainNumber = DN1, targetPortIdentity = SPI1, tlvType = 0x0003, wrMessageId = 0x1004, deltaTx = 0, deltaRx = 0]
WRPTP CALIBRATE [messageType = 0x0C, domainNumber = DN1, tlvType = 0x0003, wrMessageId = 0x1003]
WRPTP CALIBRATED [messageType = 0x0C, domainNumber = DN1, tlvType = 0x0003, wrMessageId = 0x1004]

Legends :

```
    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1
```

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IPv4/UDP.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port P1 with following parameters.

```
PTP Header
    messageType          = 0x0B
    domainNumber         = DN1
    grandmasterPriority1 = X - 1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x2000
    wrConfig             = 0x3
    calibrated           = 1
    wrModeOn             = 0
```

Step 4 : Wait until completion of BMCA and verify that DUT transmits WRPTP SLAVE_PRESENT message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

```
Ethernet Header
  1) Source MAC               = Unicast MAC
  2) Destination MAC          = Unicast MAC or
                                01:1B:19:00:00:00
  3) EtherType                = IPv4 (0x800)

IPv4 Fields
```

© Copyrights 2018 - 2019, CERN

```
              4) IP Protocol = 17 (UDP)
              5) Destination IP = 224.0.1.129
              6) Source IP = Unicast IP
              7) Checksum = Valid

            UDP Fields
              8) UDP Destination Port = 320 (General Message)
              9) Checksum = Valid

            PTP Header
             10) transportSpecific         = 0 or 1, Reserved: 2-F
                                             (4 bits)
             11) messageType               = 0x0C (4 bits)
             12) Reserved Bits (1)         = 0 (4 bits)
             13) Version                   = 2 (4 bits)
             14) messageLength             = 56 (2 octets)
             15) domainNumber              = 0 - 255, Reserved: 128 - 255
             16) Reserved Bits (2)         = 0 (8 bits)
             17) flagField                 = 0x0000 - 0xFFFF
             18) correctionField           = 0  (8 octets)
             19) Reserved Bits (3)         = 0 (32 bits)
             20) sourcePortIdentity
                  a)clockIdentity          = 8 octets
                  b)portNumber             = 2 octets
             21) sequenceId                = 0 - 65535
             22) controlField              = 5
             23) logMessageInterval        = 127
             24) targetPortIdentity        = non-zero (10 octets)
            TLV Header
             25) tlvType                   = 0x0003
             26) lengthField               = 8 (2 octets)
             27) OrganizationId            = 0x080030
             28) magicNumber               = 0xDEAD
             29) versionNumber             = 0x01
             30) wrMessageId               = 0x1000
```

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001
```

Step 6 : Verify that DUT transmits WRPTP LOCKED message on the port P1 with following parameters.

```
             Ethernet Header
               1) Source MAC               = Unicast MAC
               2) Destination MAC          = Unicast MAC or
                                             01:1B:19:00:00:00
               3) EtherType                = IPv4 (0x800)

             IPv4 Fields
               4) IP Protocol = 17 (UDP)
```

© Copyrights 2018 - 2019, CERN

```
   5) Destination IP = 224.0.1.129
   6) Source IP = Unicast IP
   7) Checksum = Valid

 UDP Fields
   8) UDP Destination Port = 320 (General Message)
   9) Checksum = Valid

 PTP Header
  10) transportSpecific         = 0 or 1, Reserved: 2-F
                                  (4 bits)
  11) messageType               = 0x0C (4 bits)
  12) Reserved Bits (1)         = 0 (4 bits)
  13) Version                   = 2 (4 bits)
  14) messageLength             = 56 (2 octets)
  15) domainNumber              = 0 - 255, Reserved: 128 - 255
  16) Reserved Bits (2)         = 0 (8 bits)
  17) flagField                 = 0x0000 - 0xFFFF
  18) correctionField           = 0 (8 octets)
  19) Reserved Bits (3)         = 0 (32 bits)
  20) sourcePortIdentity
       a)clockIdentity          = 8 octets
       b)portNumber             = 2 octets
  21) sequenceId                = 0 - 65535
  22) controlField              = 5
  23) logMessageInterval        = 127
  24) targetPortIdentity        = non-zero (10 octets)
 TLV Header
  25) tlvType                   = 0x0003
  26) lengthField               = 8 (2 octets)
  27) OrganizationId            = 0x080030
  28) magicNumber               = 0xDEAD
  29) versionNumber             = 0x01
  30) wrMessageId               = 0x1002
```

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1003
    calSendPattern       = FALSE
    calRetry             = 0
    calPeriod            = 3000us
```

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1004
```

© Copyrights 2018 - 2019, CERN

```
              deltaTx              = 0
              deltaRx              = 0

Step 9 : Verify that DUT transmits WRPTP CALIBRATE message on the port P1
         with following parameters.

              Ethernet Header
                1) Source MAC                = Unicast MAC
                2) Destination MAC           = Unicast MAC or
                                               01:1B:19:00:00:00
                3) EtherType                 = IPv4 (0x800)

              IPv4 Fields
                4) IP Protocol = 17 (UDP)
                5) Destination IP = 224.0.1.129
                6) Source IP = Unicast IP
                7) Checksum = Valid

              UDP Fields
                8) UDP Destination Port = 320 (General Message)
                9) Checksum = Valid

              PTP Header
               10) transportSpecific         = 0 or 1, Reserved: 2-F
                                               (4 bits)
               11) messageType               = 0x0C (4 bits)
               12) Reserved Bits (1)         = 0 (4 bits)
               13) Version                   = 2 (4 bits)
               14) messageLength             = 62 (2 octets)
               15) domainNumber              = 0 - 255, Reserved: 128 - 255
               16) Reserved Bits (2)         = 0 (8 bits)
               17) flagField                 = 0x0000 - 0xFFFF
               18) correctionField           = 0 (8 octets)
               19) Reserved Bits (3)         = 0 (32 bits)
               20) sourcePortIdentity
                    a)clockIdentity          = 8 octets
                    b)portNumber             = 2 octets
               21) sequenceId                = 0 - 65535
               22) controlField              = 5
               23) logMessageInterval        = 127
               24) targetPortIdentity        = non-zero (10 octets)
              TLV Header
               25) tlvType                   = 0x0003
               26) lengthField               = 14 (2 octets)
               27) OrganizationId            = 0x080030
               28) magicNumber               = 0xDEAD
               29) versionNumber             = 0x01
               30) wrMessageId               = 0x1003
               31) calSendPattern            = 0x0 (Warning, if 0x1)
               32) calRetry                  = 1 octet
               33) calPeriod                 = 4 octets

Step 10 : Verify that DUT transmits WRPTP CALIBRATED message on the port P1
          with following parameters.

              Ethernet Header
                1) Source MAC                = Unicast MAC
```

© Copyrights 2018 - 2019, CERN

```
  2) Destination MAC           = Unicast MAC or
                                 01:1B:19:00:00:00
  3) EtherType                 = IPv4 (0x800)

IPv4 Fields
  4) IP Protocol = 17 (UDP)
  5) Destination IP = 224.0.1.129
  6) Source IP = Unicast IP
  7) Checksum = Valid

UDP Fields
  8) UDP Destination Port = 320 (General Message)
  9) Checksum = Valid

PTP Header
 10) transportSpecific         = 0 or 1, Reserved: 2-F
                                 (4 bits)
 11) messageType               = 0x0C (4 bits)
 12) Reserved Bits (1)         = 0 (4 bits)
 13) Version                   = 2 (4 bits)
 14) messageLength             = 72 (2 octets)
 15) domainNumber              = 0 - 255, Reserved: 128 - 255
 16) Reserved Bits (2)         = 0 (8 bits)
 17) flagField                 = 0x0000 - 0xFFFF
 18) correctionField           = 0 (8 octets)
 19) Reserved Bits (3)         = 0 (32 bits)
 20) sourcePortIdentity
      a)clockIdentity          = 8 octets
      b)portNumber             = 2 octets
 21) sequenceId                = 0 - 65535
 22) controlField              = 5
 23) logMessageInterval        = 127
 24) targetPortIdentity        = non-zero (10 octets)
TLV Header
 25) tlvType                   = 0x0003
 26) lengthField               = 24 (2 octets)
 27) OrganizationId            = 0x080030
 28) magicNumber               = 0xDEAD
 29) versionNumber             = 0x01
 30) wrMessageId               = 0x1004
 31) deltaTx                   = 8 octets
 32) deltaRx                   = 8 octets
```

2. WRPTP State Machine Group (WSMG)

2.1. tc_conf_wrptp_wsmg_001

```
Test Case         : tc_conf_wrptp_wsmg_001
Test Case Version : 1.0
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WRPTP portState - IDLE

Purpose           : To verify that port of a WRPTP enabled device shall be
```

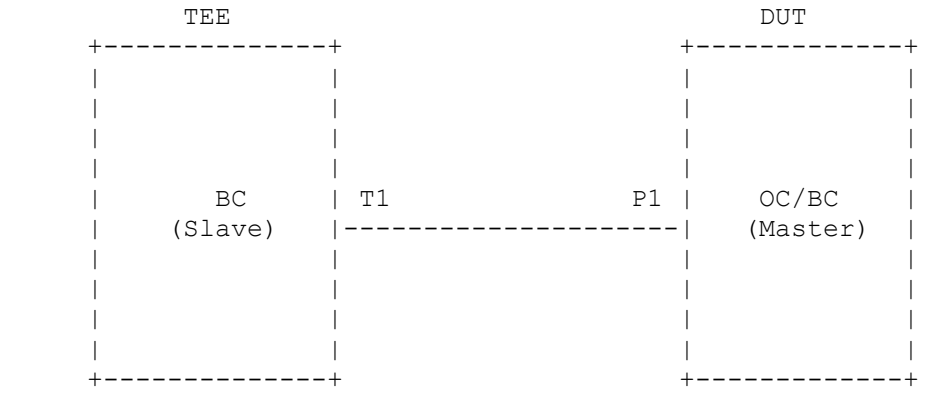
© Copyrights 2018 - 2019, CERN

in the IDLE state when WR Link Setup is not being performed.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Page 35, Figure 27 Page 62

Conformance Type : MUST

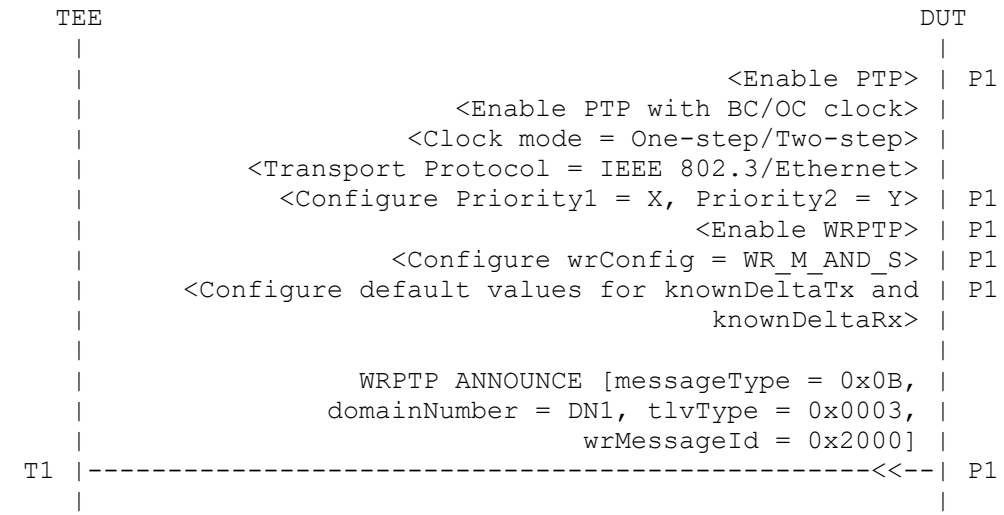
Topology



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          |                      <Check WRPTP portState = IDLE> | P1
          |                                                    |

Legends           :

    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1



Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters:

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Verify that WRPTP portState of port P1 is in IDLE state.
```

2.2. tc_conf_wrptp_wsmg_002

```
Test Case         : tc_conf_wrptp_wsmg_002
Test Case Version : 1.1
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
```

© Copyrights 2018 - 2019, CERN

Module Name : WRPTP State Machine Group (WSMG)

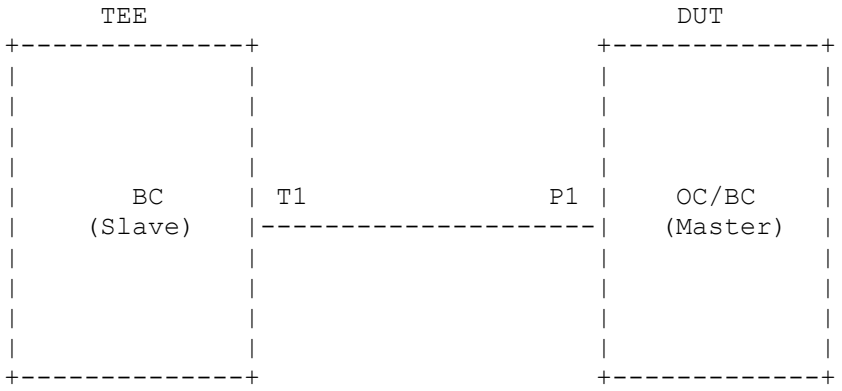
Title : WR Master transition of WRPTP portState from IDLE to M_LOCK

Purpose : To verify that a WRPTP enabled device with it's port in PTP Master sends LOCK message and transitions it's port WR state from IDLE to M_LOCK state upon receiving SLAVE_PRESENT message.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Page 35, Figure 27 Page 62

Conformance Type : MUST

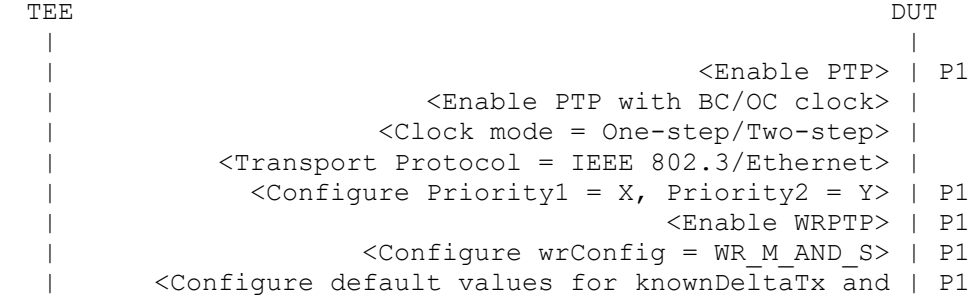
Topology



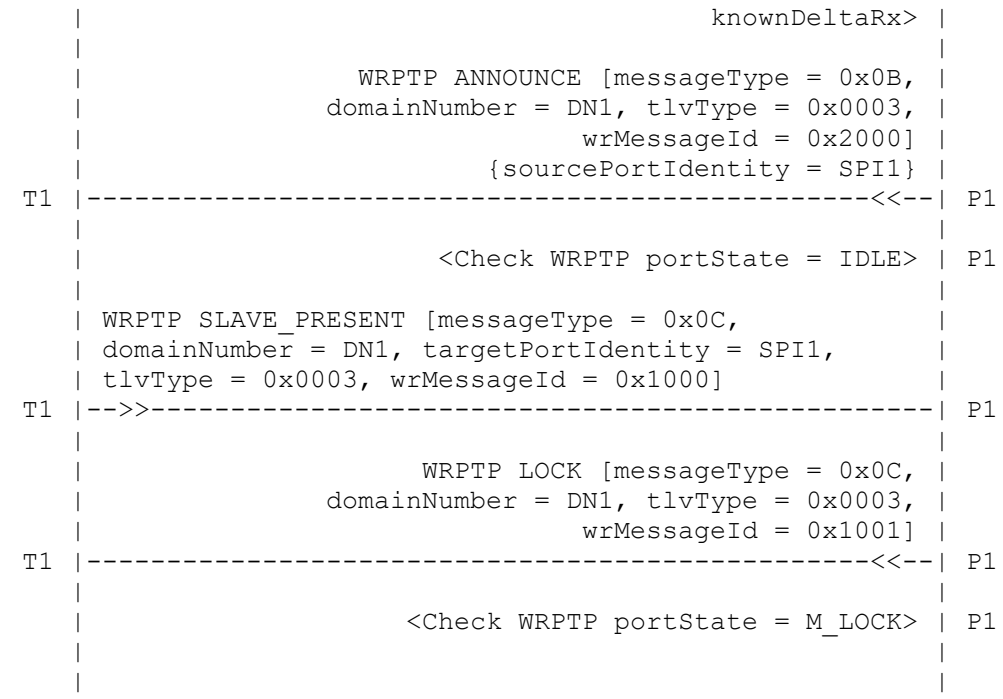
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Enable WRPTP on port P1.
- viii. Configure wrConfig = WR_M_AND_S.
- ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

© Copyrights 2018 - 2019, CERN

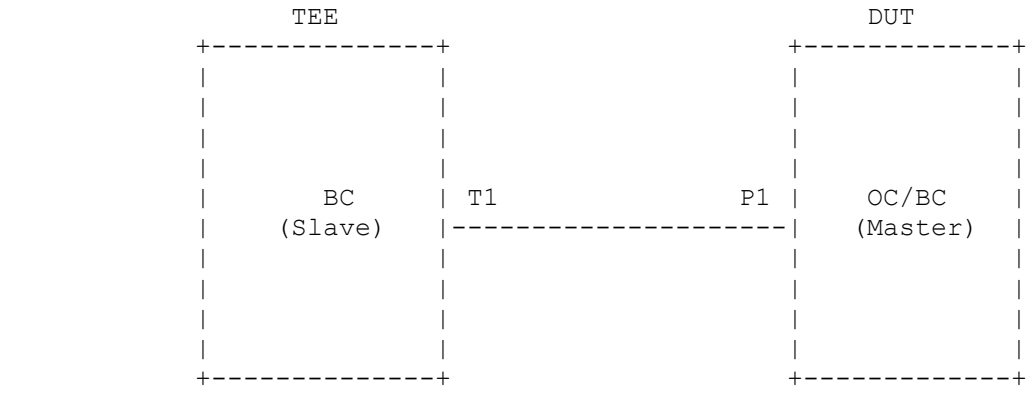
```
Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Observe that WRPTP portState of port P1 is in IDLE state.

Step 5 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 6 : Verify that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 7 : Verify that WRPTP portState of port P1 is in M_LOCK state.
```

2.3. tc_conf_wrptp_wsmg_003

```
Test Case         : tc_conf_wrptp_wsmg_003
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master re-entering of WRPTP portState - M_LOCK - on
                    expiry of WR_M_LOCK_TIMEOUT

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master sends LOCK message and re-enters to it's port
                    WR state M_LOCK on expiry of WR_M_LOCK_TIMEOUT.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Figure 27 Page 62

Conformance Type  : MUST
```

© Copyrights 2018 - 2019, CERN

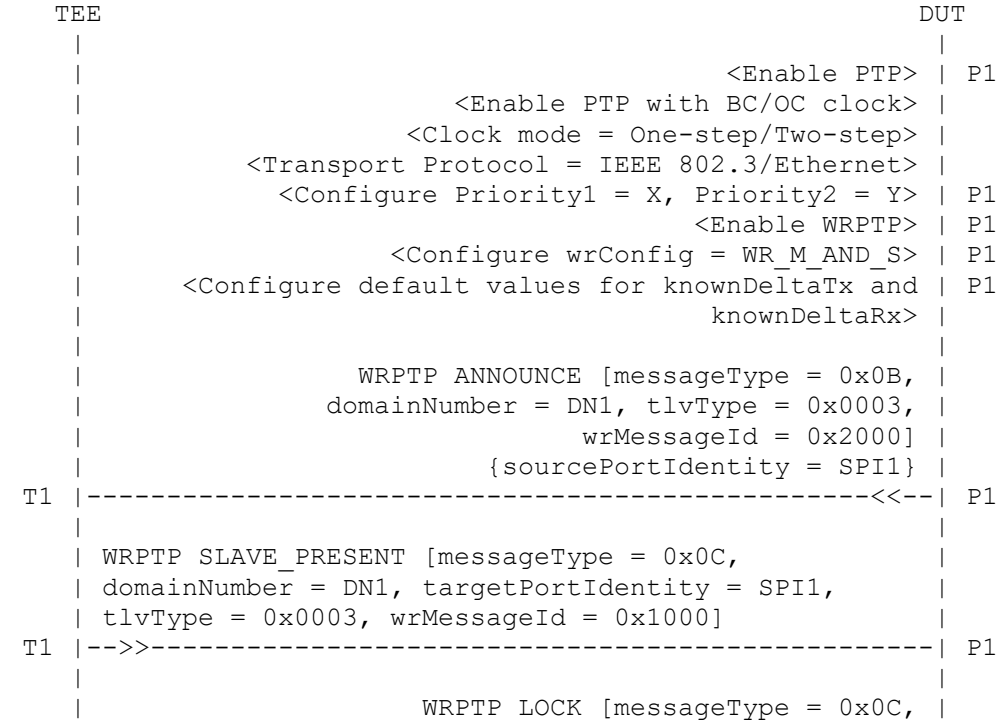
Topology



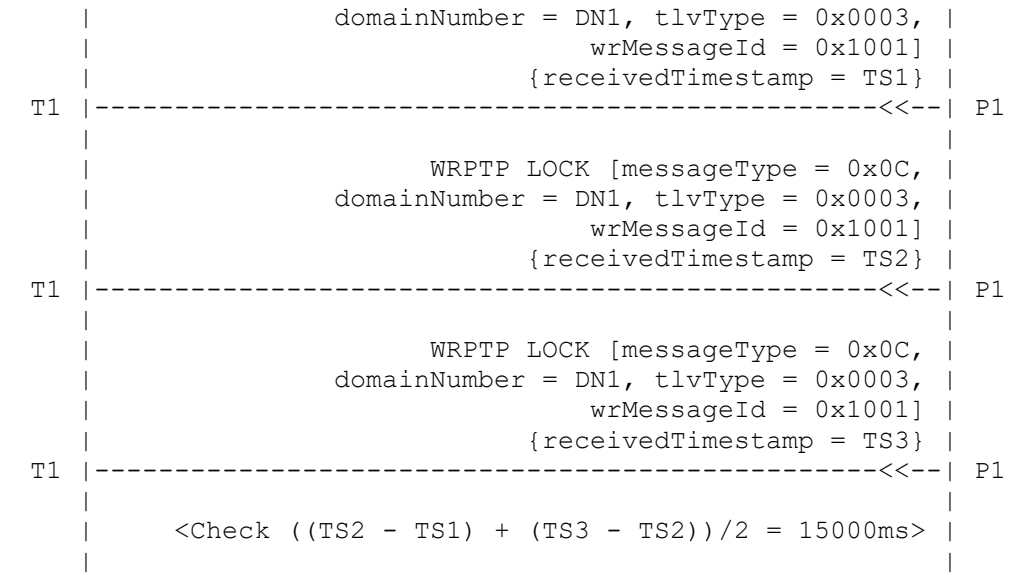
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Enable WRPTP on port P1.
- viii. Configure wrConfig = WR_M_AND_S.
- ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

© Copyrights 2018 - 2019, CERN

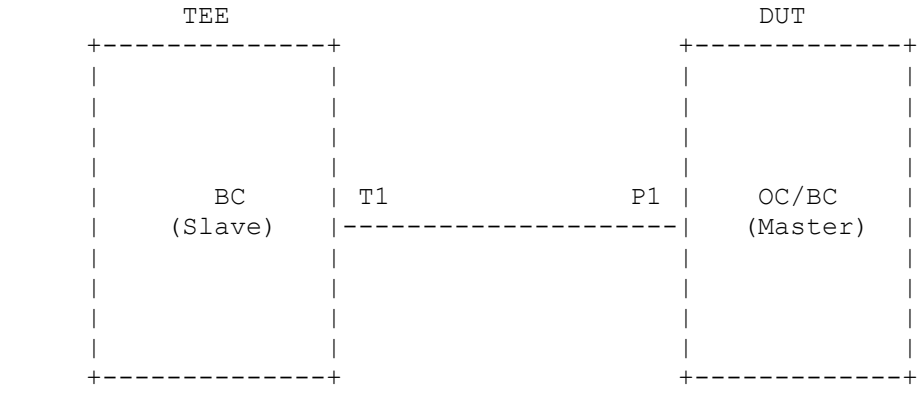
```
            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters and store the received timestamp as TS1.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters and store the received timestamp as TS2.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 7 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters and store the received timestamp as TS3.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 8 : Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 15000ms (WR_M_LOCK_TIMEOUT).

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

© Copyrights 2018 - 2019, CERN

2.4. tc_conf_wrptp_wsmg_004

```
Test Case          : tc_conf_wrptp_wsmg_004
Test Case Version  : 1.2
Component Name     : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name        : WRPTP State Machine Group (WSMG)

Title              : WR Master transition of WRPTP portState from M_LOCK to
                     CALIBRATION before EXC_TIMEOUT_RETRY occurs

Purpose            : To verify that a WRPTP enabled device with it's port in
                     PTP Master sends CALIBRATE message and transitions it's
                     port state from M_LOCK to CALIBRATION state on the
                     reception of LOCKED message before EXC_TIMEOUT_RETRY
                     occurs.

Reference          : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                     Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type   : MUST
```

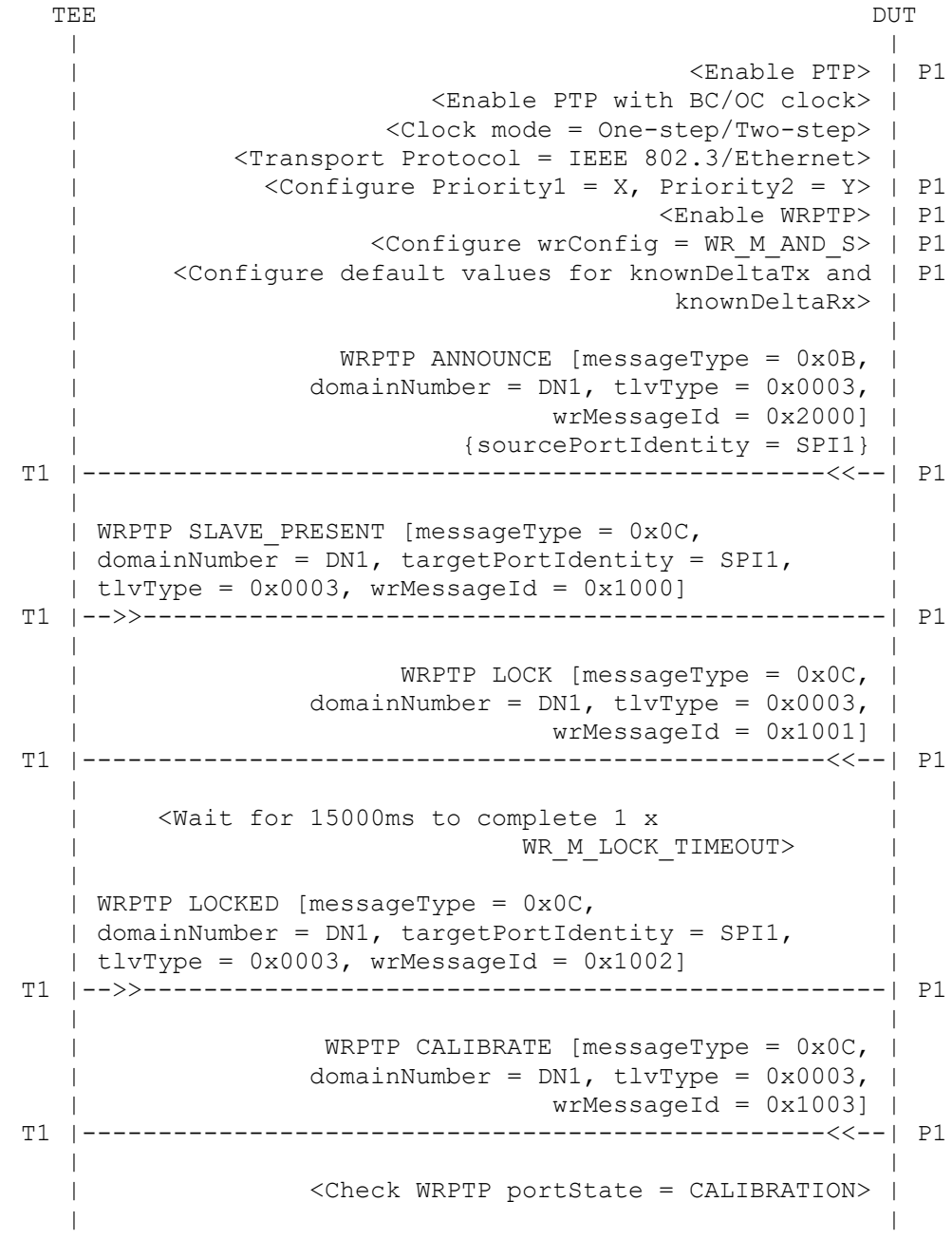
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

© Copyrights 2018 - 2019, CERN

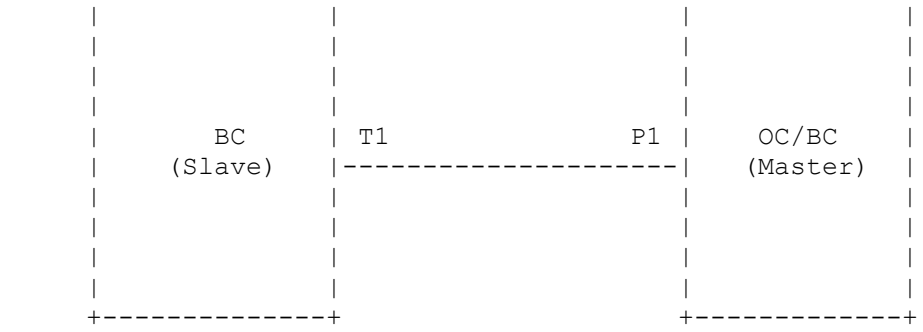
```
Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Observe that WRPTP portState of port P1 is in M_LOCK state.

Step 7 : Wait for 15000ms to complete 1 x WR_M_LOCK_TIMEOUT.

Step 8 : Send WRPTP LOCKED message on port T1 with following parameters.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002

Step 9 : Verify that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003

Step 10: Verify that WRPTP portState of port P1 is in CALIBRATION state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.5. tc_conf_wrptp_wsmg_005

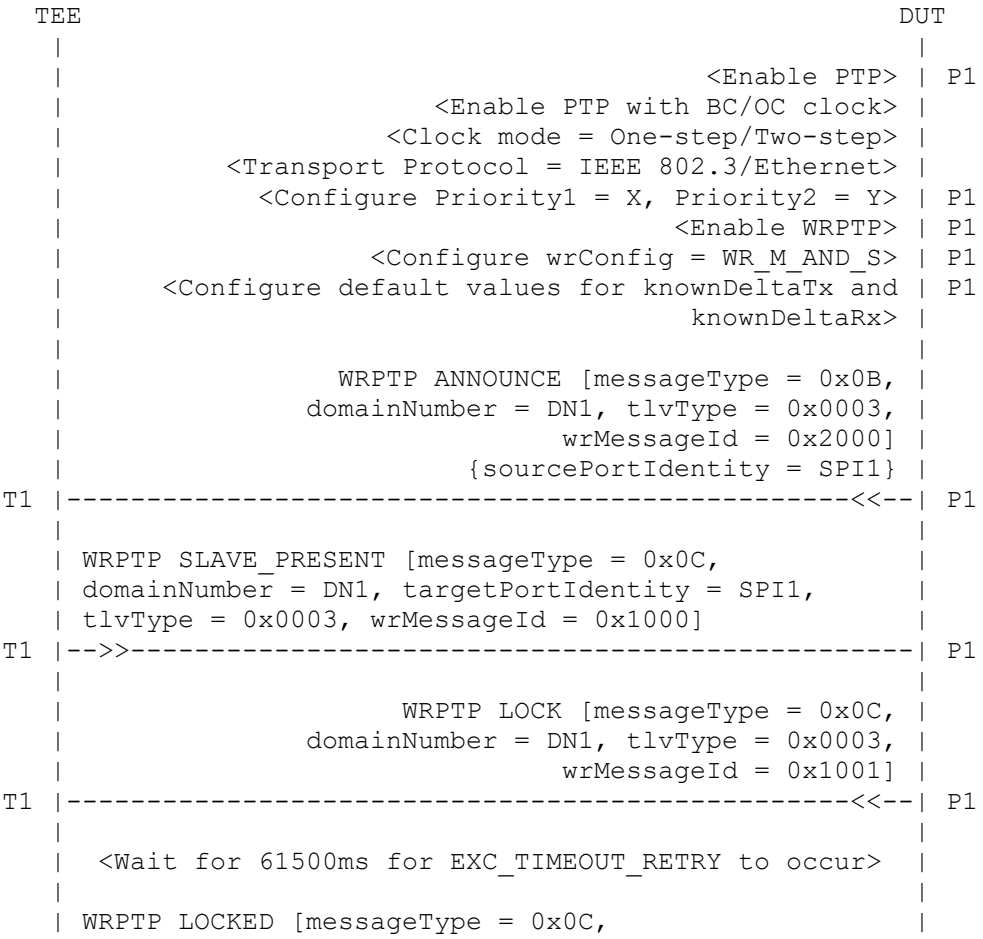
```
Test Case         : tc_conf_wrptp_wsmg_005
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from M_LOCK to
                    IDLE after EXC_TIMEOUT_RETRY occurs

Purpose           : To verify that a WRPTP enabled device with its port in
                    PTP Master transitions it's port WR state from M_LOCK to
                    IDLE state after EXC_TIMEOUT_RETRY occurs.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST


Topology


                 TEE                                DUT
            +--------------+                    +-------------+
```



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          | domainNumber = DN1, targetPortIdentity = SPI1,      |
          | tlvType = 0x0003, wrMessageId = 0x1002]             |
       T1 |-->>-------------------------------------------------| P1
          |                                                     |
          |                      <Check WRPTP portState = IDLE> |
          |                                                     |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header		
	messageType	= 0x0B
	domainNumber	= DN1
TLV		
	tlvType	= 0x0003
	wrMessageId	= 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

PTP Header		
	messageType	= 0x0C
	domainNumber	= DN1

© Copyrights 2018 - 2019, CERN

```
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Wait for 61500ms ((WR_M_LOCK_TIMEOUT * (WR_STATE_RETRY + 1)) +
        (10% of WR_M_LOCK_TIMEOUT)) for EXC_TIMEOUT_RETRY to occur.

Step 7 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002

Step 8 : Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

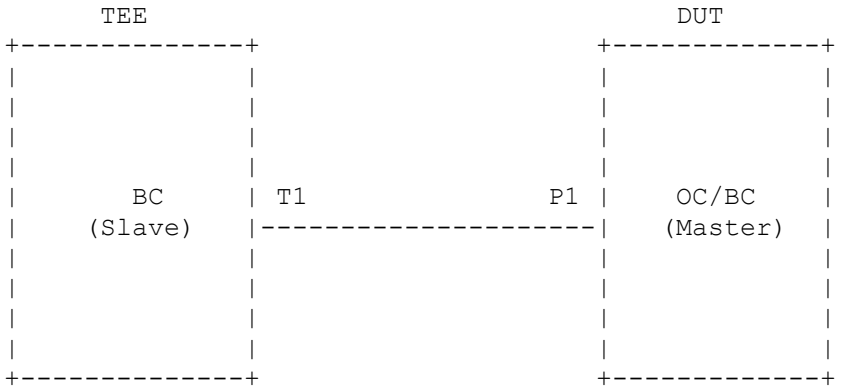
2.6. tc_conf_wrptp_wsmg_006

```
Test Case         : tc_conf_wrptp_wsmg_006
Test Case Version : 1.1
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from CALIBRATION
                    to CALIBRATED

Purpose           : To verify that a WRPTP enabled device with its port in
                    PTP Master sends CALIBRATED message and transition its
                    port WR state from the CALIBRATION to CALIBRATED state.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Figure 27 Page 62
```

© Copyrights 2018 - 2019, CERN

Conformance Type : MUST

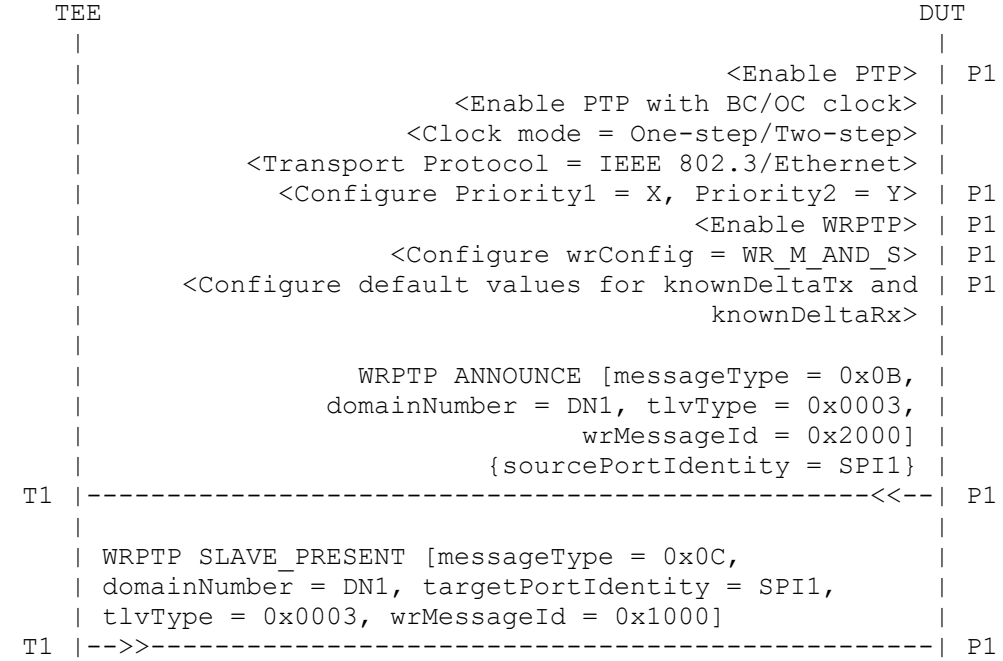
Topology



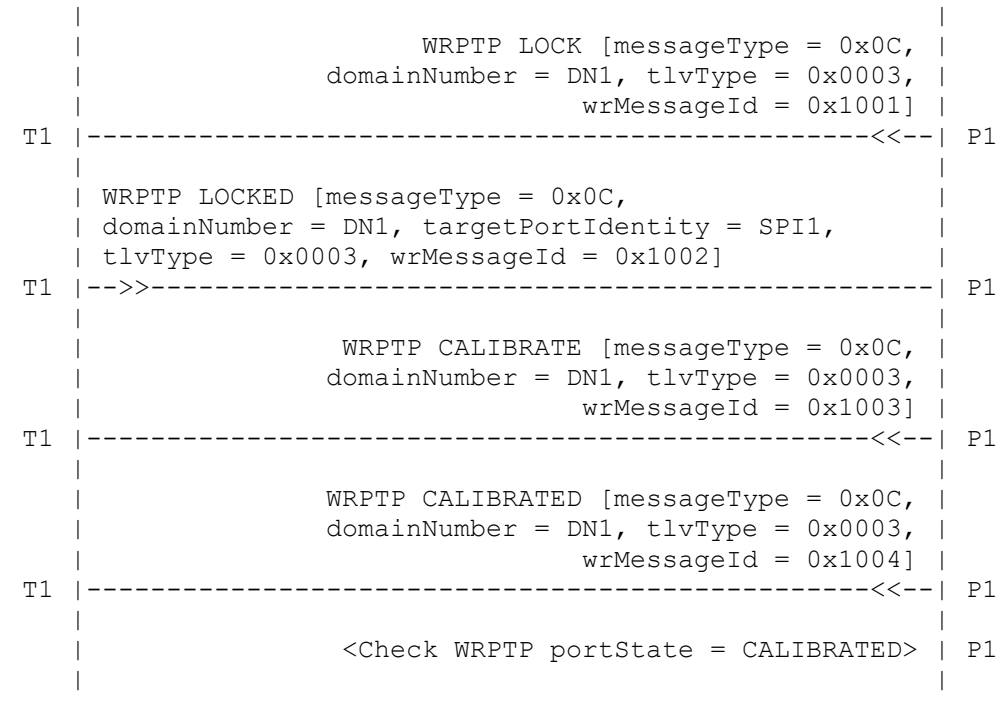
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Enable WRPTP on port P1.
- viii. Configure wrConfig = WR_M_AND_S.
- ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

© Copyrights 2018 - 2019, CERN

```
Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Step 8 : Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
```

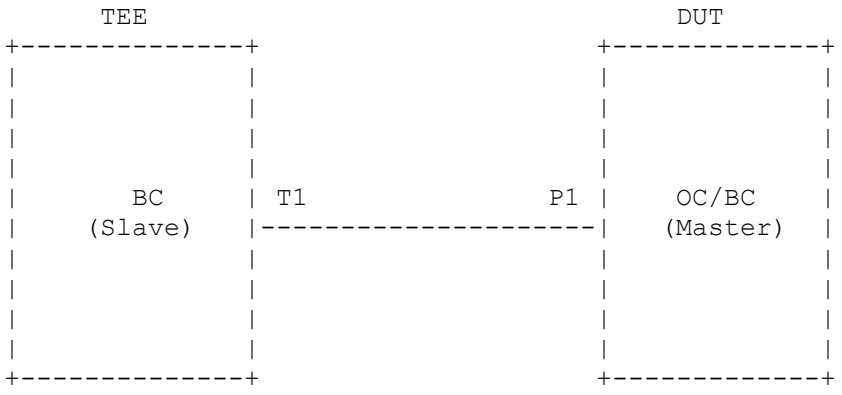
© Copyrights 2018 - 2019, CERN

```
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1004

 Step 9 : Verify that WRPTP portState of port P1 is in CALIBRATED state.
```

2.7. tc_conf_wrptp_wsmg_007

```
 Test Case          : tc_conf_wrptp_wsmg_007
 Test Case Version  : 1.2
 Component Name     : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name        : WRPTP State Machine Group (WSMG)

 Title              : WR Master re-entering of WRPTP portState - CALIBRATED -
                      on expiry of WR_CALIBRATED_TIMEOUT.

 Purpose            : To verify that a WRPTP enabled device with it's port in
                      PTP Master sends CALIBRATED message and re-enters to
                      it's port WR state CALIBRATED on expiry of
                      WR_CALIBRATED_TIMEOUT.

 Reference          : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                      Page 35, Figure 27 Page 62

 Conformance Type   : MUST
```

Topology



Legends:

```
    TEE     : Test Execution Engine
    DUT     : Device Under Test
    OC      : Ordinary Clock
    BC      : Boundary Clock
    T1      : Port 1 at TEE
    P1      : Port 1 at DUT
```

© Copyrights 2018 - 2019, CERN

Ladder Diagram :

© Copyrights 2018 - 2019, CERN

```
          |                                  wrMessageId = 0x1004] |
          |                               {receivedTimestamp = TS3} |
       T1 |-----------------------------------------------------<<--| P1
          |                                                         |
          |       <Check ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms> |
          |                                                         |
```

Legends :

TEE	=	Test Execution Engine
DUT	=	Device Under Test
T1	=	TEE's port 1
P1	=	DUT's port 1
PTP	=	Precision Time Protocol
WRPTP	=	White Rabbit Precision Time Protocol
OC	=	Ordinary Clock
BC	=	Boundary Clock
DN1	=	Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header		
messageType	=	0x0B
domainNumber	=	DN1
TLV		
tlvType	=	0x0003
wrMessageId	=	0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

PTP Header		
messageType	=	0x0C
domainNumber	=	DN1

© Copyrights 2018 - 2019, CERN

```
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters and store the received timestamp as TS1.

            PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004

Step 9 : Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters and store the received timestamp as TS2.

            PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004

Step 10: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters and store the received timestamp as TS3.
```

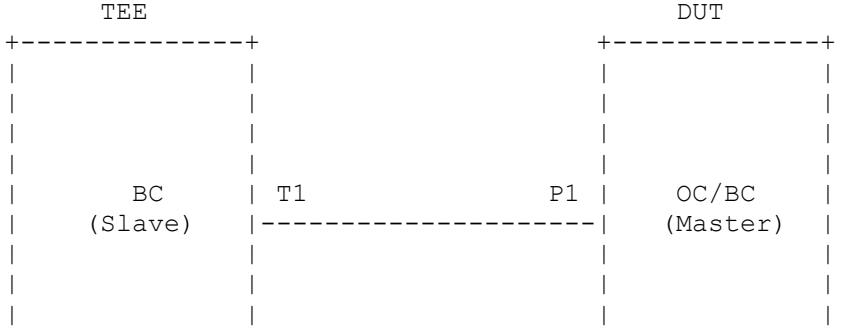
© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004

Step 11: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms
         (WR_CALIBRATED_TIMEOUT).

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

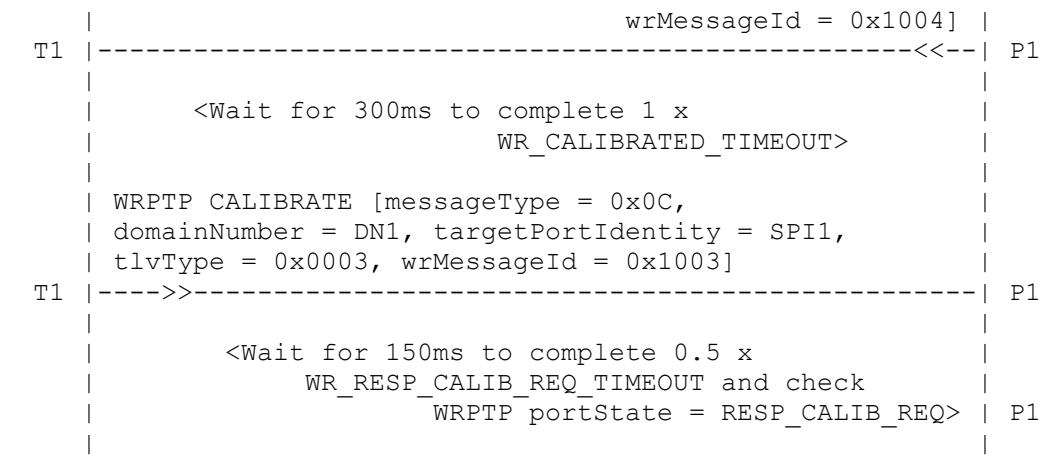
2.8. tc_conf_wrptp_wsmg_008

```
Test Case         : tc_conf_wrptp_wsmg_008
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from CALIBRATED
                    to RESP_CALIB_REQ before EXC_TIMEOUT_RETRY occurs

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master transitions it's port WR state from
                    CALIBRATED to RESP_CALIB_REQ state on the reception of
                    CALIBRATE message before EXC_TIMEOUT_RETRY occurs.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

Topology



```
          |              |                      |             |
          +--------------+                      +-------------+


   Legends:

       TEE     : Test Execution Engine
       DUT     : Device Under Test
       OC      : Ordinary Clock
       BC      : Boundary Clock
       T1      : Port 1 at TEE
       P1      : Port 1 at DUT



Ladder Diagram    :

         TEE                                                   DUT
          |                                                      |
          |                                         <Enable PTP> | P1
          |                        <Enable PTP with BC/OC clock> |
          |                     <Clock mode = One-step/Two-step> |
          |            <Transport Protocol = IEEE 802.3/Ethernet> |
          |              <Configure Priority1 = X, Priority2 = Y> | P1
          |                                        <Enable WRPTP> | P1
          |                    <Configure wrConfig = WR_M_AND_S> | P1
          |        <Configure default values for knownDeltaTx and | P1
          |                                         knownDeltaRx> |
          |                                                      |
          |                  WRPTP ANNOUNCE [messageType = 0x0B, |
          |                domainNumber = DN1, tlvType = 0x0003, |
          |                                wrMessageId = 0x2000] |
          |                          {sourcePortIdentity = SPI1} |
       T1 |-----------------------------------------------------<<--| P1
          |                                                      |
          | WRPTP SLAVE_PRESENT [messageType = 0x0C,              |
          | domainNumber = DN1, targetPortIdentity = SPI1,        |
          | tlvType = 0x0003, wrMessageId = 0x1000]               |
       T1 |---->>-----------------------------------------------| P1
          |                                                      |
          |                      WRPTP LOCK [messageType = 0x0C, |
          |                domainNumber = DN1, tlvType = 0x0003, |
          |                                wrMessageId = 0x1001] |
       T1 |-----------------------------------------------------<<--| P1
          |                                                      |
          | WRPTP LOCKED [messageType = 0x0C,                     |
          | domainNumber = DN1, targetPortIdentity = SPI1,        |
          | tlvType = 0x0003, wrMessageId = 0x1002]               |
       T1 |---->>-----------------------------------------------| P1
          |                                                      |
          |                 WRPTP CALIBRATE [messageType = 0x0C, |
          |                domainNumber = DN1, tlvType = 0x0003, |
          |                                wrMessageId = 0x1003] |
       T1 |-----------------------------------------------------<<--| P1
          |                                                      |
          |                WRPTP CALIBRATED [messageType = 0x0C, |
          |                domainNumber = DN1, tlvType = 0x0003, |
```



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Enable WRPTP on port P1.
- viii. Configure wrConfig = WR_M_AND_S.
- ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header
- messageType = 0x0B
- domainNumber = DN1

TLV

```
                tlvType             = 0x0003
                wrMessageId         = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
                 targetPortIdentity  = SPI1
             TLV
                 tlvType             = 0x0003
                 wrMessageID         = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
                 targetPortIdentity  = SPI1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1004

Step 9 : Wait for 300ms to complete 1 x WR_CALIBRATED_TIMEOUT.

Step 10: Send WRPTP CALIBRATE message on port T1 with following parameters.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
```

Step 11: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and verify that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

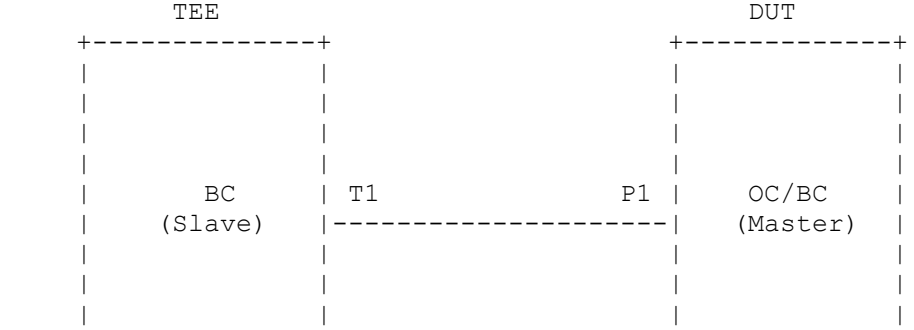
Note :

Values mentioned in above steps are examples based on default values. However, the test will be executed using the values given in ATTEST GUI (Selected configuration in ATTEST Configuration Manager > Protocol Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

2.9. tc_conf_wrptp_wsmg_009

```
Test Case         : tc_conf_wrptp_wsmg_009
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from CALIBRATED
                    to IDLE after EXC_TIMEOUT_RETRY occurs

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master transitions it's port WR state from
                    CALIBRATED to IDLE state after EXC_TIMEOUT_RETRY occurs.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

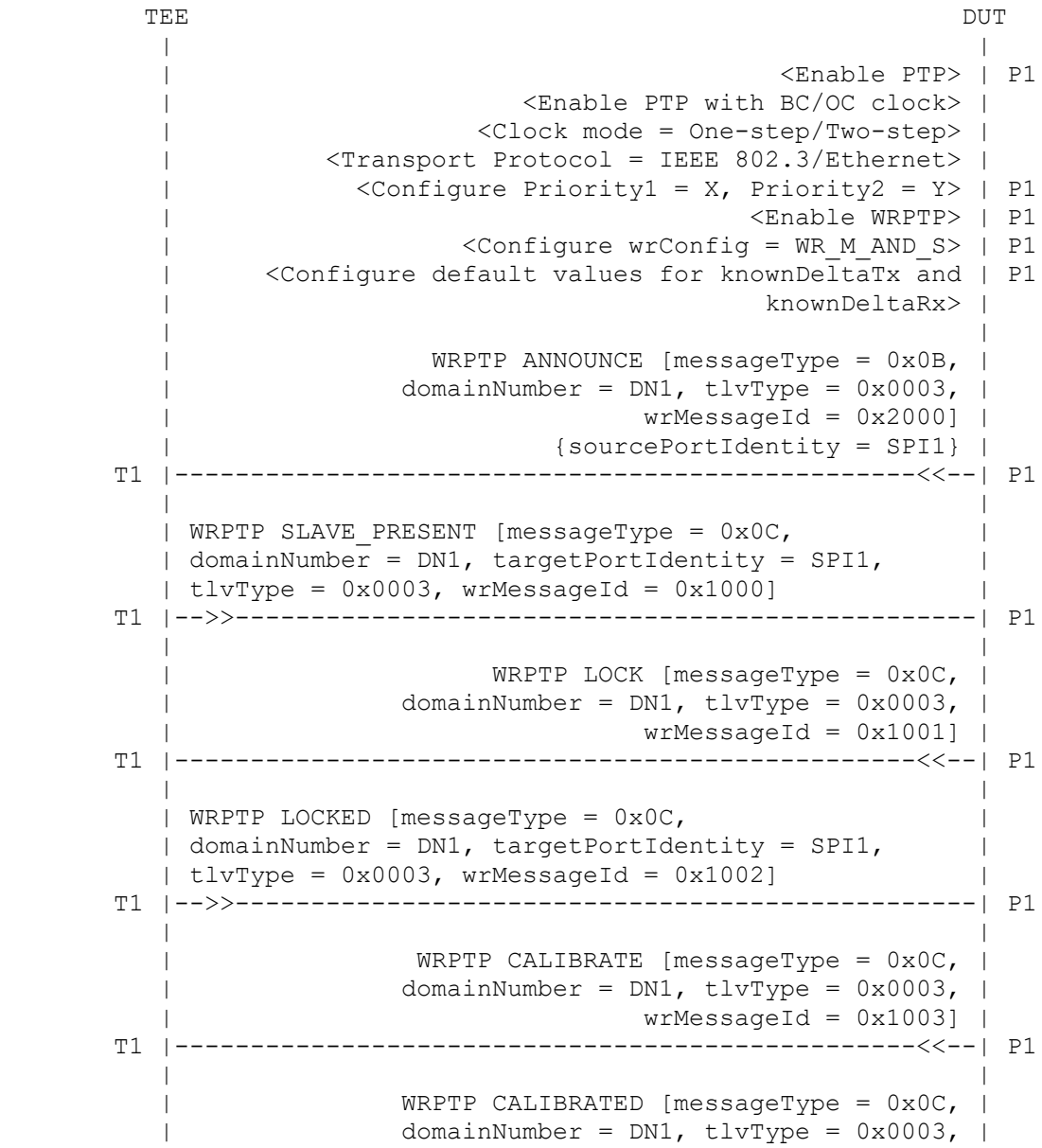
Topology



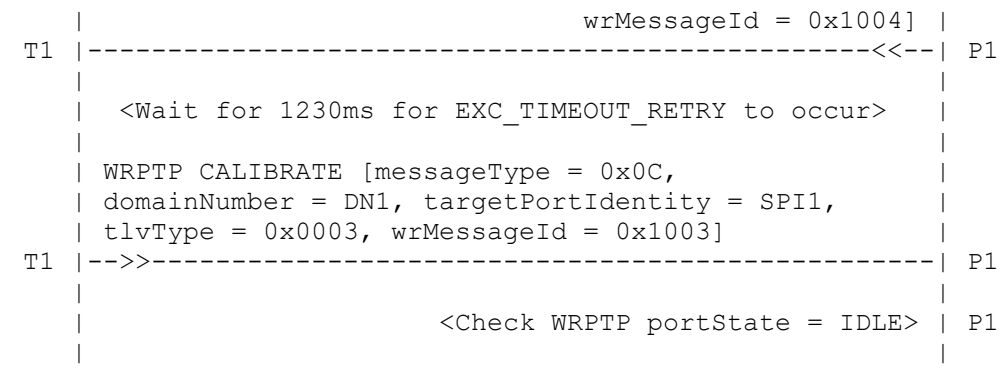
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Enable WRPTP on port P1.
- viii. Configure wrConfig = WR_M_AND_S.
- ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header		
	messageType	= 0x0B
	domainNumber	= DN1
TLV		
	tlvType	= 0x0003
	wrMessageId	= 0x2000

© Copyrights 2018 - 2019, CERN

```
Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 9 : Wait for 1230ms ((WR_CALIBRATED_TIMEOUT * (WR_STATE_RETRY + 1)) +
         (10% of WR_CALIBRATED_TIMEOUT)) for EXC_TIMEOUT_RETRY to occur.

Step 10: Send WRPTP CALIBRATE message on port T1 with following parameters.

             PTP Header
```

© Copyrights 2018 - 2019, CERN

```
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003
```

Step 11: Verify that WRPTP portState of port P1 is in IDLE state.

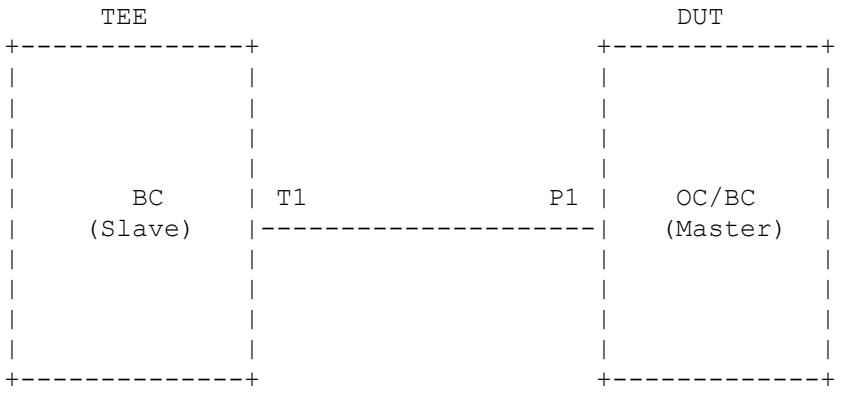
Note :

Values mentioned in above steps are examples based on default values. However, the test will be executed using the values given in ATTEST GUI (Selected configuration in ATTEST Configuration Manager > Protocol Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

2.10. tc_conf_wrptp_wsmg_010

```
Test Case         : tc_conf_wrptp_wsmg_010
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master re-entering of WRPTP portState -
                    RESP_CALIB_REQ - on expiry of WR_RESP_CALIB_REQ_TIMEOUT

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master re-enters to it's port WR state
                    RESP_CALIB_REQ on expiry of WR_RESP_CALIB_REQ_TIMEOUT
                    when otherPortCalPeriod is 0x0.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

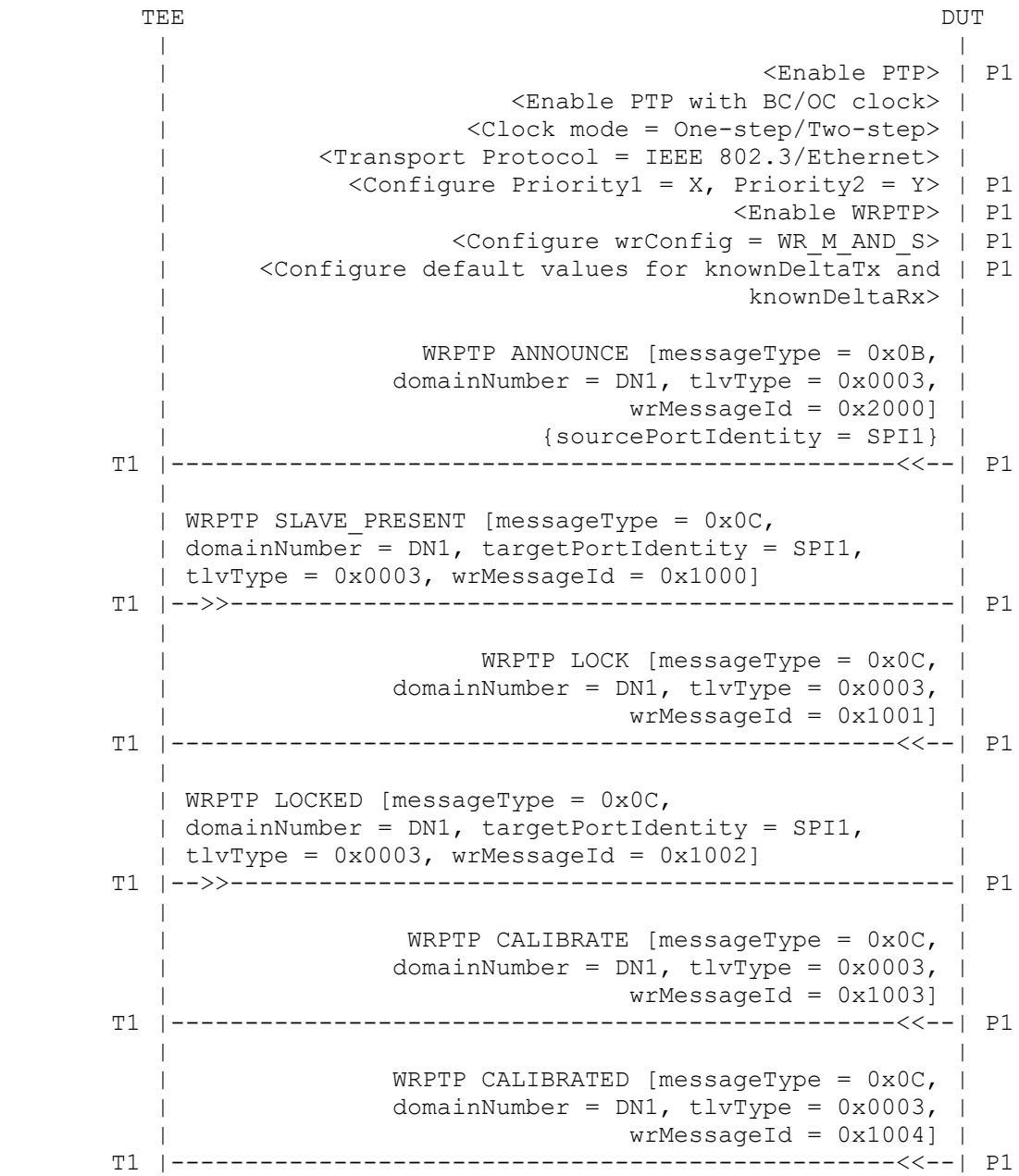
Topology



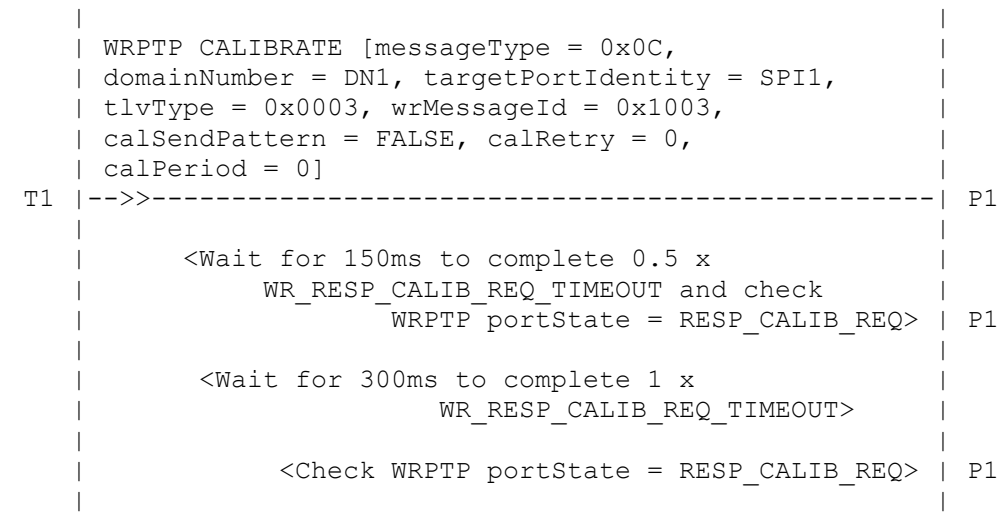
Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header
messageType = 0x0B

```
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
            targetPortIdentity    = SPI1
        TLV
            tlvType               = 0x0003
            wrMessageID           = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
            targetPortIdentity    = SPI1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.
```

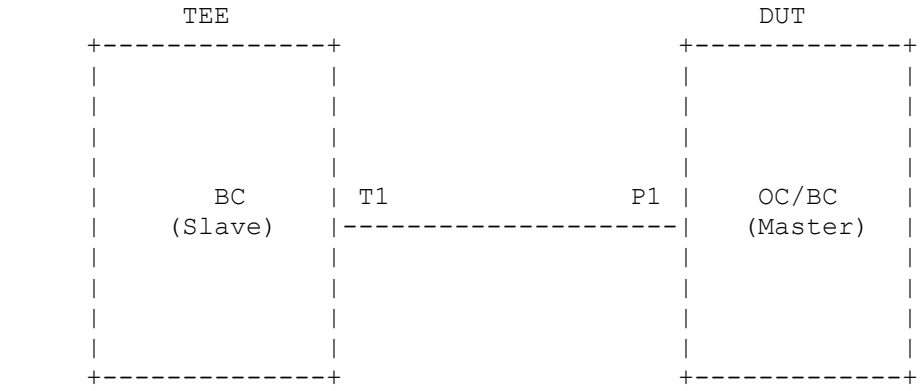
© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0

 Step 10: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
          WRPTP portState of port P1 is in RESP_CALIB_REQ state.

 Step 11: Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

 Step 12: Verify that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

 Note :

   Values mentioned in above steps are examples based on default values.
   However, the test will be executed using the values given in ATTEST GUI
   (Selected configuration in ATTEST Configuration Manager > Protocol
   Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
   logs may differ from those mentioned in the steps.
```

2.11. tc_conf_wrptp_wsmg_011

```
 Test Case         : tc_conf_wrptp_wsmg_011
 Test Case Version : 1.3
 Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name       : WRPTP State Machine Group (WSMG)

 Title             : WR Master re-entering of WRPTP portState -
                     RESP_CALIB_REQ - on expiry of RESP_CALIB_REQ_TIMEOUT
                     - otherPortCalPeriod and otherPortCalRetry > 0x0

 Purpose           : To verify that a WRPTP enabled device with it's port in
                     PTP Master re-enters to it's port WR state
                     RESP_CALIB_REQ on expiry of WR_RESP_CALIB_REQ_TIMEOUT
                     when otherPortCalPeriod and otherPortCalRetry are
                     greater than 0x0 (otherPortCalPeriod and
                     otherPortCalRetry should be ignored by DUT).

 Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                     Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

 Conformance Type  : MUST


Topology
```

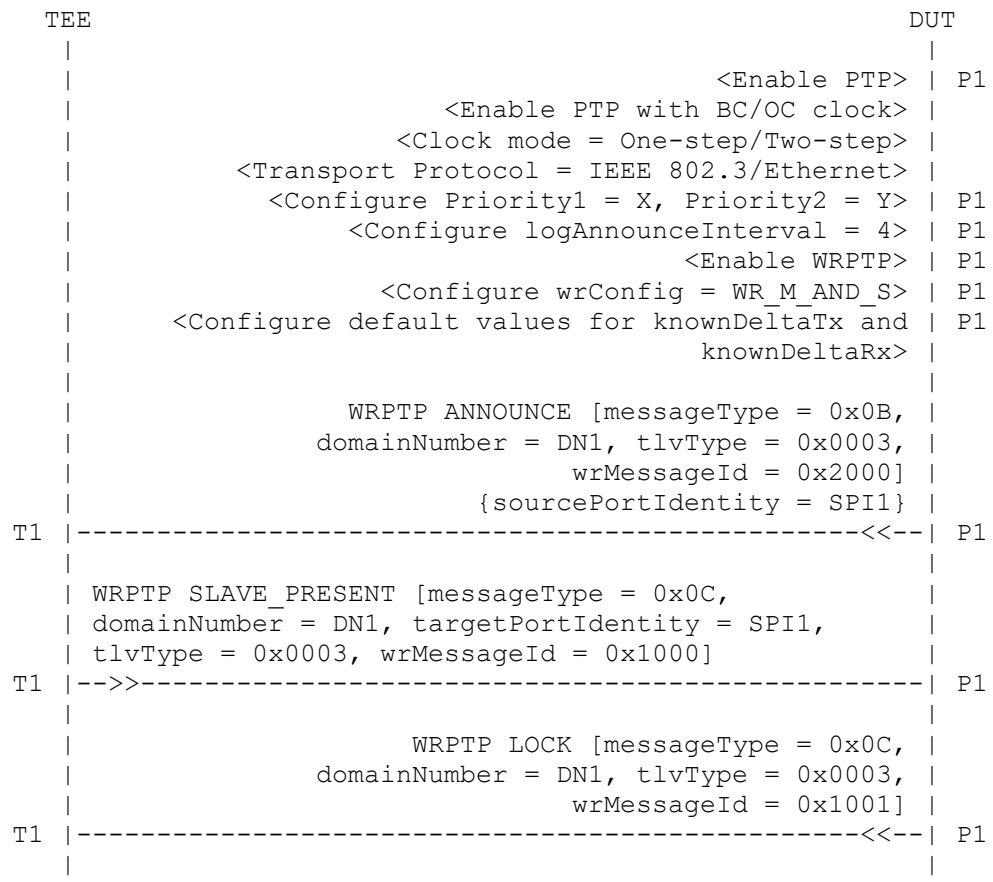
© Copyrights 2018 - 2019, CERN



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          | WRPTP LOCKED [messageType = 0x0C,                    |
          | domainNumber = DN1, targetPortIdentity = SPI1,       |
          | tlvType = 0x0003, wrMessageId = 0x1002]              |
       T1 |-->>--------------------------------------------------| P1
          |                                                      |
          |                 WRPTP CALIBRATE [messageType = 0x0C, |
          |                domainNumber = DN1, tlvType = 0x0003, |
          |                                 wrMessageId = 0x1003] |
       T1 |------------------------------------------------<<--| P1
          |                                                      |
          |                WRPTP CALIBRATED [messageType = 0x0C, |
          |                domainNumber = DN1, tlvType = 0x0003, |
          |                                 wrMessageId = 0x1004] |
       T1 |------------------------------------------------<<--| P1
          |                                                      |
          | WRPTP CALIBRATE [messageType = 0x0C,                 |
          | domainNumber = DN1, targetPortIdentity = SPI1,       |
          | tlvType = 0x0003, wrMessageId = 0x1003,              |
          | calSendPattern = FALSE, calRetry = 1,                |
          | calPeriod = 50ms]                                    |
       T1 |-->>--------------------------------------------------| P1
          |                                                      |
          |      <Wait for 150ms to complete 0.5 x               |
          |           WR_RESP_CALIB_REQ_TIMEOUT and check        |
          |                   WRPTP portState = RESP_CALIB_REQ>  | P1
          |                                                      |
          |      <Wait for 300ms to complete 1 x                 |
          |                   WR_RESP_CALIB_REQ_TIMEOUT>         |
          |                                                      |
          |            <Check WRPTP portState = RESP_CALIB_REQ>  | P1
          |                                                      |
          |                                                      |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.

© Copyrights 2018 - 2019, CERN

```
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Configure logAnnounceInterval = 4.
 viii.   Enable WRPTP on port P1.
   ix.   Configure wrConfig = WR_M_AND_S.
    x.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
```

© Copyrights 2018 - 2019, CERN

```
                domainNumber          = DN1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
                targetPortIdentity    = SPI1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1003
                calSendPattern        = FALSE
                calRetry              = 1
                calPeriod             = 50ms

Step 10: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 11: Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 12: Verify that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.12. tc_conf_wrptp_wsmg_012

```
Test Case         : tc_conf_wrptp_wsmg_012
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from
                    RESP_CALIB_REQ to WR_LINK_ON before EXC_TIMEOUT_RETRY
                    occurs - otherPortCalPeriod and otherPortCalRetry
                    are 0x0
```

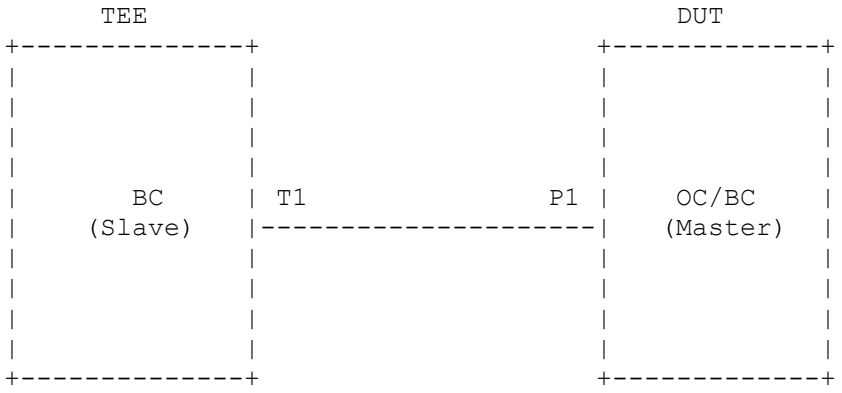
© Copyrights 2018 - 2019, CERN

Purpose : To verify that a WRPTP enabled device with it's port in PTP Master sends WR_MODE_ON message and transitions it's port state from RESP_CALIB_REQ to WR_LINK_ON state on the reception of CALIBRATED message before EXC_TIMEOUT_RETRY occurs when otherPortCalPeriod and otherPortCalRetry are 0x0.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type : MUST

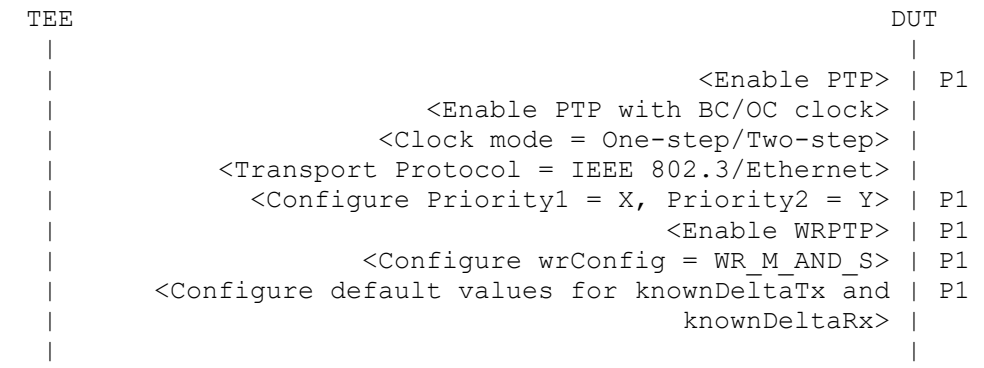
Topology



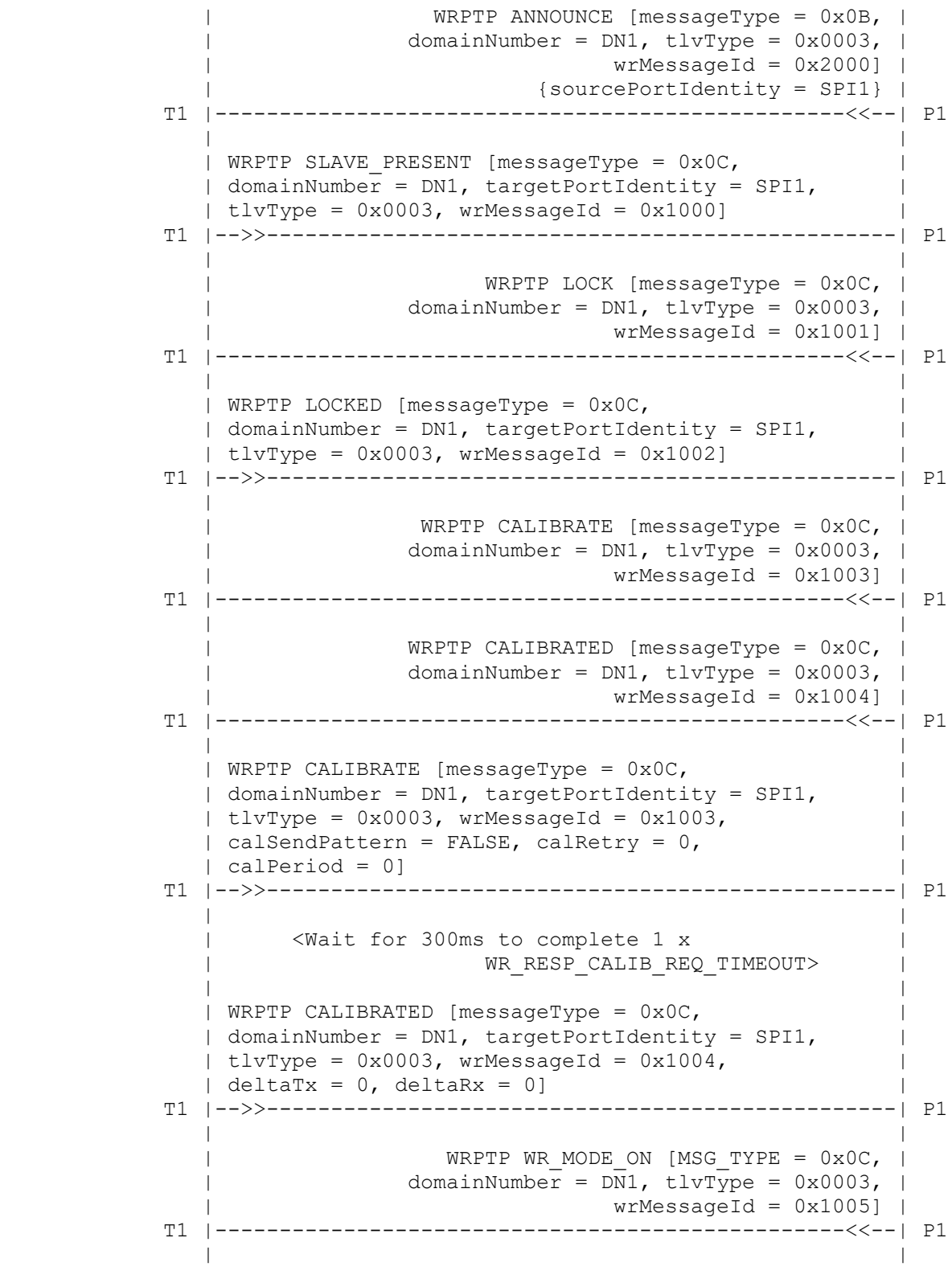
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE = Test Execution Engine
DUT = Device Under Test

© Copyrights 2018 - 2019, CERN

```
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1


Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN

```
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 10: Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 11: Send WRPTP CALIBRATED message on port T1 with following parameters

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
```

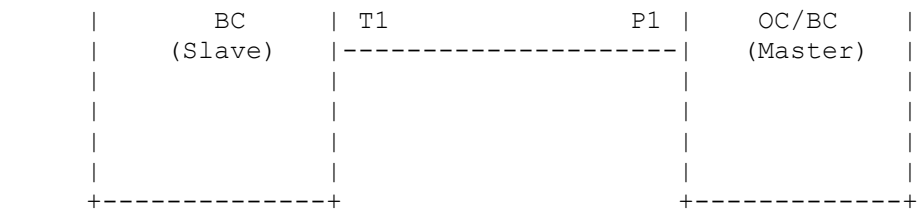
© Copyrights 2018 - 2019, CERN

```
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 12: Verify that DUT transmits WRPTP WR_MODE_ON message on the port P1
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1005

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.13. tc_conf_wrptp_wsmg_013

```
Test Case         : tc_conf_wrptp_wsmg_013
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from
                    RESP_CALIB_REQ to IDLE after EXC_TIMEOUT_RETRY occurs -
                    otherPortCalPeriod and otherPortCalRetry are 0x0

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master transitions it's port WR state from
                    RESP_CALIB_REQ to IDLE state after EXC_TIMEOUT_RETRY
                    occurs when otherPortCalPeriod and otherPortCalRetry are
                    0x0.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

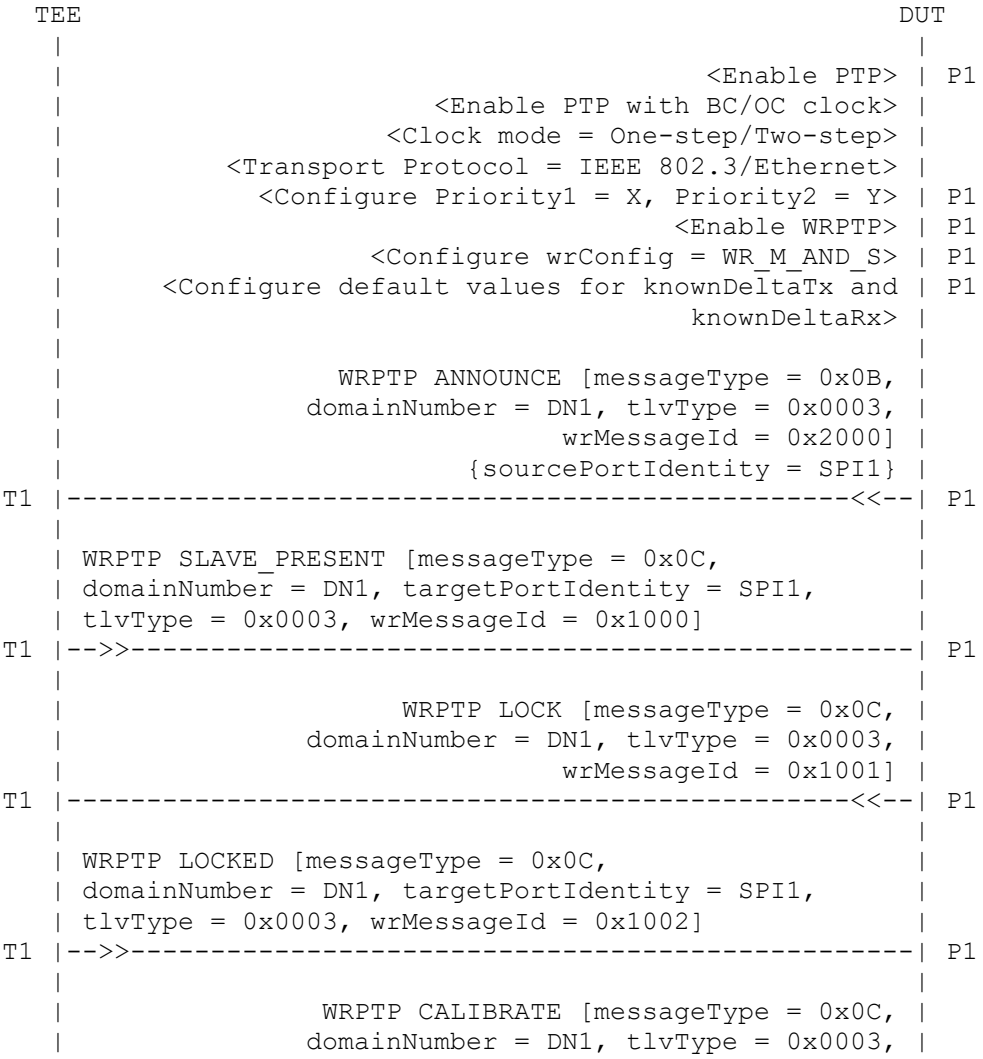
Topology



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.

© Copyrights 2018 - 2019, CERN

```
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
```

© Copyrights 2018 - 2019, CERN

```
                wrMessageId          = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003
                 calSendPattern       = FALSE
                 calRetry             = 0
                 calPeriod            = 0

Step 10: Wait for 1230ms ((WR_RESP_CALIB_REQ_TIMEOUT * (WR_STATE_RETRY + 1))
         + (10% of WR_RESP_CALIB_REQ_TIMEOUT)) for EXC_TIMEOUT_RETRY to
         occur.

Step 11: Send WRPTP CALIBRATED message on port T1 with following parameters

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 0
                 deltaRx              = 0

Step 12 : Observe that DUT does not transmit WRPTP WR_MODE_ON message on the
          port P1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1005

Step 13: Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
```

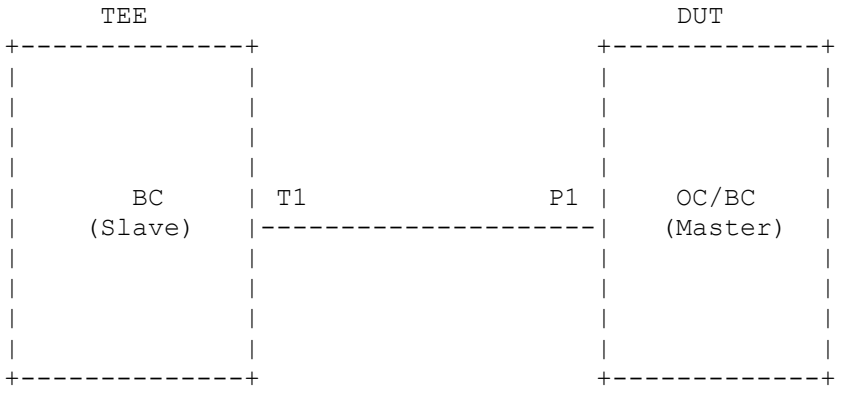
© Copyrights 2018 - 2019, CERN

(Selected configuration in ATTEST Configuration Manager > Protocol Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

2.14. tc_conf_wrptp_wsmg_014

```
Test Case         : tc_conf_wrptp_wsmg_014
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from
                    RESP_CALIB_REQ to WR_LINK_ON before EXC_TIMEOUT_RETRY
                    occurs - otherPortCalPeriod and otherPortCalRetry > 0x0

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master sends WR_MODE_ON message and transitions it's
                    port WR state from RESP_CALIB_REQ to WR_LINK_ON state on
                    the reception of CALIBRATED message before
                    EXC_TIMEOUT_RETRY occurs when otherPortCalPeriod and
                    otherPortCalRetry are greater than 0x0
                    (otherPortCalPeriod and otherPortCalRetry should be
                    ignored by DUT).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

Topology

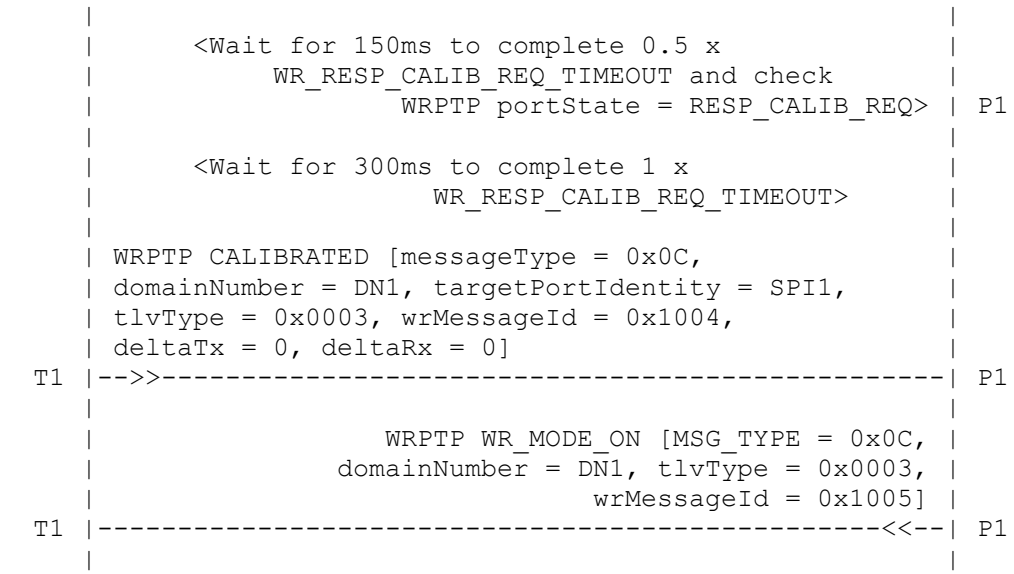


Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
```

```
        T1      : Port 1 at TEE
        P1      : Port 1 at DUT


Ladder Diagram    :

          TEE                                                    DUT
           |                                                      |
           |                                          <Enable PTP> | P1
           |                          <Enable PTP with BC/OC clock> |
           |                      <Clock mode = One-step/Two-step> |
           |           <Transport Protocol = IEEE 802.3/Ethernet> |
           |             <Configure Priority1 = X, Priority2 = Y> | P1
           |                  <Configure logAnnounceInterval = 4> | P1
           |                                       <Enable WRPTP> | P1
           |                    <Configure wrConfig = WR_M_AND_S> | P1
           |      <Configure default values for knownDeltaTx and | P1
           |                                        knownDeltaRx> |
           |                                                      |
           |                  WRPTP ANNOUNCE [messageType = 0x0B, |
           |               domainNumber = DN1, tlvType = 0x0003, |
           |                                wrMessageId = 0x2000] |
           |                         {sourcePortIdentity = SPI1} |
        T1 |-----------------------------------------------<<--| P1
           |                                                      |
           | WRPTP SLAVE_PRESENT [messageType = 0x0C,             |
           | domainNumber = DN1, targetPortIdentity = SPI1,       |
           | tlvType = 0x0003, wrMessageId = 0x1000]              |
        T1 |-->>-----------------------------------------------| P1
           |                                                      |
           |                      WRPTP LOCK [messageType = 0x0C, |
           |               domainNumber = DN1, tlvType = 0x0003, |
           |                                wrMessageId = 0x1001] |
        T1 |-----------------------------------------------<<--| P1
           |                                                      |
           | WRPTP LOCKED [messageType = 0x0C,                    |
           | domainNumber = DN1, targetPortIdentity = SPI1,       |
           | tlvType = 0x0003, wrMessageId = 0x1002]              |
        T1 |-->>-----------------------------------------------| P1
           |                                                      |
           |                WRPTP CALIBRATE [messageType = 0x0C, |
           |               domainNumber = DN1, tlvType = 0x0003, |
           |                                wrMessageId = 0x1003] |
        T1 |-----------------------------------------------<<--| P1
           |                                                      |
           |               WRPTP CALIBRATED [messageType = 0x0C, |
           |               domainNumber = DN1, tlvType = 0x0003, |
           |                                wrMessageId = 0x1004] |
        T1 |-----------------------------------------------<<--| P1
           |                                                      |
           | WRPTP CALIBRATE [messageType = 0x0C,                 |
           | domainNumber = DN1, targetPortIdentity = SPI1,       |
           | tlvType = 0x0003, wrMessageId = 0x1003,              |
           | calSendPattern = FALSE, calRetry = 1,                |
           | calPeriod = 50ms]                                    |
        T1 |-->>-----------------------------------------------| P1
```

© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT
- i. Enable DUT's port P1.
- ii. Enable PTP on port P1.
- iii. Enable PTP globally with device type as Boundary/Ordinary clock.
- iv. Configure clock mode as One-step/Two-step.
- v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
- vi. Configure default values for Priority1 = X and Priority2 = Y.
- vii. Configure logAnnounceInterval = 4.
- viii. Enable WRPTP on port P1.
- ix. Configure wrConfig = WR_M_AND_S.
- x. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
- i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
```

© Copyrights 2018 - 2019, CERN

```
                wrMessageId          = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003
                 calSendPattern       = FALSE
                 calRetry             = 1
                 calPeriod            = 50ms

Step 10: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 11: Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 12: Send WRPTP CALIBRATED message on port T1 with following parameters

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 0
                 deltaRx              = 0

Step 13 : Verify that DUT transmits WRPTP WR_MODE_ON message on the port P1
          with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1005

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.15. tc_conf_wrptp_wsmg_015

```
Test Case         : tc_conf_wrptp_wsmg_015
```

© Copyrights 2018 - 2019, CERN

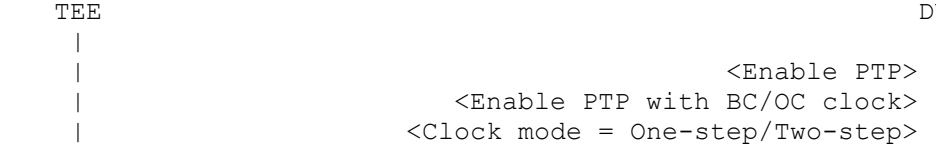
```
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from
                    RESP_CALIB_REQ to IDLE after EXC_TIMEOUT_RETRY occurs -
                    otherPortCalPeriod and otherPortCalRetry > 0x0

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master transitions it's port WR state from
                    RESP_CALIB_REQ to IDLE state after EXC_TIMEOUT_RETRY
                    occurs when otherPortCalPeriod and otherPortCalRetry are
                    greater than 0x0 (otherPortCalPeriod and
                    otherPortCalRetry should be ignored by DUT).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

Topology

Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
    |          <Transport Protocol = IEEE 802.3/Ethernet> |
    |            <Configure Priority1 = X, Priority2 = Y> | P1
    |                 <Configure logAnnounceInterval = 4> | P1
    |                                      <Enable WRPTP> | P1
    |                    <Configure wrConfig = WR_M_AND_S> | P1
    |      <Configure default values for knownDeltaTx and | P1
    |                                       knownDeltaRx> |
    |                                                     |
    |                 WRPTP ANNOUNCE [messageType = 0x0B, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                 wrMessageId = 0x2000] |
    |                          {sourcePortIdentity = SPI1} |
 T1 |-----------------------------------------------<<--| P1
    |                                                     |
    | WRPTP SLAVE_PRESENT [messageType = 0x0C,            |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1000]             |
 T1 |-->>-----------------------------------------------| P1
    |                                                     |
    |                      WRPTP LOCK [messageType = 0x0C, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                 wrMessageId = 0x1001] |
 T1 |-----------------------------------------------<<--| P1
    |                                                     |
    | WRPTP LOCKED [messageType = 0x0C,                   |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1002]             |
 T1 |-->>-----------------------------------------------| P1
    |                                                     |
    |                WRPTP CALIBRATE [messageType = 0x0C, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                 wrMessageId = 0x1003] |
 T1 |-----------------------------------------------<<--| P1
    |                                                     |
    |               WRPTP CALIBRATED [messageType = 0x0C, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                 wrMessageId = 0x1004] |
 T1 |-----------------------------------------------<<--| P1
    |                                                     |
    | WRPTP CALIBRATE [messageType = 0x0C,                |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1003,             |
    | calSendPattern = FALSE, calRetry = 3,               |
    | calPeriod = 50ms]                                   |
 T1 |-->>-----------------------------------------------| P1
    |                                                     |
    |      <Wait for 150ms to complete 0.5 x              |
    |           WR_RESP_CALIB_REQ_TIMEOUT and check       |
    |                   WRPTP portState = RESP_CALIB_REQ> | P1
    |                                                     |
    |  <Wait for 1230ms for EXC_TIMEOUT_RETRY to occur>   |
    |                                                     |
    | WRPTP CALIBRATED [messageType = 0x0C,               |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1004,             |
    | deltaTx = 0, deltaRx = 0]                           |
 T1 |-->>-----------------------------------------------| P1
```

© Copyrights 2018 - 2019, CERN

```
          |                                                    |
          |                      <Check WRPTP portState = IDLE> | P1
          |                                                    |
```

Legends :

TEE	=	Test Execution Engine
DUT	=	Device Under Test
T1	=	TEE's port 1
P1	=	DUT's port 1
PTP	=	Precision Time Protocol
WRPTP	=	White Rabbit Precision Time Protocol
OC	=	Ordinary Clock
BC	=	Boundary Clock
DN1	=	Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Configure logAnnounceInterval = 4.
viii. Enable WRPTP on port P1.
ix. Configure wrConfig = WR_M_AND_S.
x. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header		
messageType	=	0x0B
domainNumber	=	DN1
TLV		
tlvType	=	0x0003
wrMessageId	=	0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

PTP Header		
messageType	=	0x0C

© Copyrights 2018 - 2019, CERN

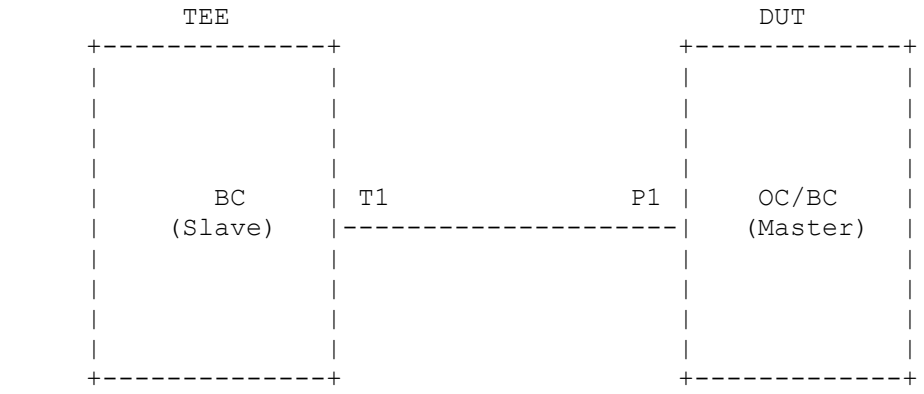
```
                domainNumber          = DN1
                targetPortIdentity    = SPI1
            TLV
                tlvType               = 0x0003
                wrMessageID           = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
                targetPortIdentity    = SPI1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType           = 0x0C
                domainNumber          = DN1
                targetPortIdentity    = SPI1
            TLV
                tlvType               = 0x0003
                wrMessageId           = 0x1003
                calSendPattern        = FALSE
                calRetry              = 3
```

© Copyrights 2018 - 2019, CERN

```
                calPeriod           = 50ms

Step 10: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 11: Wait for 1230ms ((WR_RESP_CALIB_REQ_TIMEOUT * (WR_STATE_RETRY + 1))
         + (10% of WR_RESP_CALIB_REQ_TIMEOUT)) for EXC_TIMEOUT_RETRY to
         occur.

Step 12: Send WRPTP CALIBRATED message on port T1 with following parameters

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 0
                 deltaRx              = 0

Step 13: Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.16. tc_conf_wrptp_wsmg_016

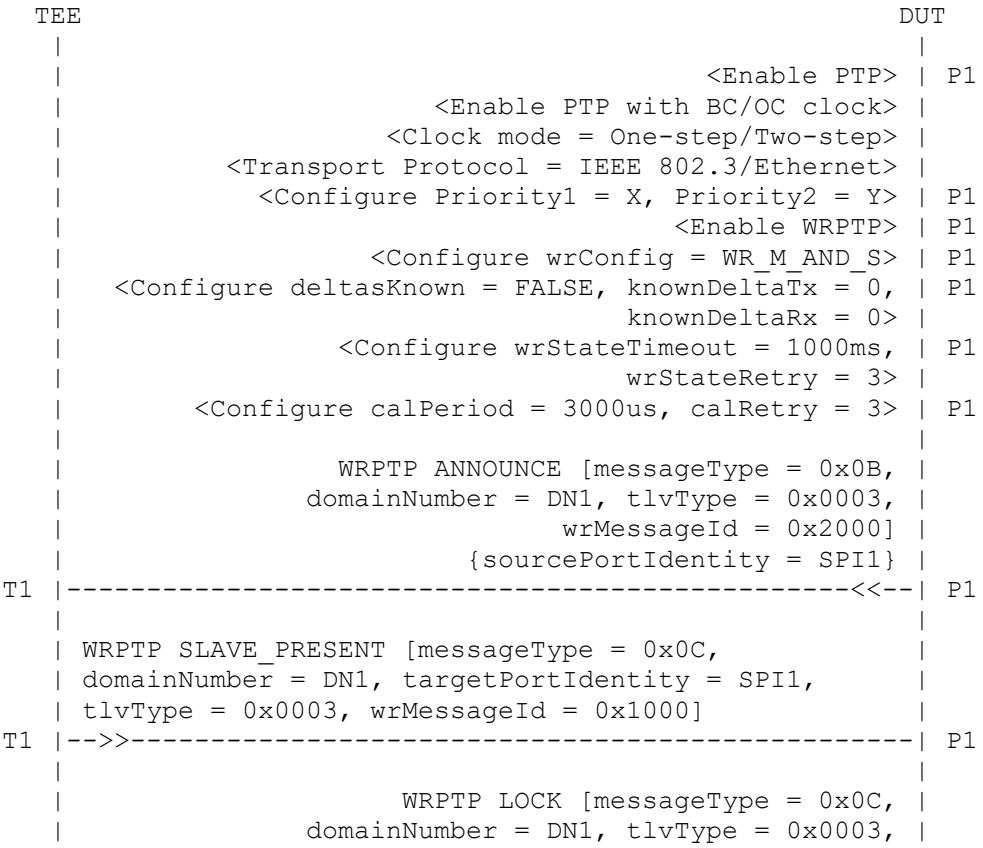
```
Test Case         : tc_conf_wrptp_wsmg_016
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Master transition of WRPTP portState from WR_LINK_ON
                    to IDLE

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master transitions it's port WR state from
                    WR_LINK_ON to IDLE state upon successful completion of
                    WR link setup process.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Page 35, Figure 27 Page 62

Conformance Type  : MUST


Topology
```



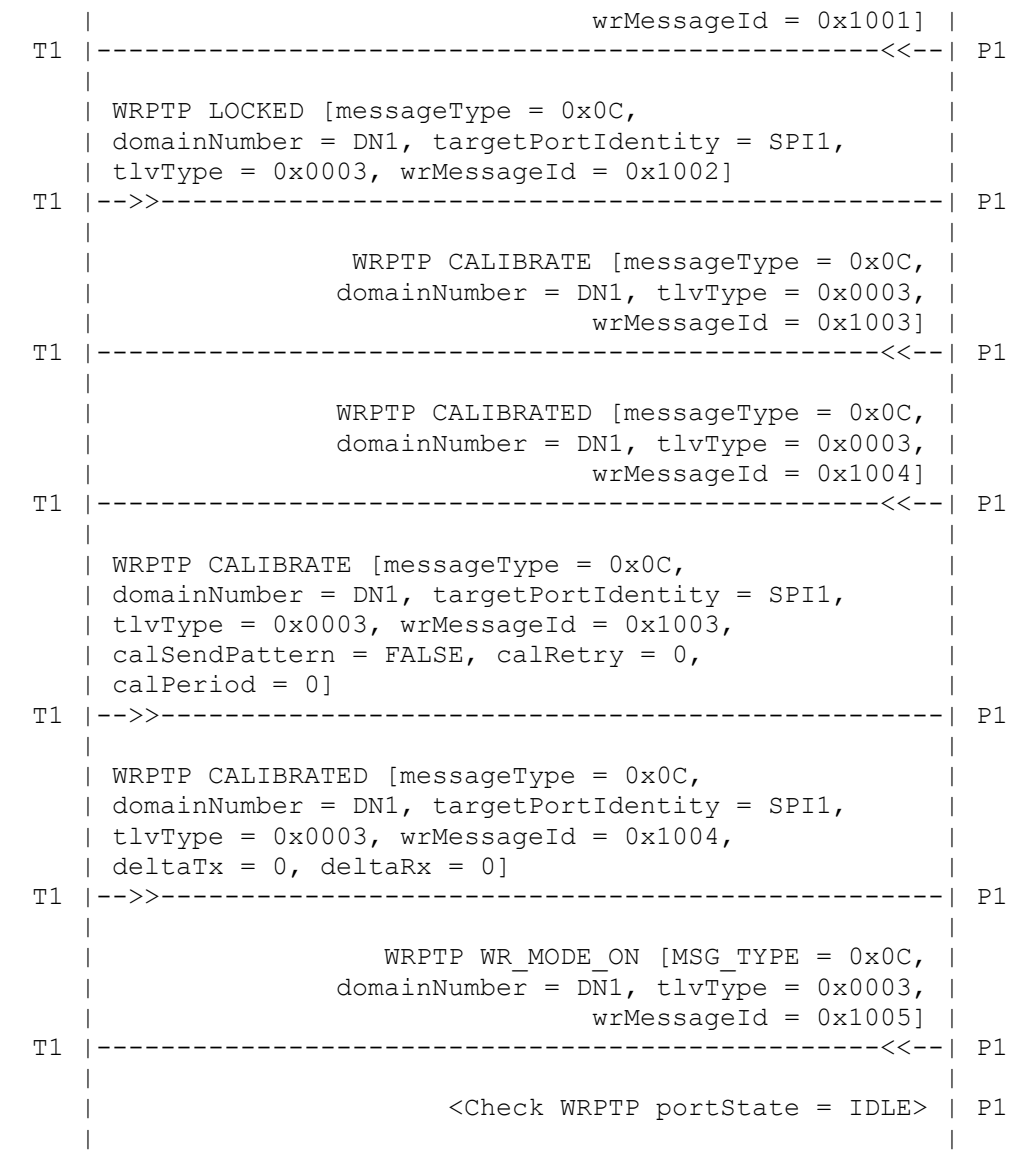
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

© Copyrights 2018 - 2019, CERN

```
Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure deltasKnown = FALSE, knownDeltaTx = 0 and
         knownDeltaRx = 0 on P1.
    x.   Configure wrStateTimeout = 1000ms and wrStateRetry = 3 on port P1.
   xi.   Configure calPeriod = 3000us and calRetry = 3 on port P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
```

© Copyrights 2018 - 2019, CERN

```
                tlvType             = 0x0003
                wrMessageId         = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 10: Send WRPTP CALIBRATED message on port T1 with following parameters

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004
                deltaTx             = 0
                deltaRx             = 0

Step 11 : Verify that DUT transmits WRPTP WR_MODE_ON message on the port P1
          with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
```

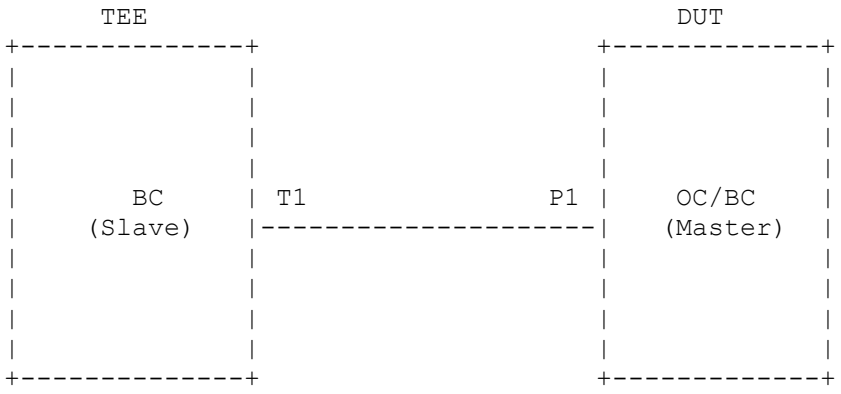
© Copyrights 2018 - 2019, CERN

```
                wrMessageId          = 0x1005

 Step 12: Verify that WRPTP portState of port P1 is in IDLE state.
```

2.17. tc_conf_wrptp_wsmg_017

```
 Test Case         : tc_conf_wrptp_wsmg_017
 Test Case Version : 1.2
 Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name       : WRPTP State Machine Group (WSMG)

 Title             : Storing of otherPortDeltaTx, otherPortDeltaRx,
                     otherPortCalPeriod, otherPortCalRetry and
                     otherPortCalSendPattern in WR Master

 Purpose           : To verify that a WRPTP enabled device with it's port in
                     PTP Master stores otherPortDeltaTx, otherPortDeltaRx,
                     otherPortCalPeriod, otherPortCalRetry and
                     otherPortCalSendPattern received in CALIBRATE message.

 Reference         : White Rabbit Specification v2.0 July 2011,
                     Clause 6.3.1.2.20 - 6.3.1.2.24 Pages 22

 Conformance Type  : MUST
```

Topology

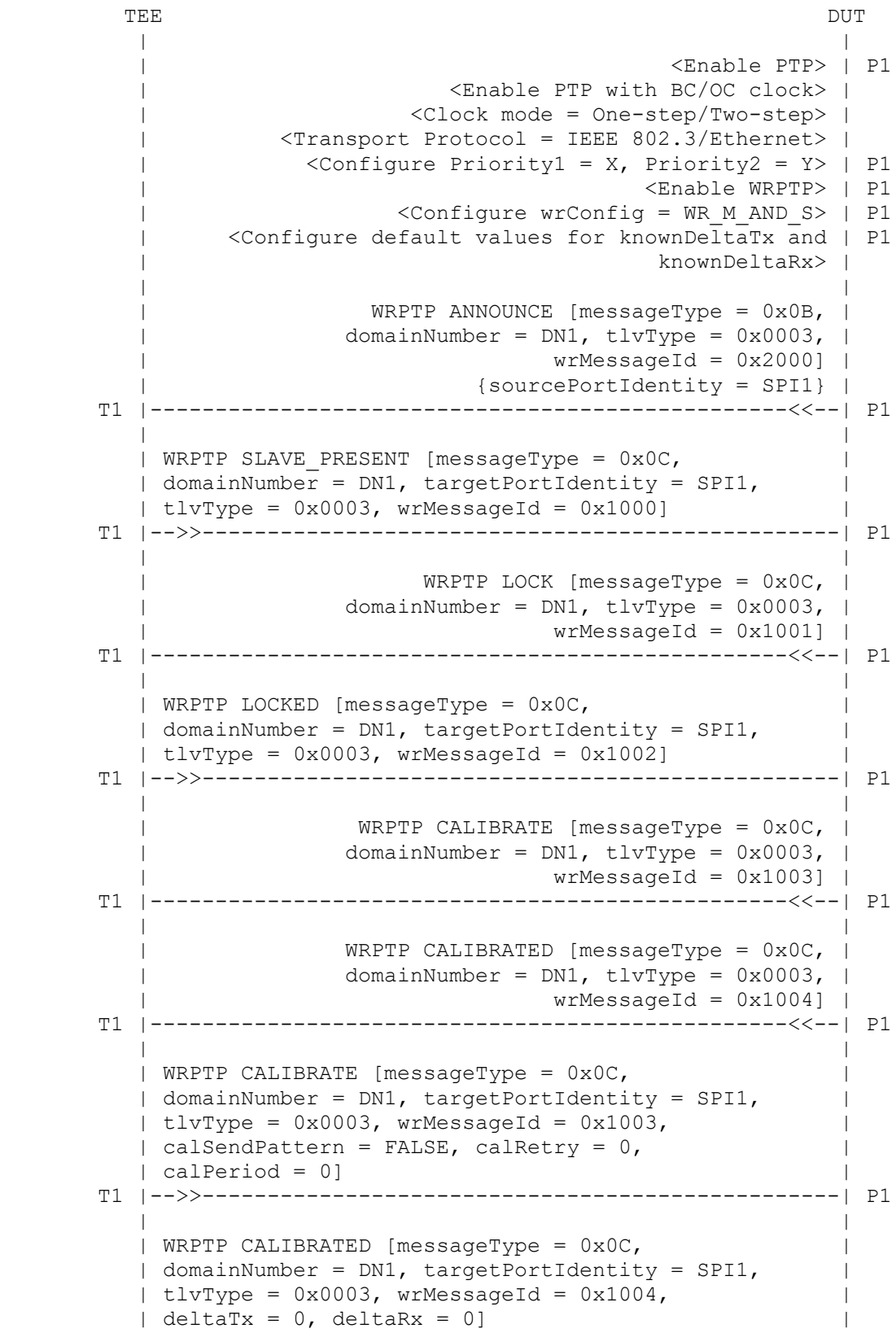


Legends:

```
    TEE     : Test Execution Engine
    DUT     : Device Under Test
    OC      : Ordinary Clock
    BC      : Boundary Clock
    T1      : Port 1 at TEE
    P1      : Port 1 at DUT
```

© Copyrights 2018 - 2019, CERN

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

© Copyrights 2018 - 2019, CERN

```
          | domainNumber = DN1, targetPortIdentity = SPI1,      |
          | tlvType = 0x0003, wrMessageId = 0x1004,             |
          | deltaTx = 226214, deltaRx = 226758]                 |
       T1 |-->>-------------------------------------------------| P1
          |                                                     |
          |                    <Check otherPortDeltaTx = 226214> | P1
          |                                                     |
          |                    <Check otherPortDeltaRx = 226758> | P1
          |                                                     |
          |               <Check otherPortCalSendPattern = TRUE> | P1
          |                                                     |
          |                  <Check otherPortCalPeriod = 3000us> | P1
          |                                                     |
          |                       <Check otherPortCalRetry = 3> | P1
          |                                                     |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header
messageType = 0x0B
domainNumber = DN1
TLV

© Copyrights 2018 - 2019, CERN

```
                tlvType             = 0x0003
                wrMessageId         = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
                 targetPortIdentity  = SPI1
             TLV
                 tlvType             = 0x0003
                 wrMessageID         = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
                 targetPortIdentity  = SPI1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1003

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType         = 0x0C
                 domainNumber        = DN1
             TLV
                 tlvType             = 0x0003
                 wrMessageId         = 0x1004

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

             PTP Header
```

© Copyrights 2018 - 2019, CERN

```
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0

Step 10: Send WRPTP CALIBRATED message on port T1 with following parameters

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 11: Verify otherPortDeltaTx = 0 on port P1.

Step 12: Verify otherPortDeltaRx = 0 on port P1.

Step 13: Verify otherPortCalSendPattern = FALSE on port P1.

Step 14: Verify otherPortCalPeriod = 0 on port P1.

Step 15: Verify otherPortCalRetry = 0 on port P1.

(Part 2)

Step 16: Disable WRPTP on port P1.

Step 17: Enable WRPTP on port P1.

Step 18: Wait for WRPTP te be enabled.

Step 19: Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000

Step 20: Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
```

© Copyrights 2018 - 2019, CERN

```
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1000

Step 21: Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 22: Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1002

Step 23: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003

Step 24: Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004

Step 25: Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = TRUE
                calRetry            = 3
                calPeriod           = 3000us
```

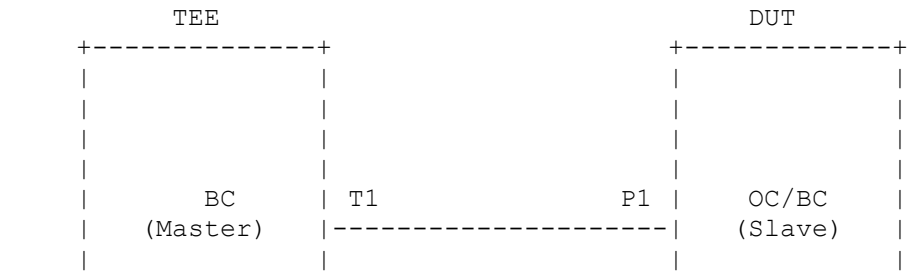
© Copyrights 2018 - 2019, CERN

```
Step 26: Send WRPTP CALIBRATED message on port T1 with following parameters

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 226214
                 deltaRx              = 226758

Step 27: Verify otherPortDeltaTx = 226214 on port P1.

Step 28: Verify otherPortDeltaRx = 226758 on port P1.

Step 29: Verify otherPortCalSendPattern = TRUE on port P1.

Step 30: Verify otherPortCalPeriod = 3000us on port P1.

Step 31: Verify otherPortCalRetry = 3 on port P1.
```

2.18. tc_conf_wrptp_wsmg_018

```
Test Case         : tc_conf_wrptp_wsmg_018
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from IDLE to
                    PRESENT

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave sends SLAVE_PRESENT message and transitions
                    it's port WR state from IDLE to PRESENT state.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Figure 27 Page 62

Conformance Type  : MUST
```

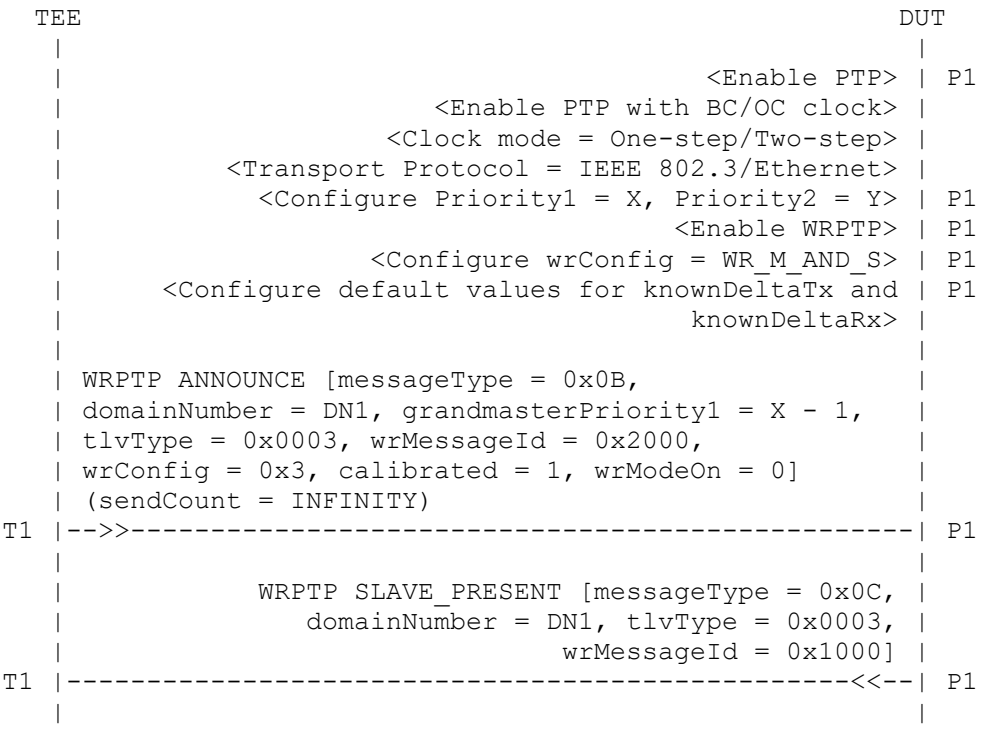
Topology



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



Legends :

TEE = Test Execution Engine
DUT = Device Under Test
T1 = TEE's port 1
P1 = DUT's port 1
PTP = Precision Time Protocol
WRPTP = White Rabbit Precision Time Protocol
OC = Ordinary Clock
BC = Boundary Clock
DN1 = Domain Number 1

© Copyrights 2018 - 2019, CERN

```
Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and verify that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000
```

2.19. tc_conf_wrptp_wsmg_019

```
Test Case         : tc_conf_wrptp_wsmg_019
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave re-entering of WRPTP portState - PRESENT - on
                    expiry of WR_PRESENT_TIMEOUT
```

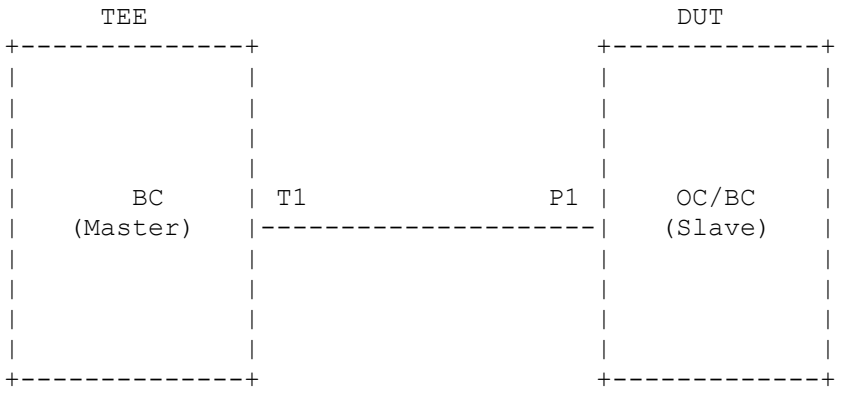
© Copyrights 2018 - 2019, CERN

Purpose : To verify that a WRPTP enabled device with it's port in PTP Slave sends SLAVE_PRESENT message and re-enters to it's port WR state PRESENT on expiry of WR_PRESENT_TIMEOUT.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Pages 35, Figure 27 Page 62

Conformance Type : MUST

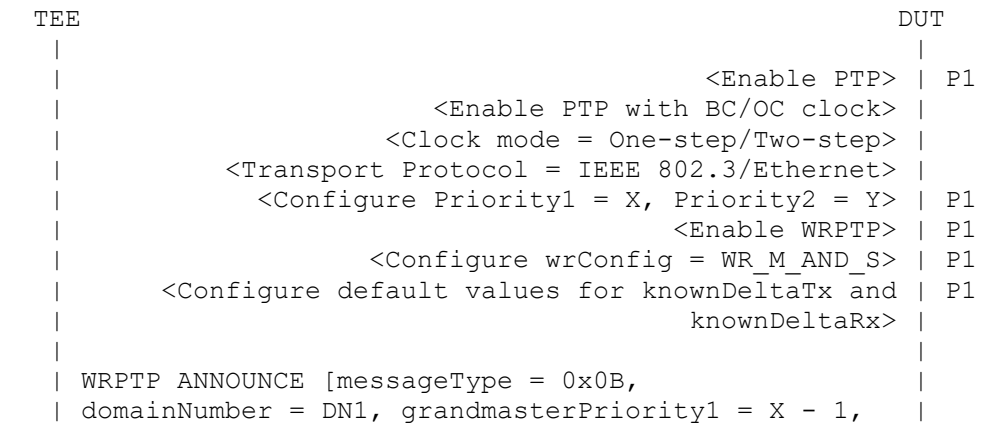
Topology



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

© Copyrights 2018 - 2019, CERN

```
(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         the received timestamp as TS1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that the DUT transmits WRPTP SLAVE_PRESENT message on port
         P1 with following parameters and store the received timestamp as
         TS2.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 6 : Verify that the DUT transmits WRPTP SLAVE_PRESENT message on port
         P1 with following parameters and store the received timestamp as
         TS3.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 7 : Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 1000ms (WR_PRESENT_TIMEOUT).

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
```

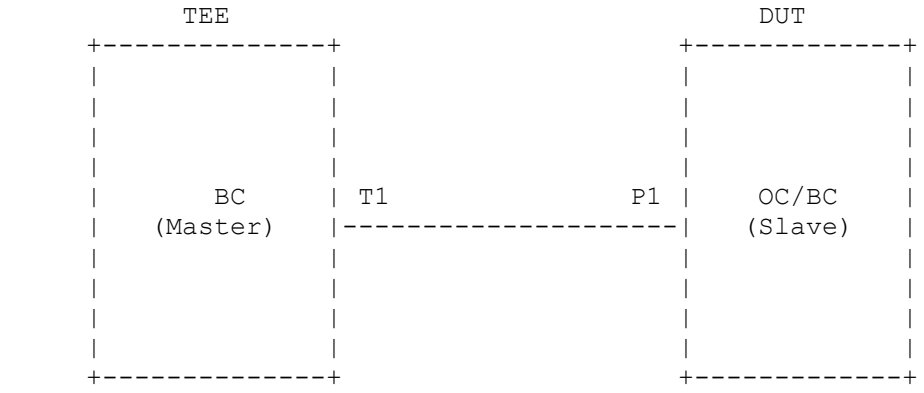
© Copyrights 2018 - 2019, CERN

Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

2.20. tc_conf_wrptp_wsmg_020

```
Test Case         : tc_conf_wrptp_wsmg_020
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from PRESENT to
                    IDLE after EXC_TIMEOUT_RETRY occurs

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave transitions it's port WR state from PRESENT to
                    IDLE state after EXC_TIMEOUT_RETRY occurs.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

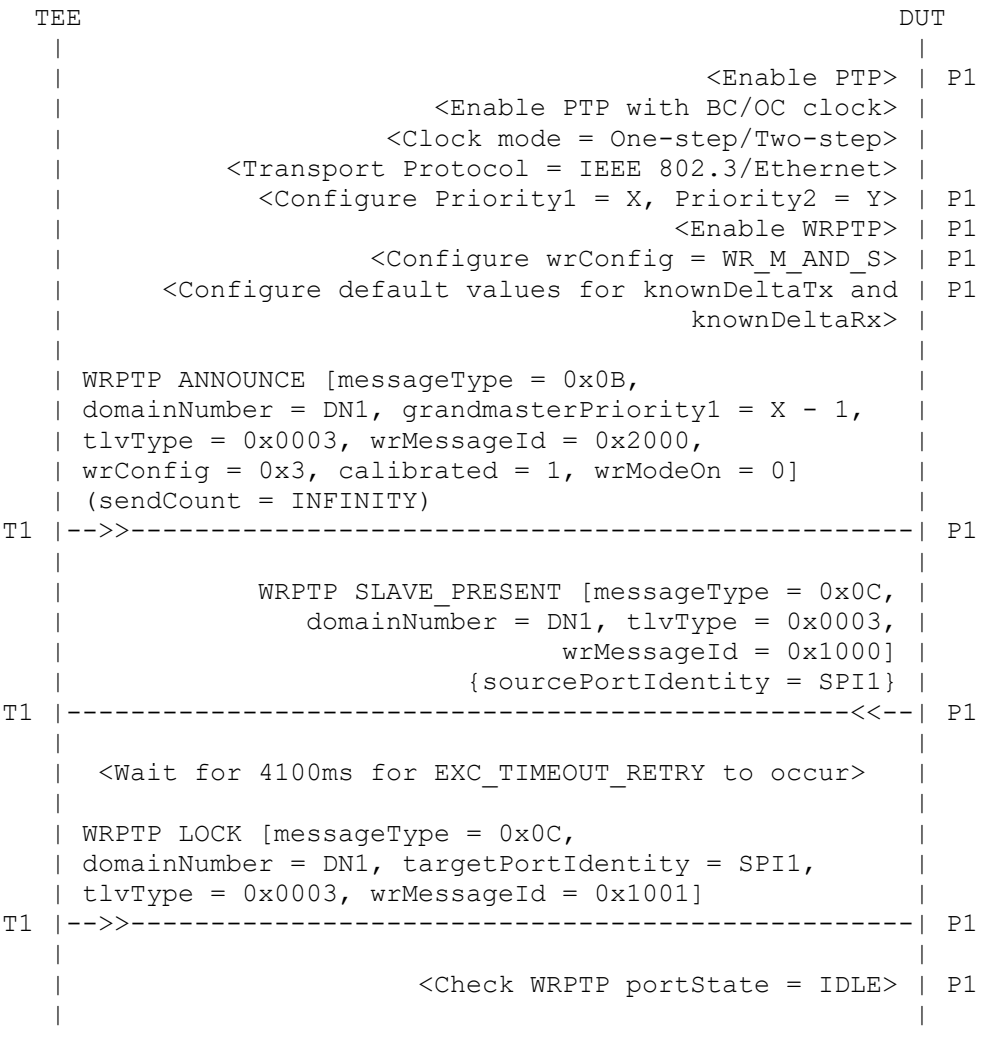
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.

© Copyrights 2018 - 2019, CERN

```
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Wait for 4100ms ((WR_PRESENT_TIMEOUT * (WR_STATE_RETRY + 1)) +
         (10% of WR_PRESENT_TIMEOUT)) for EXC_TIMEOUT_RETRY to occur.

Step 6 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 7 : Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
```

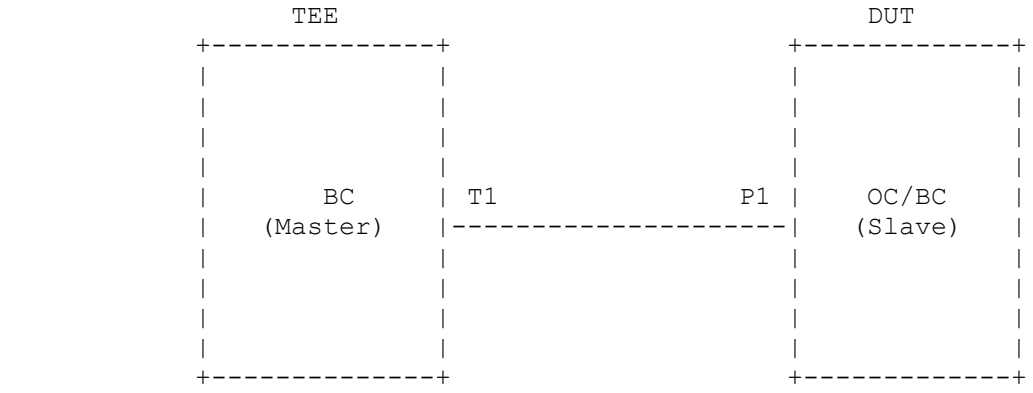
© Copyrights 2018 - 2019, CERN

Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

2.21. tc_conf_wrptp_wsmg_021

```
Test Case         : tc_conf_wrptp_wsmg_021
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from S_LOCK to
                    LOCKED

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave sends a LOCKED message and transitions it's
                    port state from S_LOCK to LOCKED state.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Figure 27 Page 62

Conformance Type  : MUST
```

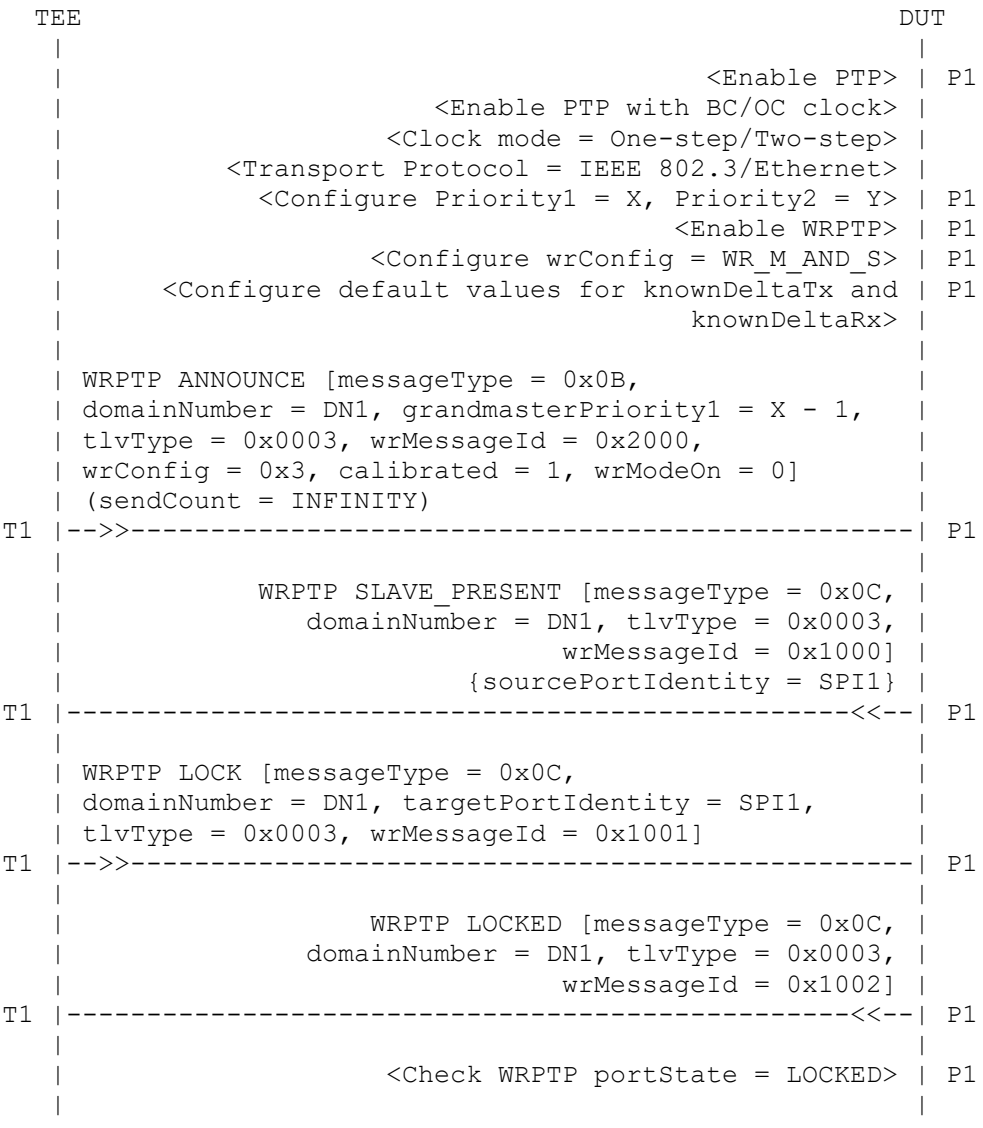
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

© Copyrights 2018 - 2019, CERN

```
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Verify that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
```

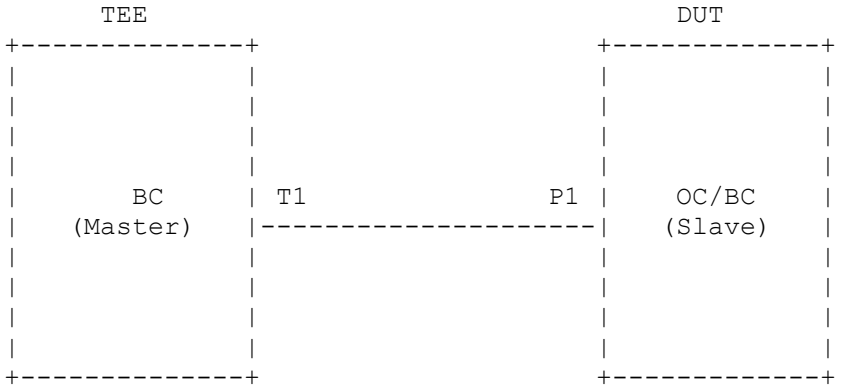
© Copyrights 2018 - 2019, CERN

```
                tlvType              = 0x0003
                wrMessageID          = 0x1002

 Step 7 : Verify that WRPTP portState of port P1 is in LOCKED state.
```

2.22. tc_conf_wrptp_wsmg_022

```
 Test Case         : tc_conf_wrptp_wsmg_022
 Test Case Version : 1.2
 Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name       : WRPTP State Machine Group (WSMG)

 Title             : WR Slave re-entering of WRPTP portState - LOCKED - on
                     expiry of WR_LOCKED_TIMEOUT

 Purpose           : To verify that a WRPTP enabled device with it's port in
                     PTP Slave sends LOCKED message and re-enters to it's
                     port WR state LOCKED on expiry of WR_LOCKED_TIMEOUT.

 Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                     Pages 35, Figure 27 Page 62

 Conformance Type  : MUST
```

Topology

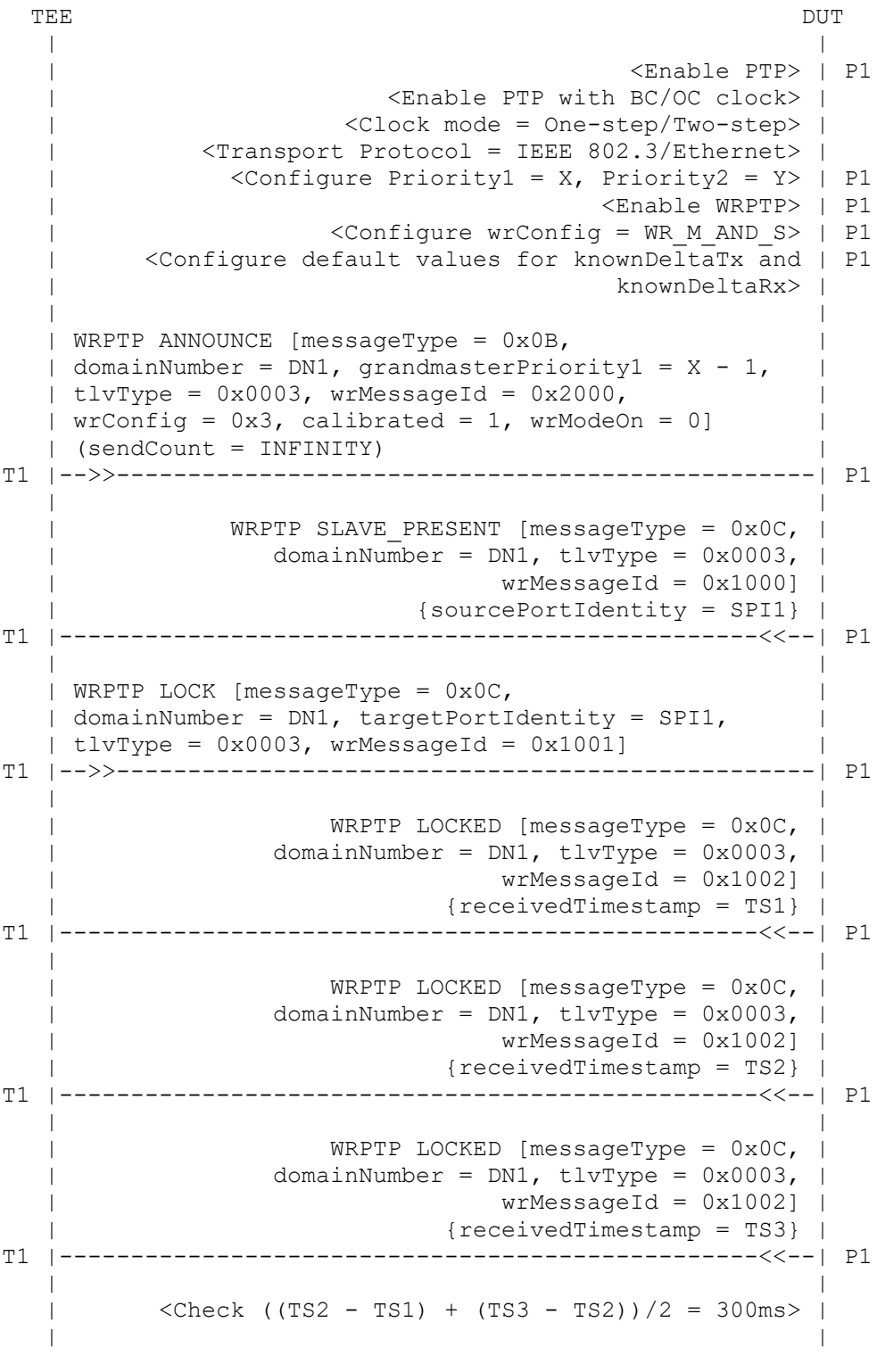


Legends:

```
    TEE     : Test Execution Engine
    DUT     : Device Under Test
    OC      : Ordinary Clock
    BC      : Boundary Clock
    T1      : Port 1 at TEE
    P1      : Port 1 at DUT
```

© Copyrights 2018 - 2019, CERN

Ladder Diagram :



Legends :

TEE = Test Execution Engine
DUT = Device Under Test

© Copyrights 2018 - 2019, CERN

```
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1


Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters and store the received timestamp as TS1.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 7 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters and store the received timestamp as TS2.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 8 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters and store the received timestamp as TS3.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 9 : Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms (WR_LOCKED_TIMEOUT).

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.23. tc_conf_wrptp_wsmg_023

```
Test Case         : tc_conf_wrptp_wsmg_023
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)
```

© Copyrights 2018 - 2019, CERN

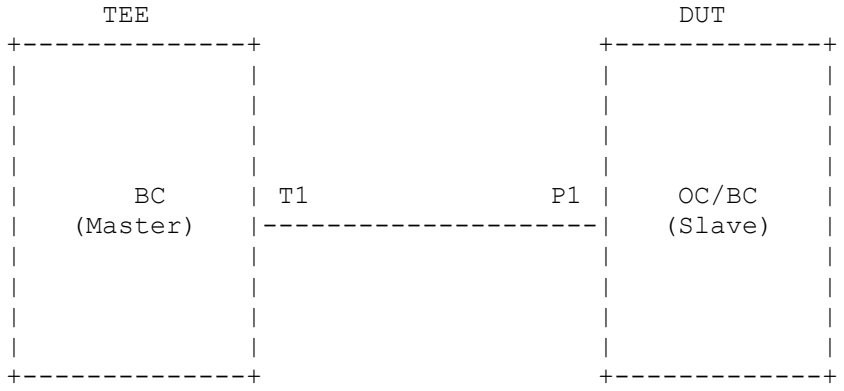
Title : WR Slave transition of WRPTP portState from LOCKED to RESP_CALIB_REQ before EXC_TIMEOUT_RETRY occurs

Purpose : To verify that a WRPTP enabled device with it's port in PTP Slave transitions it's port WR state from LOCKED to RESP_CALIB_REQ state on the reception of CALIBRATE message before EXC_TIMEOUT_RETRY occurs.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type : MUST

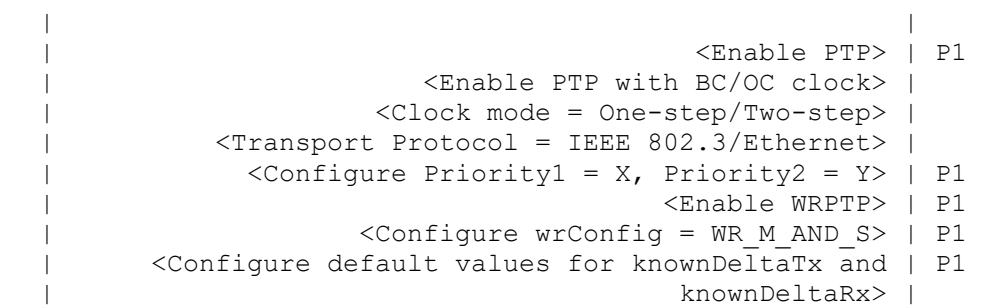
Topology



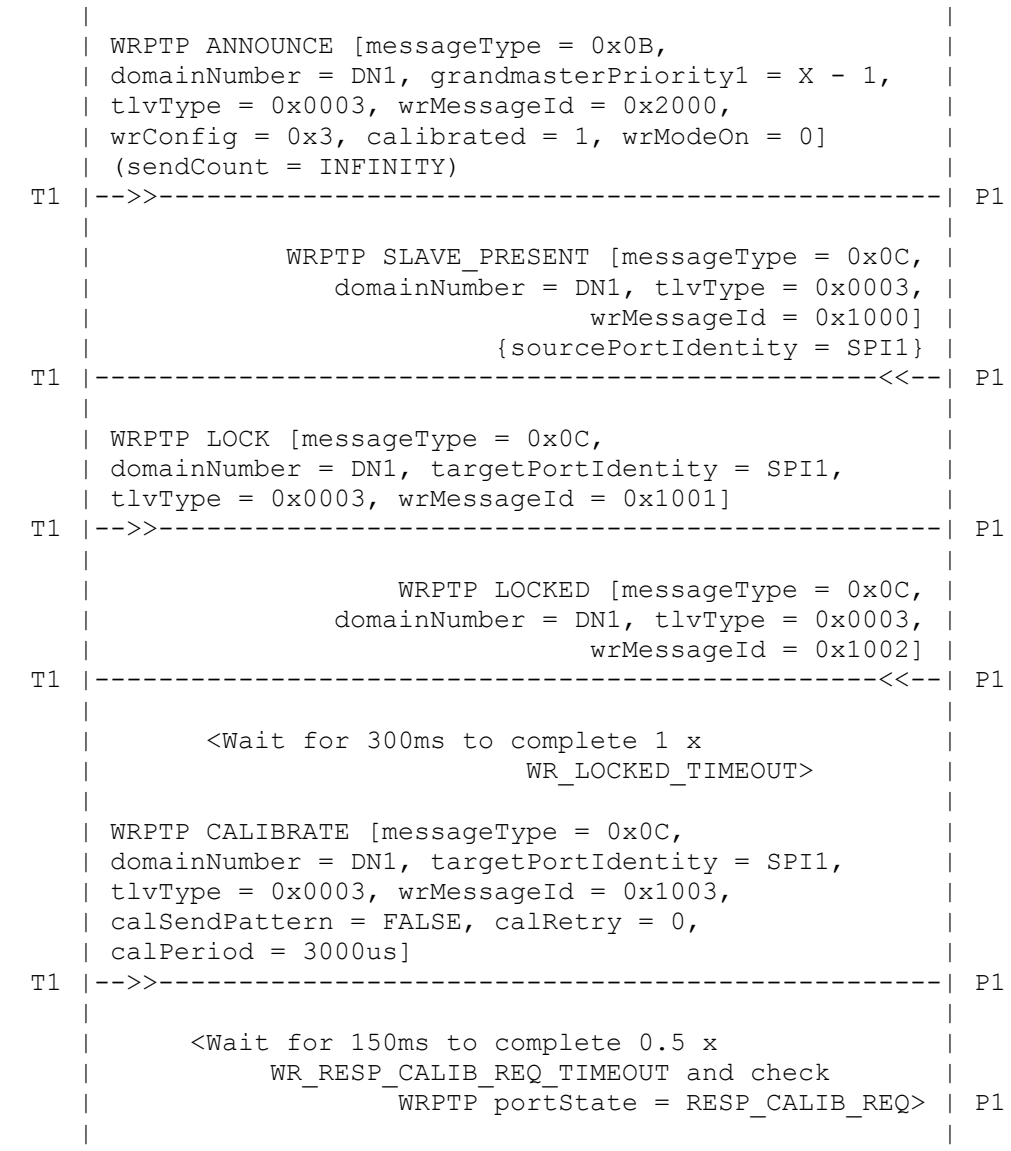
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

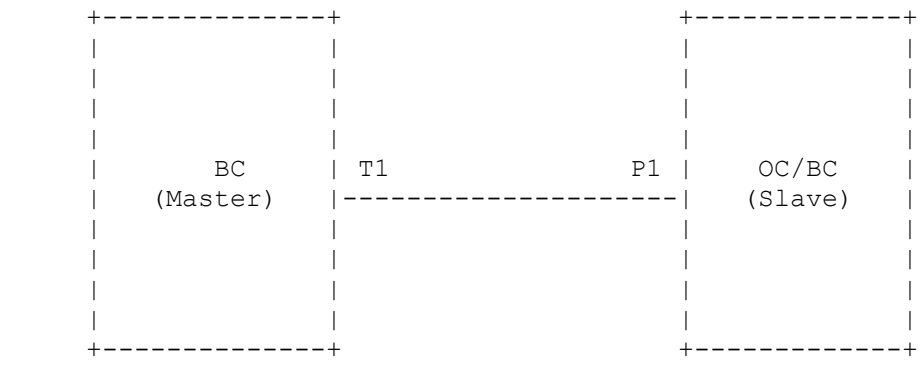
```
Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN

```
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002

 Step 7 : Wait for 300ms to complete 1 x WR_LOCKED_TIMEOUT.

 Step 8 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 3000us

 Step 9 : Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and verify that
          WRPTP portState of port P1 is in RESP_CALIB_REQ state.

 Note :

   Values mentioned in above steps are examples based on default values.
   However, the test will be executed using the values given in ATTEST GUI
   (Selected configuration in ATTEST Configuration Manager > Protocol
   Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
   logs may differ from those mentioned in the steps.
```

2.24. tc_conf_wrptp_wsmg_024

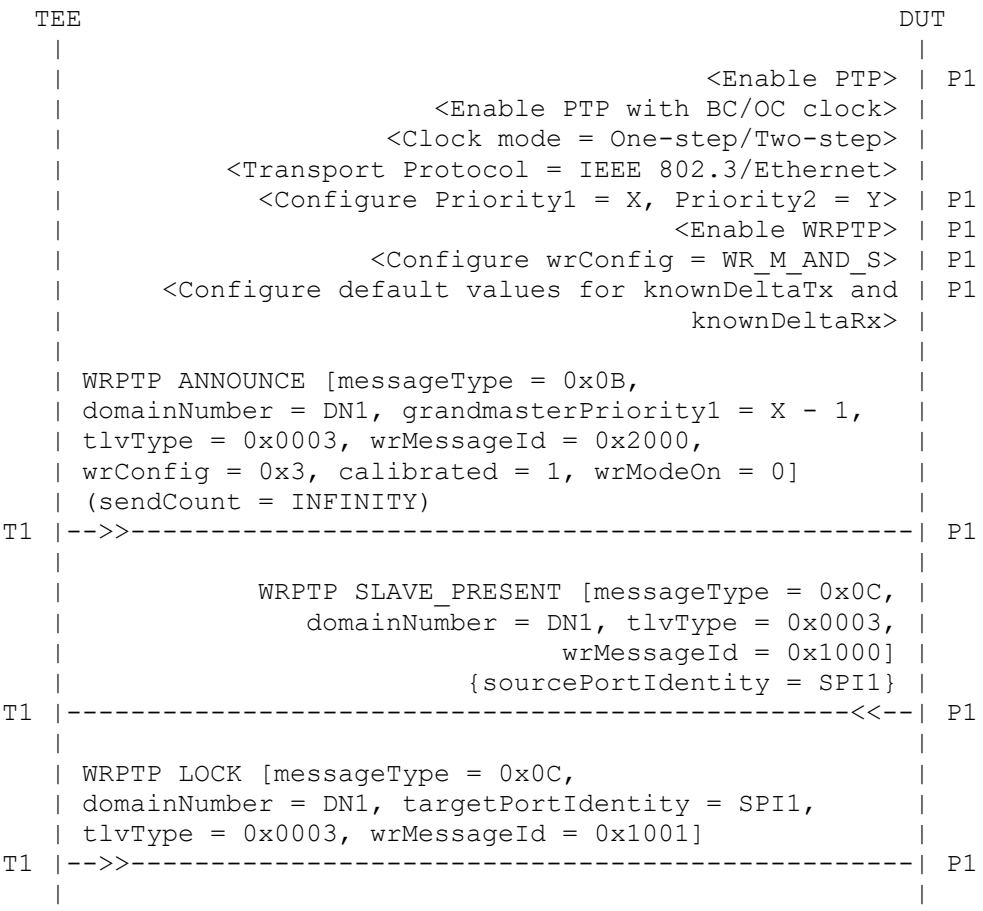
```
 Test Case         : tc_conf_wrptp_wsmg_024
 Test Case Version : 1.3
 Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name       : WRPTP State Machine Group (WSMG)

 Title             : WR Slave transition of WRPTP portState from LOCKED to
                     IDLE after EXC_TIMEOUT_RETRY occurs

 Purpose           : To verify that a WRPTP enabled device with it's port in
                     PTP Slave transitions it's port WR state from LOCKED to
                     IDLE state after EXC_TIMEOUT_RETRY occurs.

 Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                     Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

 Conformance Type  : MUST


Topology


                  TEE                                   DUT
```



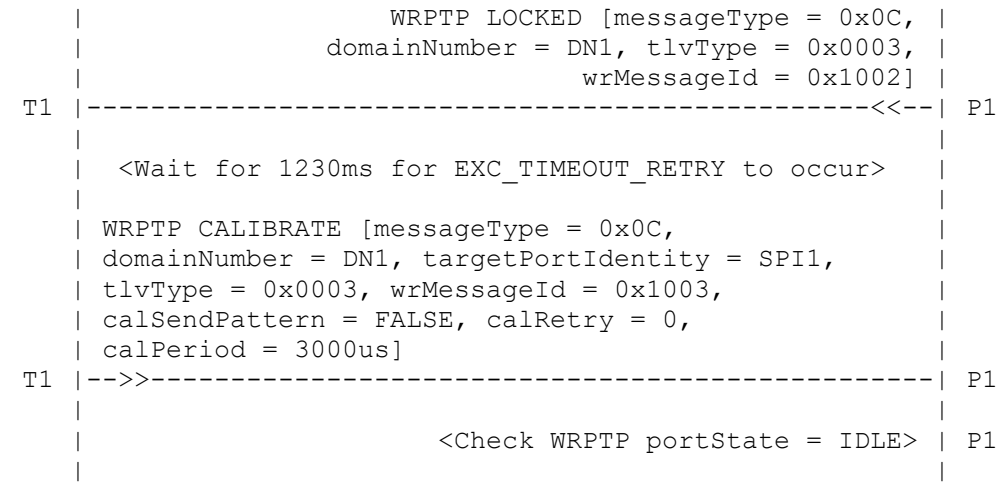
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

PTP Header

messageType	= 0x0B
domainNumber	= DN1

© Copyrights 2018 - 2019, CERN

```
            grandmasterPriority1 = X - 1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x2000
            wrConfig             = 0x3
            calibrated           = 1
            wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageID          = 0x1002

Step 7 : Wait for 1230ms ((WR_LOCKED_TIMEOUT * (WR_STATE_RETRY + 1)) +
         (10% of WR_LOCKED_TIMEOUT)) for EXC_TIMEOUT_RETRY to occur.

Step 8 : Send WRPTP CALIBRATE message on port T1 with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003
            calSendPattern       = FALSE
            calRetry             = 0
            calPeriod            = 3000us

Step 9 : Verify that WRPTP portState of port P1 is in IDLE state.
```

© Copyrights 2018 - 2019, CERN

Note :

Values mentioned in above steps are examples based on default values. However, the test will be executed using the values given in ATTEST GUI (Selected configuration in ATTEST Configuration Manager > Protocol Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

2.25. tc_conf_wrptp_wsmg_025

Test Case : tc_conf_wrptp_wsmg_025
Test Case Version : 1.3
Component Name : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name : WRPTP State Machine Group (WSMG)

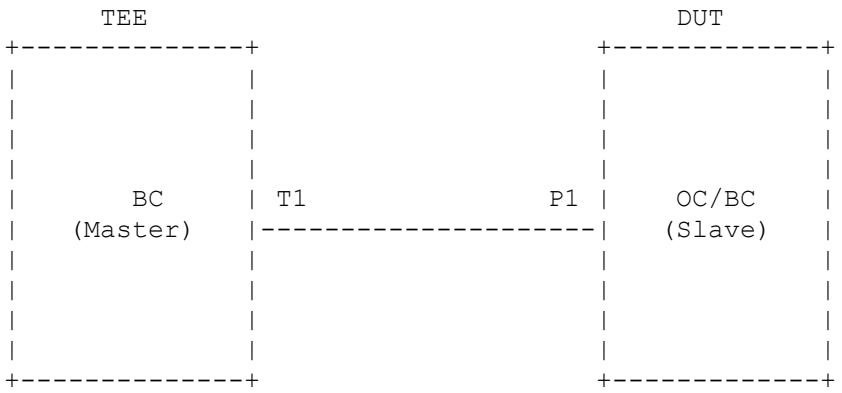
Title : WR Slave re-entering of WRPTP portState - RESP_CALIB_REQ - on expiry of WR_RESP_CALIB_REQ_TIMEOUT

Purpose : To verify that a WRPTP enabled device with it's port in PTP Slave re-enters to it's port WR state RESP_CALIB_REQ on expiry of WR_RESP_CALIB_REQ_TIMEOUT when otherPortCalPeriod is 0x0.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type : MUST

Topology

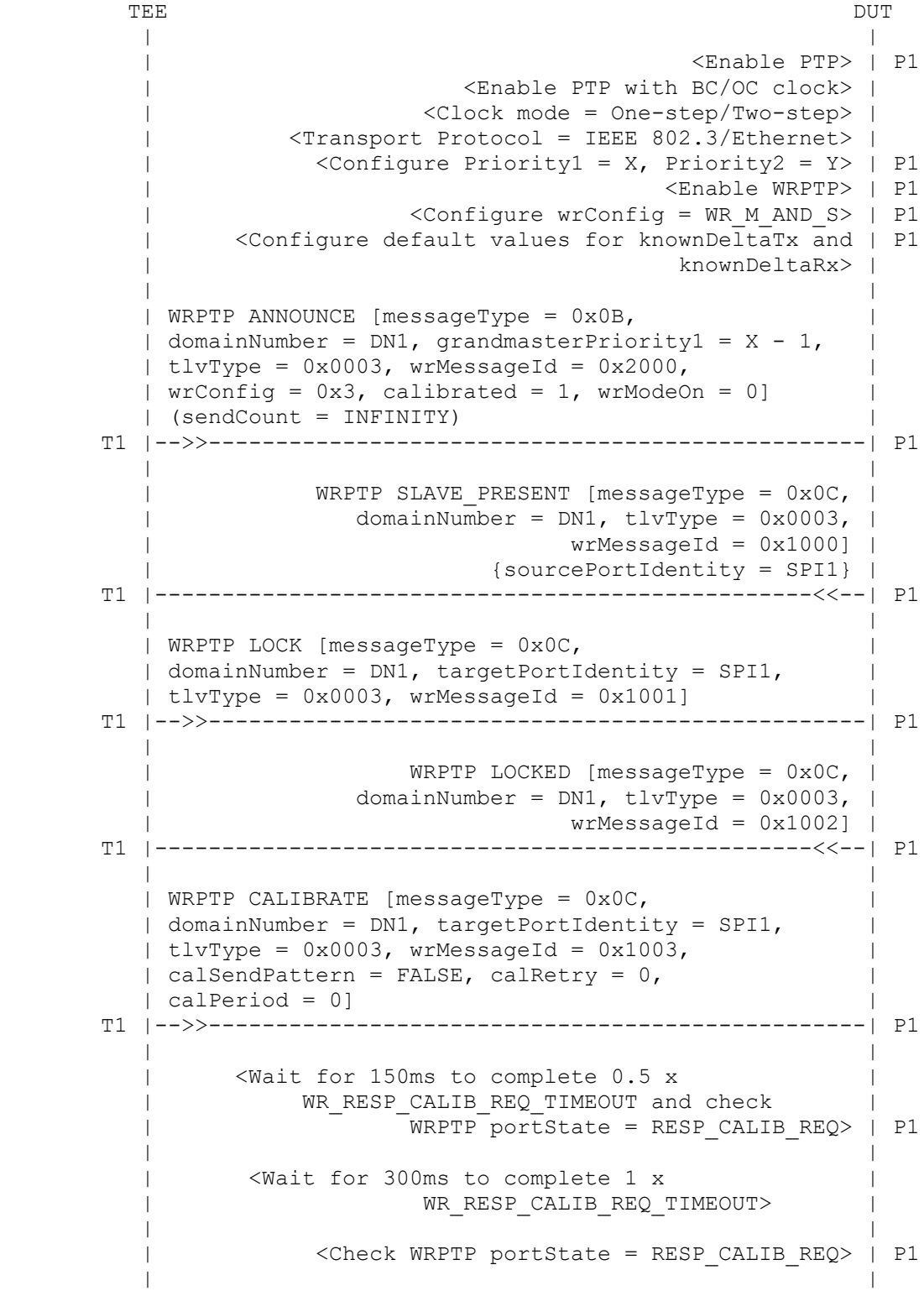


Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE

P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
Legends           :

    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1



Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
```

© Copyrights 2018 - 2019, CERN

```
                tlvType             = 0x0003
                wrMessageID         = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 8 : Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 9 : Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 10: Observe that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

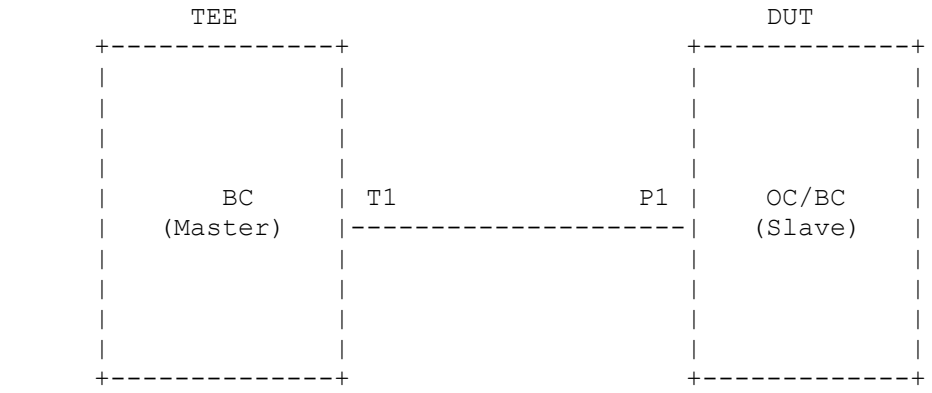
2.26. tc_conf_wrptp_wsmg_026

```
Test Case         : tc_conf_wrptp_wsmg_026
```

© Copyrights 2018 - 2019, CERN

```
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave re-entering of WRPTP portState - RESP_CALIB_REQ
                    - on expiry of WR_RESP_CALIB_REQ_TIMEOUT -
                    otherPortCalPeriod and otherPortCalRetry > 0x0

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave re-enters to it's port WR state RESP_CALIB_REQ
                    on expiry of WR_RESP_CALIB_REQ_TIMEOUT when
                    otherPortCalPeriod is greater than 0x0
                    (otherPortCalPeriod and otherPortCalRetry should be
                    ignored by DUT).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

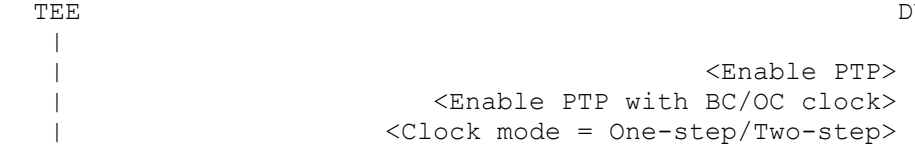
Topology

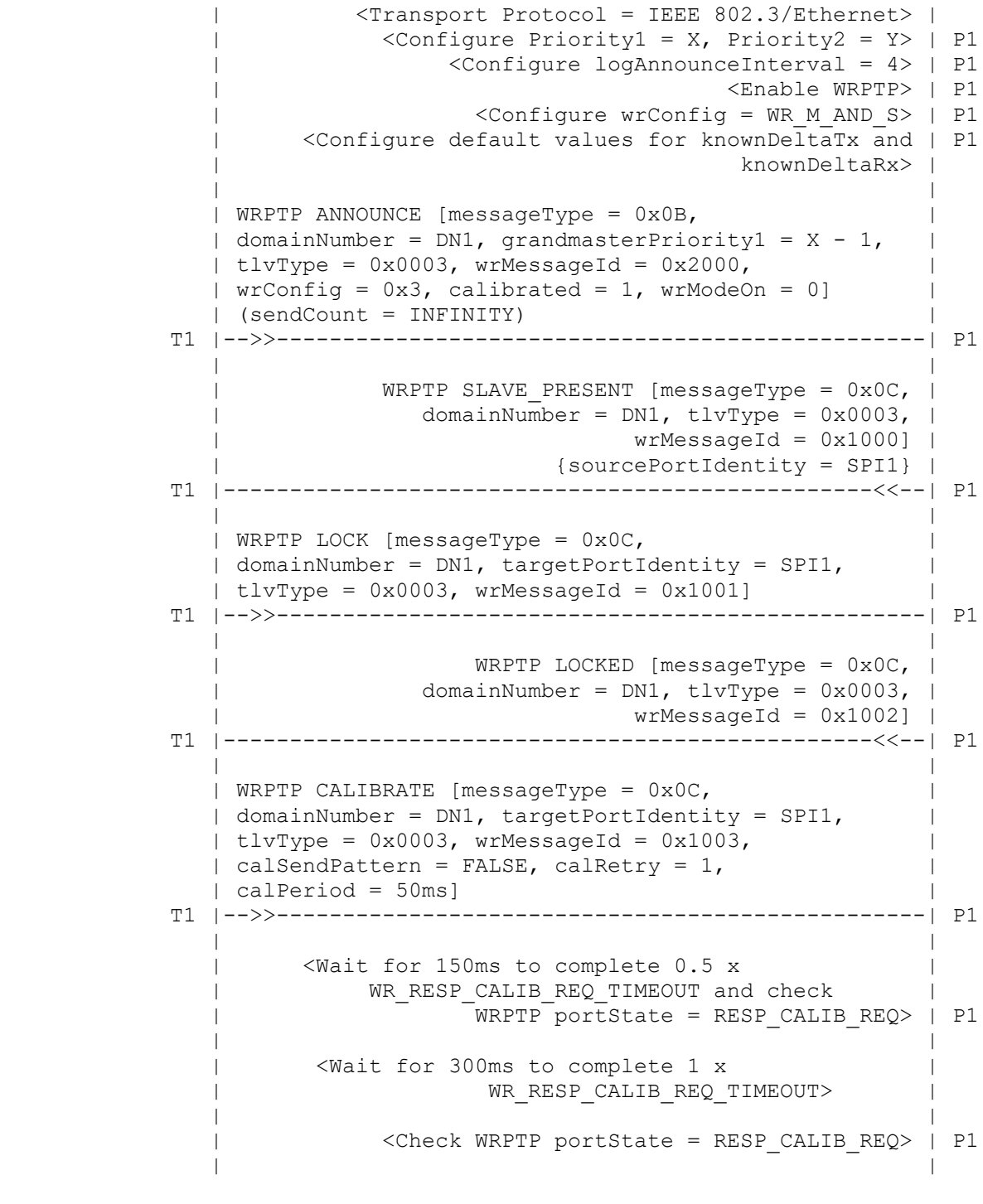


Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :





Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock

© Copyrights 2018 - 2019, CERN

```
    BC        = Boundary Clock
    DN1       = Domain Number 1


Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Configure logAnnounceInterval = 4.
 viii.   Enable WRPTP on port P1.
   ix.   Configure wrConfig = WR_M_AND_S.
    x.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
```

© Copyrights 2018 - 2019, CERN

```
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 1
                calPeriod           = 50ms

Step 8 : Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 9 : Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 10: Verify that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.27. tc_conf_wrptp_wsmg_027

```
Test Case         : tc_conf_wrptp_wsmg_027
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from
                    RESP_CALIB_REQ to CALIBRATION before EXC_TIMEOUT_RETRY
                    occurs - otherPortCalPeriod and otherPortCalRetry are
                    0x0
```

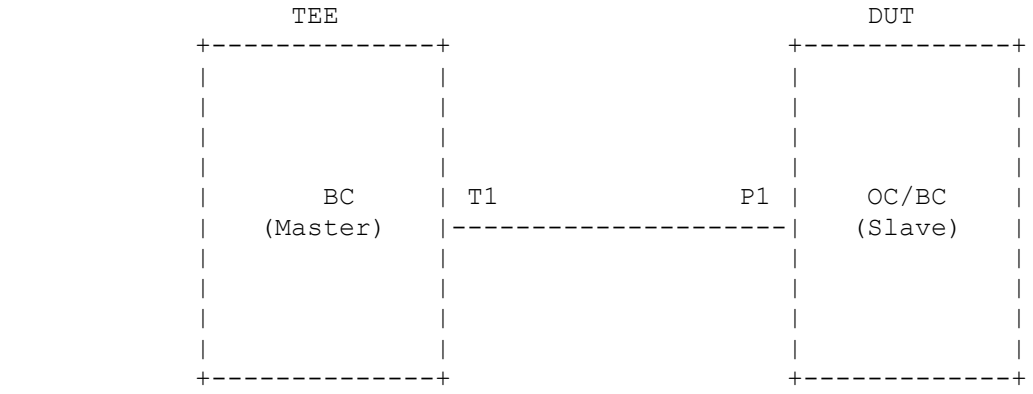
© Copyrights 2018 - 2019, CERN

Purpose : To verify that a WRPTP enabled device with it's port in PTP Slave sends CALIBRATE message and transitions it's port WR state from RESP_CALIB_REQ to CALIBRATION state on the reception of CALIBRATED message before EXC_TIMEOUT_RETRY occurs when otherPortCalPeriod and otherPortCalRetry are 0x0.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type : MUST

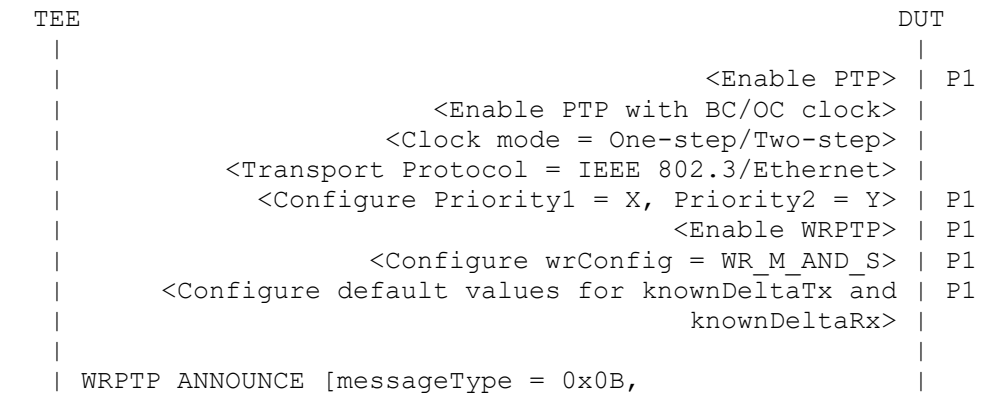
Topology



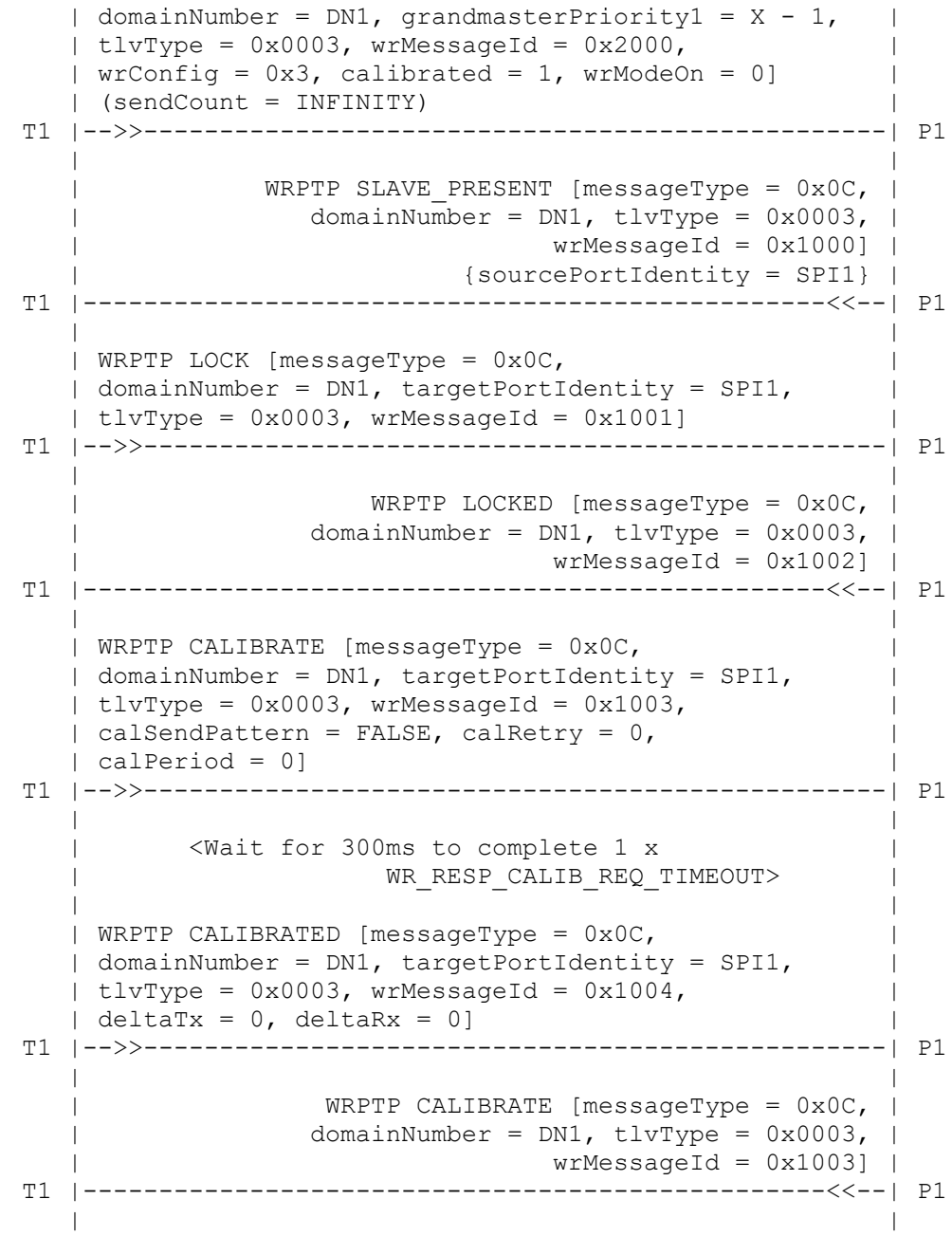
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

© Copyrights 2018 - 2019, CERN

```
Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
```

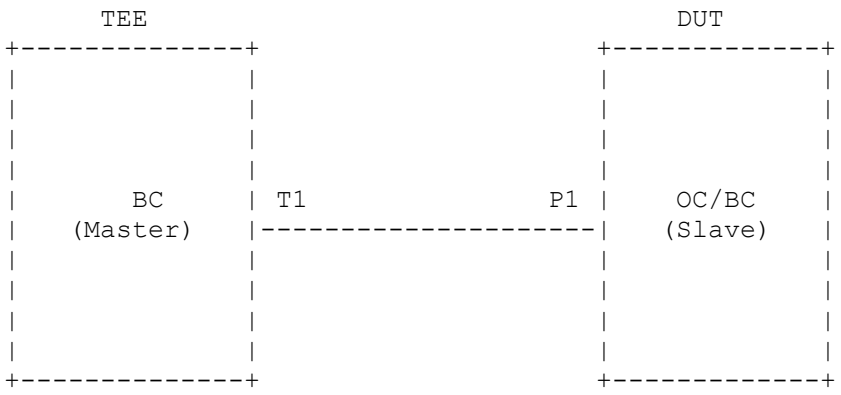
© Copyrights 2018 - 2019, CERN

```
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003
                 calSendPattern       = FALSE
                 calRetry             = 0
                 calPeriod            = 0

Step 8 : Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 9 : Send WRPTP CALIBRATED message on port T1 with following parameters

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 0
                 deltaRx              = 0

Step 10: Verify that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

© Copyrights 2018 - 2019, CERN

2.28. tc_conf_wrptp_wsmg_028

```
 Test Case         : tc_conf_wrptp_wsmg_028
 Test Case Version : 1.3
 Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name       : WRPTP State Machine Group (WSMG)

 Title             : WR Slave transition of WRPTP portState from
                     RESP_CALIB_REQ to IDLE after EXC_TIMEOUT_RETRY occurs -
                     otherPortCalPeriod and otherPortCalRetry are 0x0

 Purpose           : To verify that a WRPTP enabled device in WR_SLAVE mode
                     transitions it's port state from RESP_CALIB_REQ to IDLE
                     state after EXC_TIMEOUT_RETRY occurs when
                     otherPortCalPeriod and otherPortCalRetry are 0x0.

 Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                     Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

 Conformance Type  : MUST


Topology


                  TEE                                  DUT
            +--------------+                     +-------------+
            |              |                     |             |
            |              |                     |             |
            |              |                     |             |
            |              |                     |             |
            |       BC     | T1               P1 |    OC/BC    |
            |   (Master)   |---------------------|   (Slave)   |
            |              |                     |             |
            |              |                     |             |
            |              |                     |             |
            |              |                     |             |
            +--------------+                     +-------------+


    Legends:

        TEE     : Test Execution Engine
        DUT     : Device Under Test
        OC      : Ordinary Clock
        BC      : Boundary Clock
        T1      : Port 1 at TEE
        P1      : Port 1 at DUT



 Ladder Diagram    :

          TEE                                                  DUT
           |                                                    |
           |                                       <Enable PTP> | P1
```



```
          |                      <Enable PTP with BC/OC clock> |
          |                   <Clock mode = One-step/Two-step> |
          |          <Transport Protocol = IEEE 802.3/Ethernet> |
          |            <Configure Priority1 = X, Priority2 = Y> | P1
          |                                     <Enable WRPTP> | P1
          |                  <Configure wrConfig = WR_M_AND_S> | P1
          |      <Configure default values for knownDeltaTx and | P1
          |                                      knownDeltaRx> |
          |                                                    |
          | WRPTP ANNOUNCE [messageType = 0x0B,                |
          | domainNumber = DN1, grandmasterPriority1 = X - 1,  |
          | tlvType = 0x0003, wrMessageId = 0x2000,            |
          | wrConfig = 0x3, calibrated = 1, wrModeOn = 0]      |
          | (sendCount = INFINITY)                             |
       T1 |-->>-------------------------------------------------| P1
          |                                                    |
          |            WRPTP SLAVE_PRESENT [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                              wrMessageId = 0x1000] |
          |                        {sourcePortIdentity = SPI1} |
       T1 |-------------------------------------------------<<--| P1
          |                                                    |
          | WRPTP LOCK [messageType = 0x0C,                    |
          | domainNumber = DN1, targetPortIdentity = SPI1,     |
          | tlvType = 0x0003, wrMessageId = 0x1001]            |
       T1 |-->>-------------------------------------------------| P1
          |                                                    |
          |                  WRPTP LOCKED [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                              wrMessageId = 0x1002] |
       T1 |-------------------------------------------------<<--| P1
          |                                                    |
          | WRPTP CALIBRATE [messageType = 0x0C,               |
          | domainNumber = DN1, targetPortIdentity = SPI1,     |
          | tlvType = 0x0003, wrMessageId = 0x1003,            |
          | calSendPattern = FALSE, calRetry = 0,              |
          | calPeriod = 0]                                     |
       T1 |-->>-------------------------------------------------| P1
          |                                                    |
          |  <Wait for 1230ms for EXC_TIMEOUT_RETRY to occur>  |
          |                                                    |
          | WRPTP CALIBRATED [messageType = 0x0C,              |
          | domainNumber = DN1, targetPortIdentity = SPI1,     |
          | tlvType = 0x0003, wrMessageId = 0x1004,            |
          | deltaTx = 0, deltaRx = 0]                          |
       T1 |-->>-------------------------------------------------| P1
          |                                                    |
          |                      <Check WRPTP portState = IDLE> | P1
          |                                                    |

Legends           :

    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
```

```
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1



Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN

```
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1001
```

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with following parameters.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageID          = 0x1002
```

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003
            calSendPattern       = FALSE
            calRetry             = 0
            calPeriod            = 0
```

Step 8 : Wait for 1230ms ((WR_RESP_CALIB_REQ_TIMEOUT * (WR_STATE_RETRY + 1)) + (10% of WR_RESP_CALIB_REQ_TIMEOUT)) for EXC_TIMEOUT_RETRY to occur.

Step 9 : Send WRPTP CALIBRATED message on port T1 with following parameters

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004
            deltaTx              = 0
            deltaRx              = 0
```

Step 10: Verify that WRPTP portState of port P1 is in IDLE state.

Note :

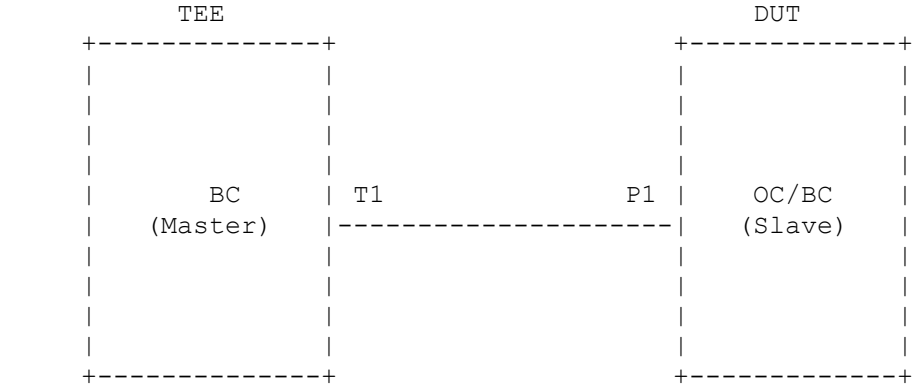
Values mentioned in above steps are examples based on default values. However, the test will be executed using the values given in ATTEST GUI (Selected configuration in ATTEST Configuration Manager > Protocol Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test logs may differ from those mentioned in the steps.

© Copyrights 2018 - 2019, CERN

2.29. tc_conf_wrptp_wsmg_029

```
Test Case          : tc_conf_wrptp_wsmg_029
Test Case Version  : 1.3
Component Name     : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name        : WRPTP State Machine Group (WSMG)

Title              : WR Slave transition of WRPTP portState from
                     RESP_CALIB_REQ to CALIBRATION before EXC_TIMEOUT_RETRY
                     occurs - otherPortCalPeriod and otherPortCalRetry > 0x0

Purpose            : To verify that a WRPTP enabled device with it's port in
                     PTP Slave transitions it's port WR state from
                     RESP_CALIB_REQ to CALIBRATION state on the reception of
                     CALIBRATED message before EXC_TIMEOUT_RETRY occurs when
                     otherPortCalPeriod and otherPortCalRetry are greater
                     than 0x0 (otherPortCalPeriod and otherPortCalRetry
                     should be ignored by DUT).

Reference          : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                     Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type   : MUST
```

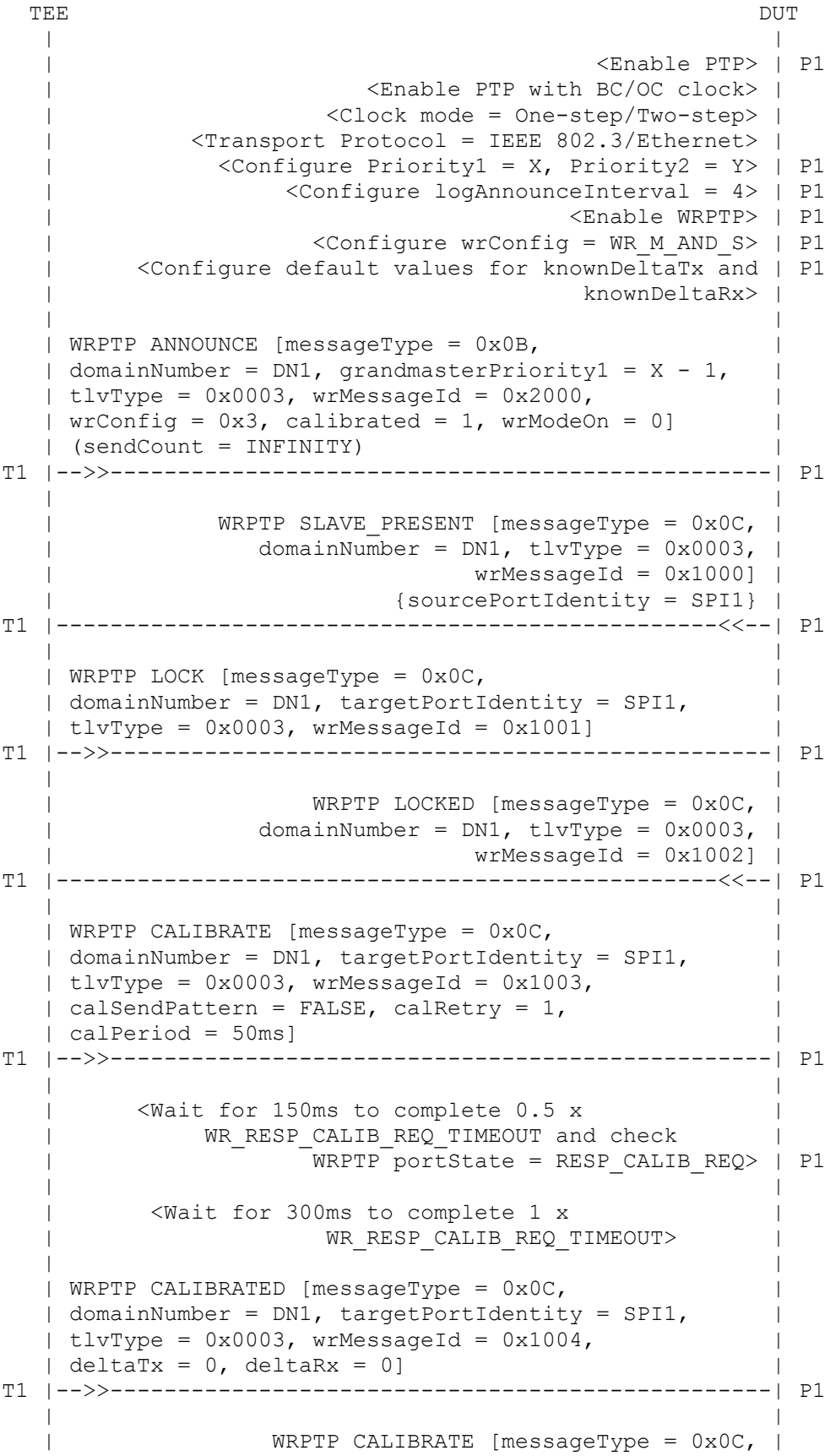
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                                 wrMessageId = 0x1003] |
       T1 |-----------------------------------------------<<--| P1
          |                                                     |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Configure logAnnounceInterval = 4.
viii. Enable WRPTP on port P1.
ix. Configure wrConfig = WR_M_AND_S.
x. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

PTP Header		
	messageType	= 0x0B
	domainNumber	= DN1
	grandmasterPriority1	= X - 1
TLV		
	tlvType	= 0x0003
	wrMessageId	= 0x2000
	wrConfig	= 0x3
	calibrated	= 1
	wrModeOn	= 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters. Store sourcePortIdentity as SPI1.

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 1
                calPeriod            = 50ms

Step 8 : Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 9 : Wait for 300ms to complete 1 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 10: Send WRPTP CALIBRATED message on port T1 with following parameters

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0
```

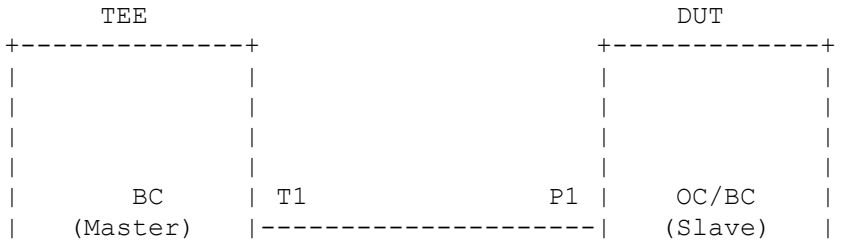
© Copyrights 2018 - 2019, CERN

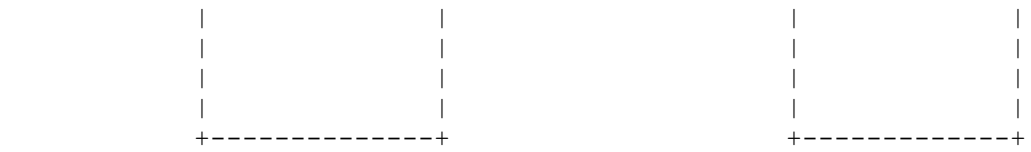
```
Step 11: Verify that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.30. tc_conf_wrptp_wsmg_030

```
Test Case         : tc_conf_wrptp_wsmg_030
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from
                    RESP_CALIB_REQ to IDLE after EXC_TIMEOUT_RETRY occurs -
                    otherPortCalPeriod and otherPortCalRetry > 0x0

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave transitions it's port WR state from
                    RESP_CALIB_REQ to IDLE state after EXC_TIMEOUT_RETRY
                    occurs when otherPortCalPeriod and otherPortCalRetry are
                    greater than 0x0 (otherPortCalPeriod and
                    otherPortCalRetry should be ignored by DUT).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type  : MUST
```

Topology

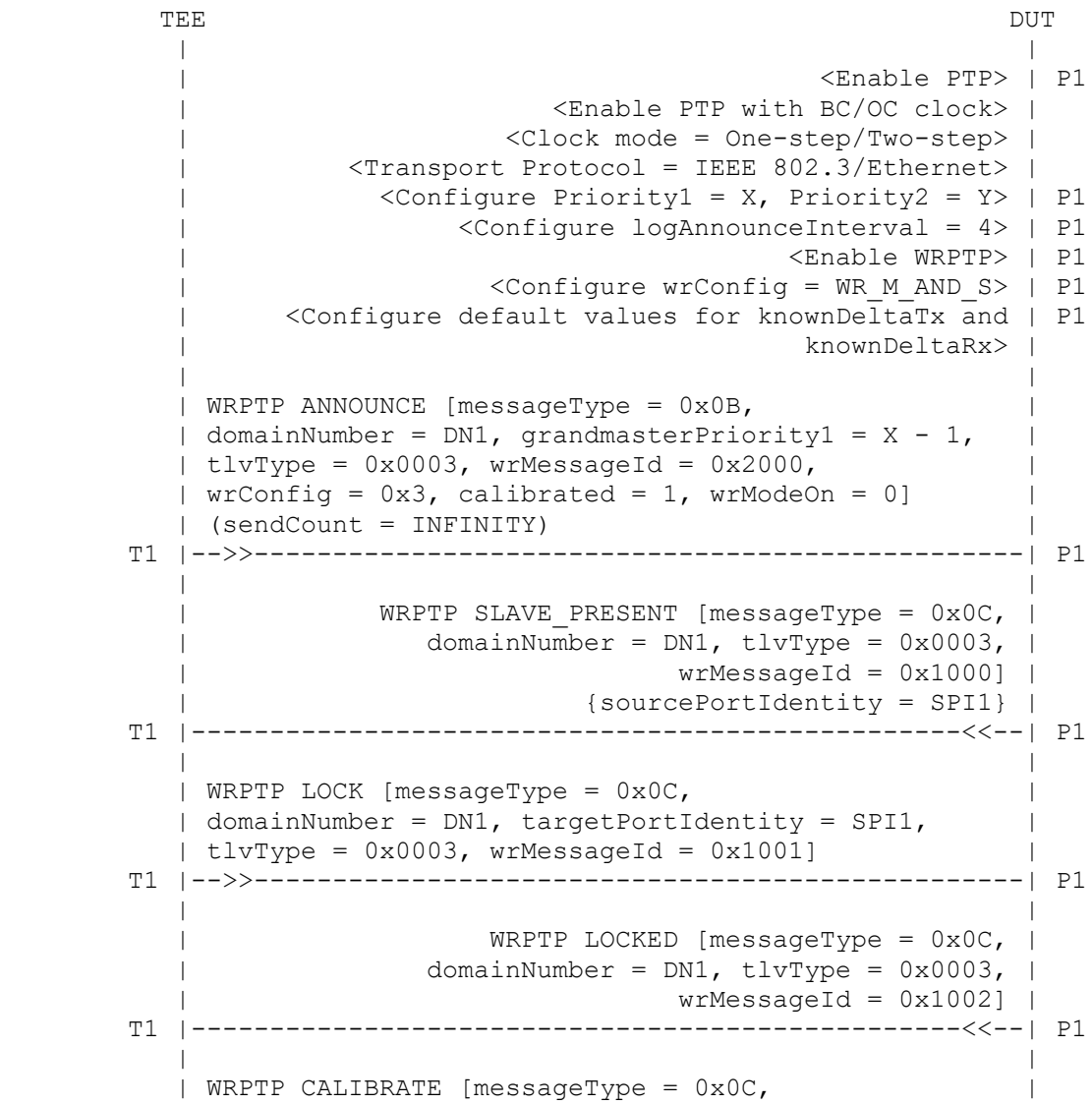




Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          | domainNumber = DN1, targetPortIdentity = SPI1,      |
          | tlvType = 0x0003, wrMessageId = 0x1003,             |
          | calSendPattern = FALSE, calRetry = 3,               |
          | calPeriod = 1000ms]                                 |
       T1 |-->>-------------------------------------------------| P1
          |                                                     |
          |      <Wait for 150ms to complete 0.5 x              |
          |           WR_RESP_CALIB_REQ_TIMEOUT and check       |
          |                   WRPTP portState = RESP_CALIB_REQ> | P1
          |                                                     |
          |  <Wait for 1230ms for EXC_TIMEOUT_RETRY to occur>   |
          |                                                     |
          | WRPTP CALIBRATED [messageType = 0x0C,               |
          | domainNumber = DN1, targetPortIdentity = SPI1,      |
          | tlvType = 0x0003, wrMessageId = 0x1004,             |
          | deltaTx = 0, deltaRx = 0]                           |
       T1 |-->>-------------------------------------------------| P1
          |                                                     |
          |                      <Check WRPTP portState = IDLE> | P1
          |                                                     |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Configure logAnnounceInterval = 4.
viii. Enable WRPTP on port P1.
ix. Configure wrConfig = WR_M_AND_S.
x. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following

parameters.

```
    PTP Header
        messageType          = 0x0B
        domainNumber         = DN1
        grandmasterPriority1 = X - 1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x2000
        wrConfig             = 0x3
        calibrated           = 1
        wrModeOn             = 0
```

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters. Store sourcePortIdentity as SPI1.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageID          = 0x1000
```

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
        targetPortIdentity   = SPI1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1001
```

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageID          = 0x1002
```

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

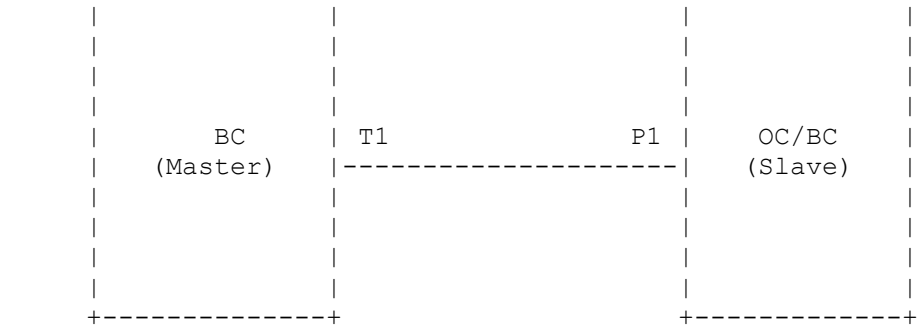
```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
        targetPortIdentity   = SPI1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1003
        calSendPattern       = FALSE
        calRetry             = 3
        calPeriod            = 1000ms
```

© Copyrights 2018 - 2019, CERN

```
Step 8 : Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 9 : Wait for 1230ms ((WR_RESP_CALIB_REQ_TIMEOUT * (WR_STATE_RETRY + 1))
         + (10% of WR_RESP_CALIB_REQ_TIMEOUT)) for EXC_TIMEOUT_RETRY to
         occur.

Step 10: Send WRPTP CALIBRATED message on port T1 with following parameters

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 0
                 deltaRx              = 0

Step 11: Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.31. tc_conf_wrptp_wsmg_031

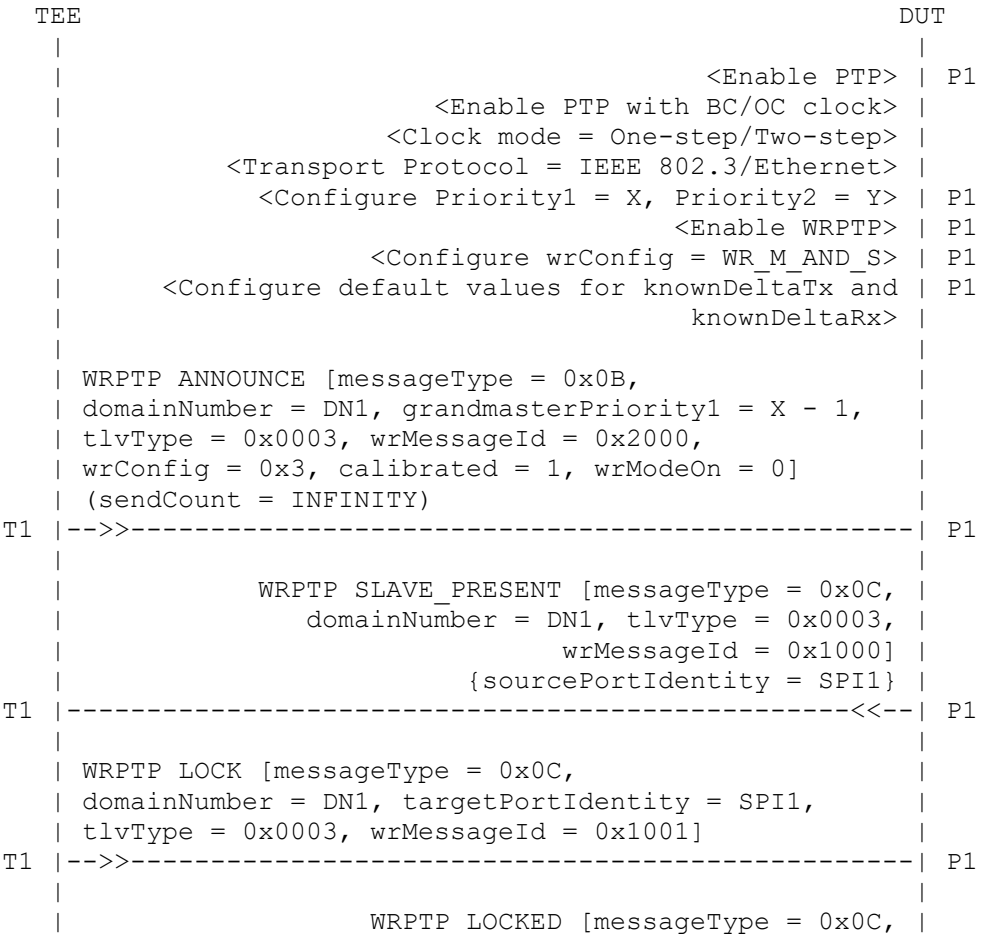
```
Test Case         : tc_conf_wrptp_wsmg_031
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from CALIBRATION
                    to CALIBRATED

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave sends CALIBRATED message and transitions it's
                    port WR state from the CALIBRATION to CALIBRATED state.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Figure 27 Page 62

Conformance Type  : MUST


Topology


                 TEE                                 DUT
            +--------------+                    +-------------+
```



Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



```
           |               domainNumber = DN1, tlvType = 0x0003, |
           |                                 wrMessageId = 0x1002] |
        T1 |-------------------------------------------------<<--| P1
           |                                                       |
           | WRPTP CALIBRATE [messageType = 0x0C,                  |
           | domainNumber = DN1, targetPortIdentity = SPI1,        |
           | tlvType = 0x0003, wrMessageId = 0x1003,               |
           | calSendPattern = FALSE, calRetry = 0,                 |
           | calPeriod = 0]                                        |
        T1 |-->>-------------------------------------------------| P1
           |                                                       |
           | WRPTP CALIBRATED [messageType = 0x0C,                 |
           | domainNumber = DN1, targetPortIdentity = SPI1,        |
           | tlvType = 0x0003, wrMessageId = 0x1004,               |
           | deltaTx = 0, deltaRx = 0]                             |
        T1 |-->>-------------------------------------------------| P1
           |                                                       |
           |                WRPTP CALIBRATE [messageType = 0x0C,   |
           |               domainNumber = DN1, tlvType = 0x0003,  |
           |                                 wrMessageId = 0x1003] |
        T1 |-------------------------------------------------<<--| P1
           |                                                       |
           |               WRPTP CALIBRATED [messageType = 0x0C,   |
           |               domainNumber = DN1, tlvType = 0x0003,  |
           |                                 wrMessageId = 0x1004] |
        T1 |-------------------------------------------------<<--| P1
           |                                                       |
           |                <Check WRPTP portState = CALIBRATED>   | P1
           |                                                       |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.

© Copyrights 2018 - 2019, CERN

```
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN

```
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003
            calSendPattern       = FALSE
            calRetry             = 0
            calPeriod            = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004
            deltaTx              = 0
            deltaRx              = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003

Step 10: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004

Step 11: Verify that WRPTP portState of port P1 is in CALIBRATED state.
```

2.32. tc_conf_wrptp_wsmg_032

```
Test Case         : tc_conf_wrptp_wsmg_032
Test Case Version : 1.1
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave re-entering of WRPTP portState - CALIBRATED -
                    on expiry of WR_CALIBRATED_TIMEOUT

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave sends CALIBRATED message and re-enters to it's
```

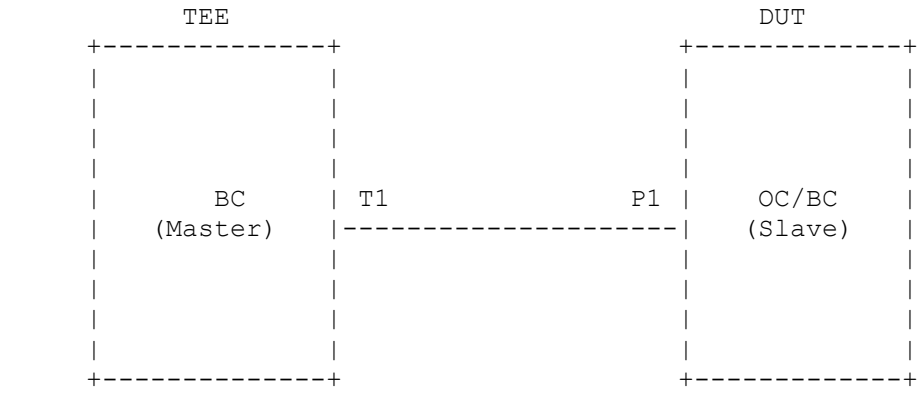
© Copyrights 2018 - 2019, CERN

port WR state CALIBRATED on expiry of WR_CALIBRATED_TIMEOUT.

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3 Pages 35, Figure 27 Page 62

Conformance Type : MUST

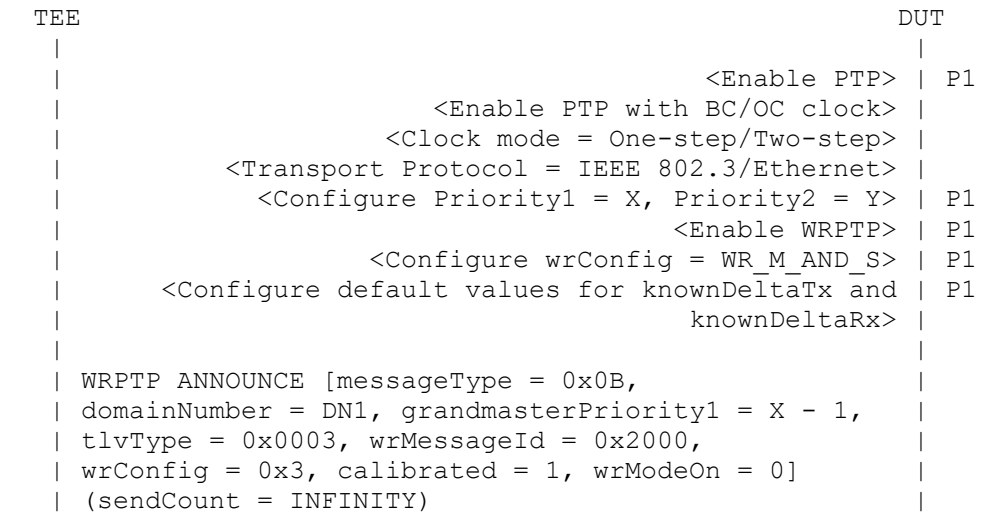
Topology



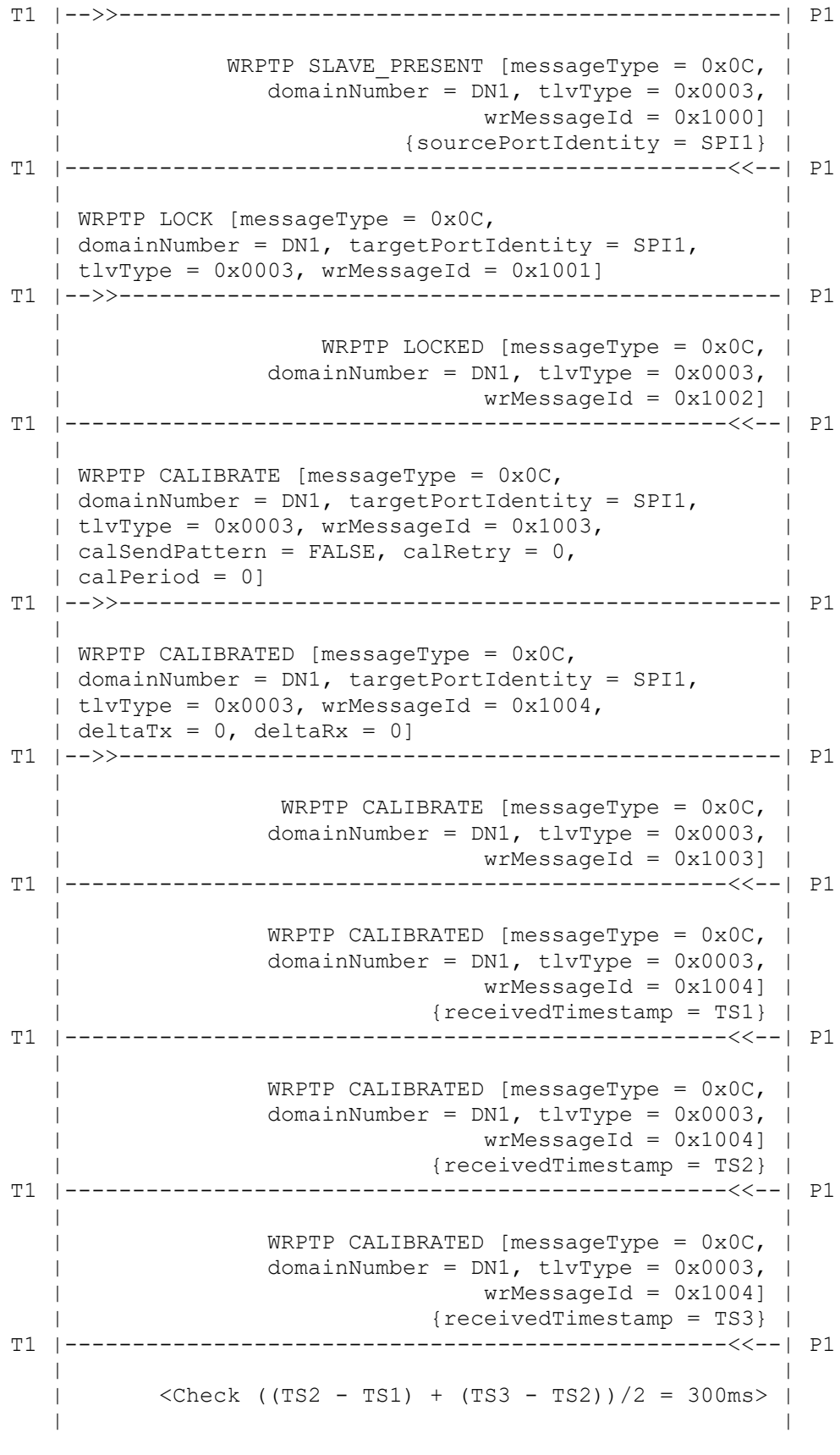
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN

```
Legends           :

    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1



Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
```

© Copyrights 2018 - 2019, CERN

```
                wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
```

© Copyrights 2018 - 2019, CERN

```
Step 10: Observe that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters and store the received timestamp as TS1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 11: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters and store the received timestamp as TS2.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 12: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters and store the received timestamp as TS3.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 13: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms
         (WR_CALIBRATED_TIMEOUT).

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.33. tc_conf_wrptp_wsmg_033

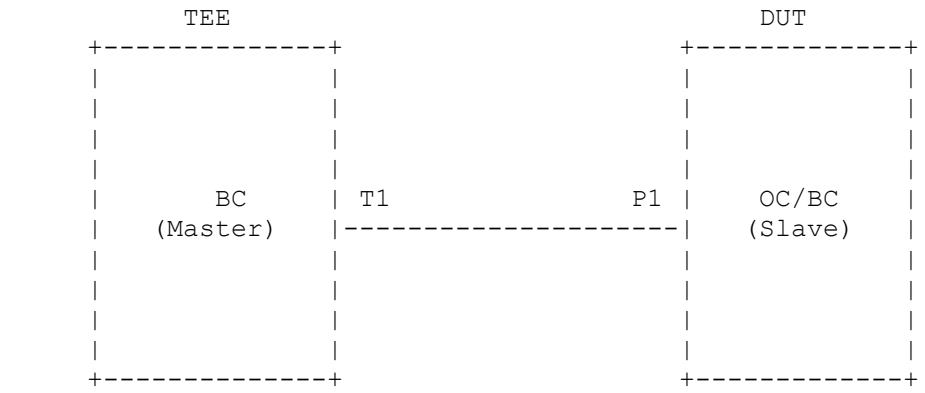
```
Test Case         : tc_conf_wrptp_wsmg_033
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from CALIBRATED
                    to IDLE after EXC_TIMEOUT_RETRY occurs

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave transitions it's port WR state from CALIBRATED
                    to IDLE state after EXC_TIMEOUT_RETRY occurs.
```

© Copyrights 2018 - 2019, CERN

Reference : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
Pages 35, Clause 6.7.4 Page 37, Figure 27 Page 62

Conformance Type : MUST

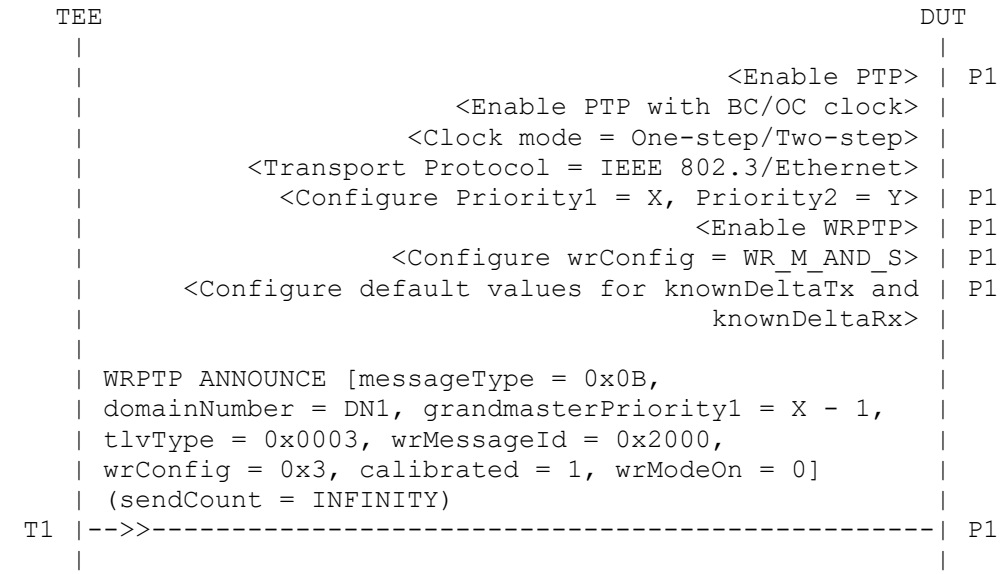
Topology



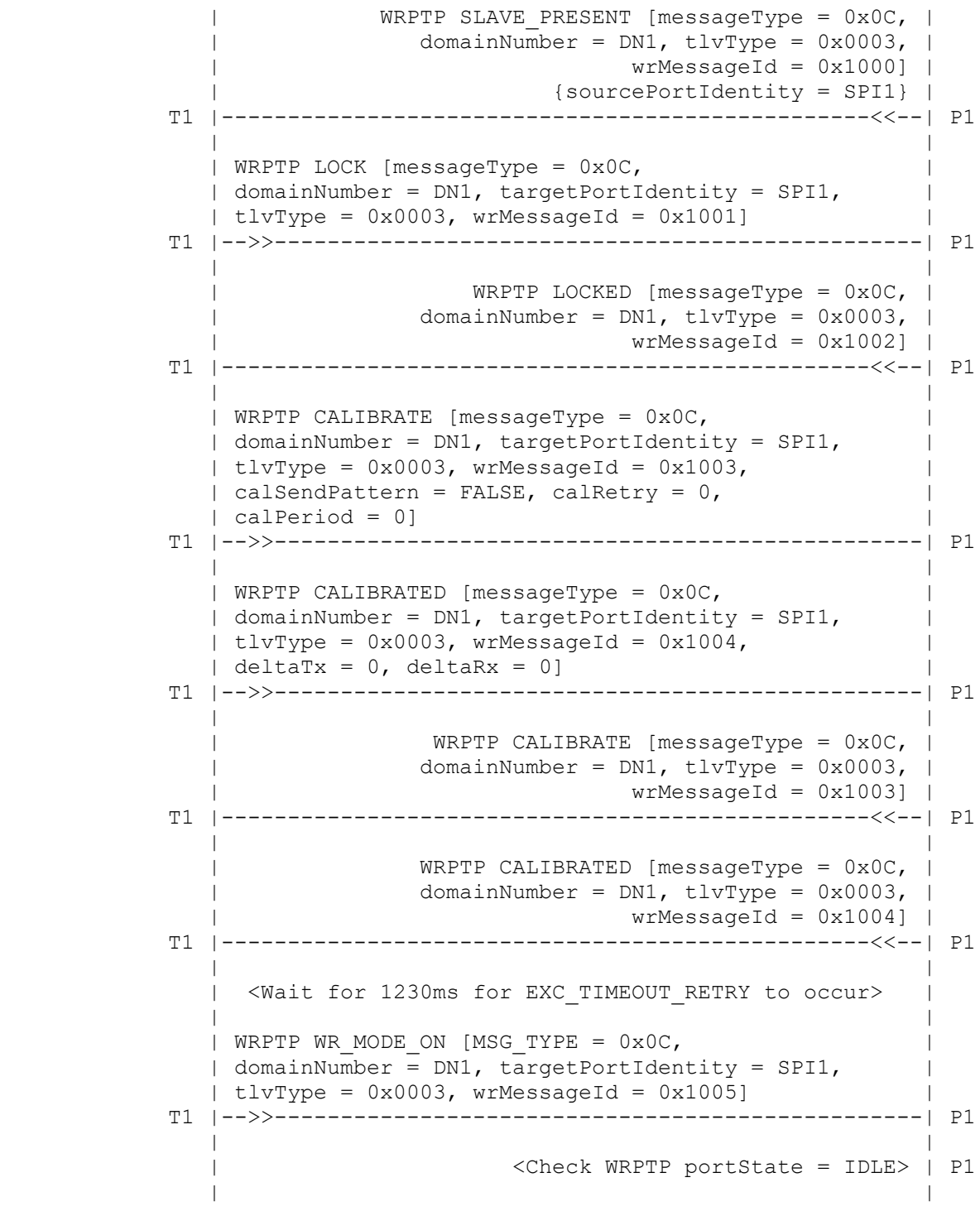
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol

© Copyrights 2018 - 2019, CERN

```
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1


Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
```

© Copyrights 2018 - 2019, CERN

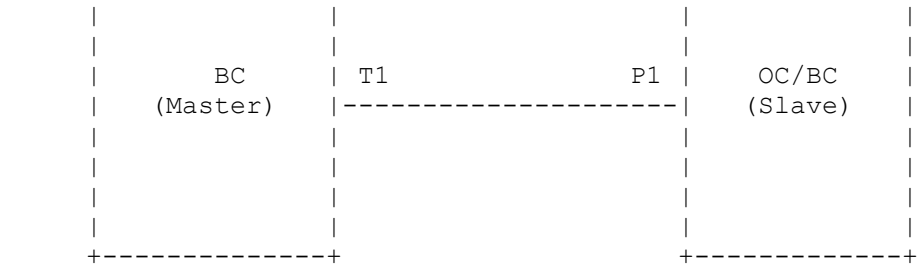
```
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004
                deltaTx             = 0
                deltaRx             = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003

Step 10: Observe that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
```

© Copyrights 2018 - 2019, CERN

```
                wrMessageId          = 0x1004

Step 11: Wait for 1230ms ((WR_CALIBRATED_TIMEOUT * (WR_STATE_RETRY + 1)) +
         (10% of WR_CALIBRATED_TIMEOUT)) for EXC_TIMEOUT_RETRY to occur.

Step 12: Send WRPTP WR_MODE_ON message on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1005

Step 13: Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.34. tc_conf_wrptp_wsmg_034

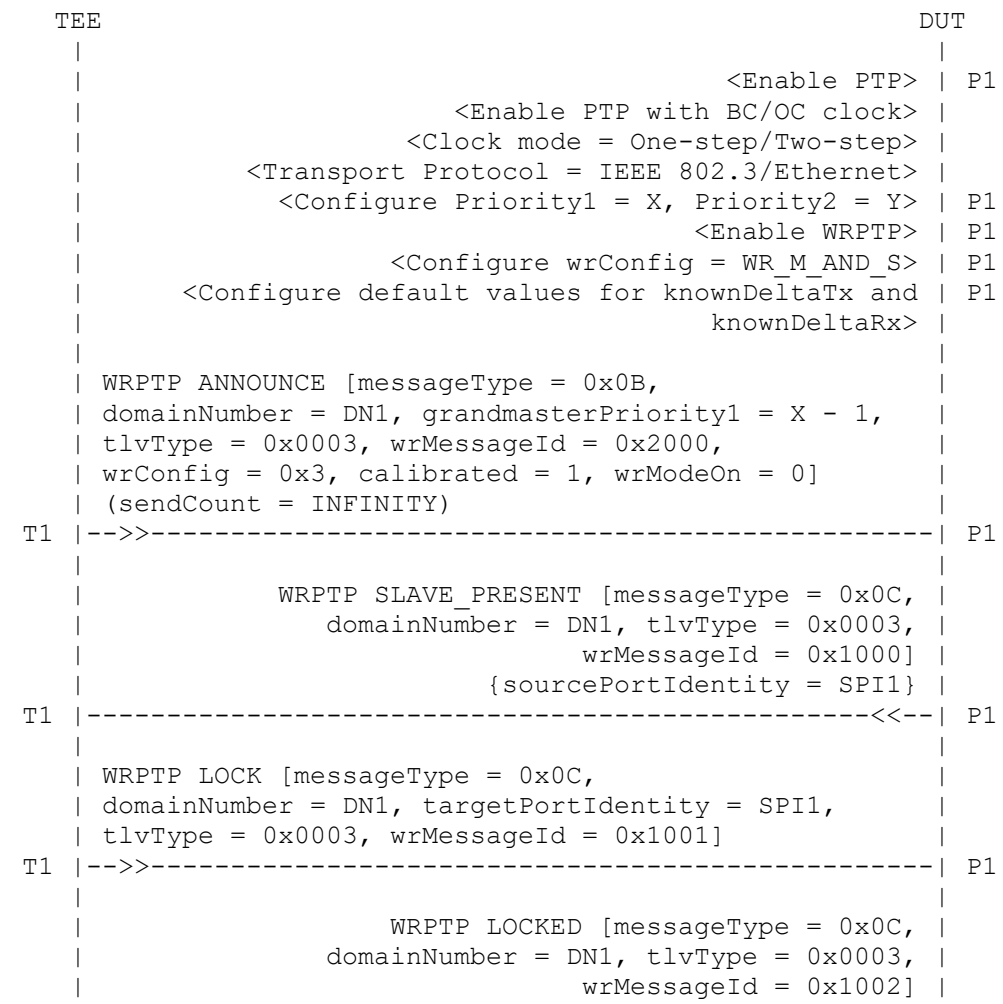
```
Test Case         : tc_conf_wrptp_wsmg_034
Test Case Version : 1.4
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : WR Slave transition of WRPTP portState from WR_LINK_ON
                    to IDLE

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave transitions it's port WR state from WR_LINK_ON
                    to IDLE state upon successful completion of WR link
                    setup process.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.7.3
                    Pages 35, Figure 27 Page 62

Conformance Type  : MUST


Topology
```



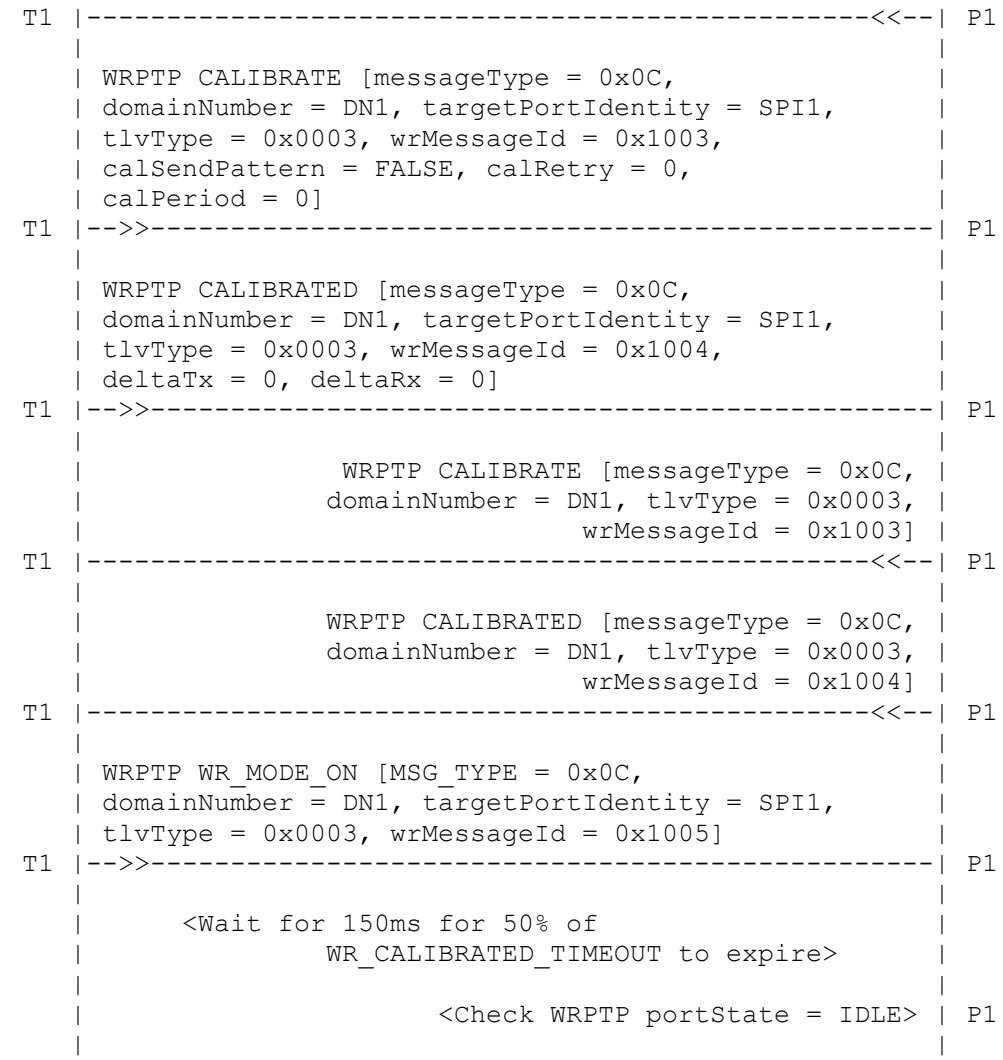
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.

ii. Enable PTP on port P1.

© Copyrights 2018 - 2019, CERN

```
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1002
```

© Copyrights 2018 - 2019, CERN

```
Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003

Step 10: Observe that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004

Step 11: Send WRPTP WR_MODE_ON message on the port T1 with following
         parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1005
```

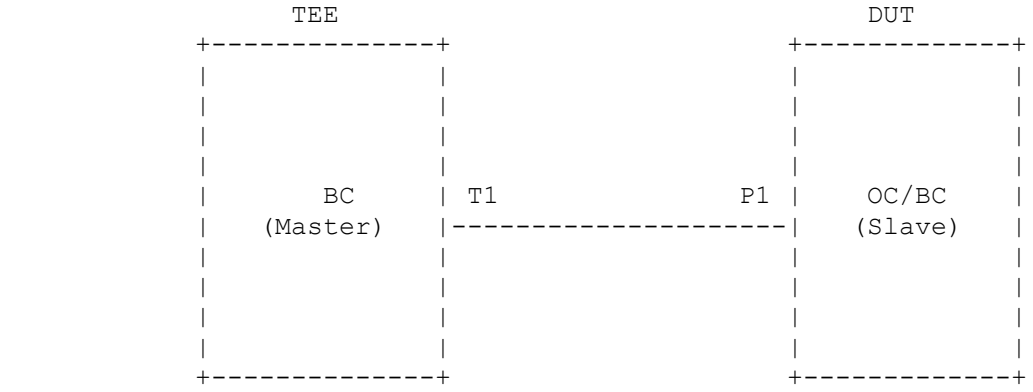
© Copyrights 2018 - 2019, CERN

```
Step 12: Wait for 150ms (50% of WR_CALIBRATED_TIMEOUT) to expire.

Step 13: Verify that WRPTP portState of port P1 is in IDLE state.

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

2.35. tc_conf_wrptp_wsmg_035

```
Test Case         : tc_conf_wrptp_wsmg_035
Test Case Version : 1.4
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP State Machine Group (WSMG)

Title             : Storing of otherPortDeltaTx, otherPortDeltaRx,
                    otherPortCalPeriod, otherPortCalRetry and
                    otherPortCalSendPattern in WR Slave

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave stores otherPortDeltaTx, otherPortDeltaRx,
                    otherPortCalPeriod, otherPortCalRetry and
                    otherPortCalSendPattern received in CALIBRATE message.

Reference         : White Rabbit Specification v2.0 July 2011, Clause
                    6.3.1.2.20 - 6.3.1.2.24 Pages 22

Conformance Type  : MUST
```

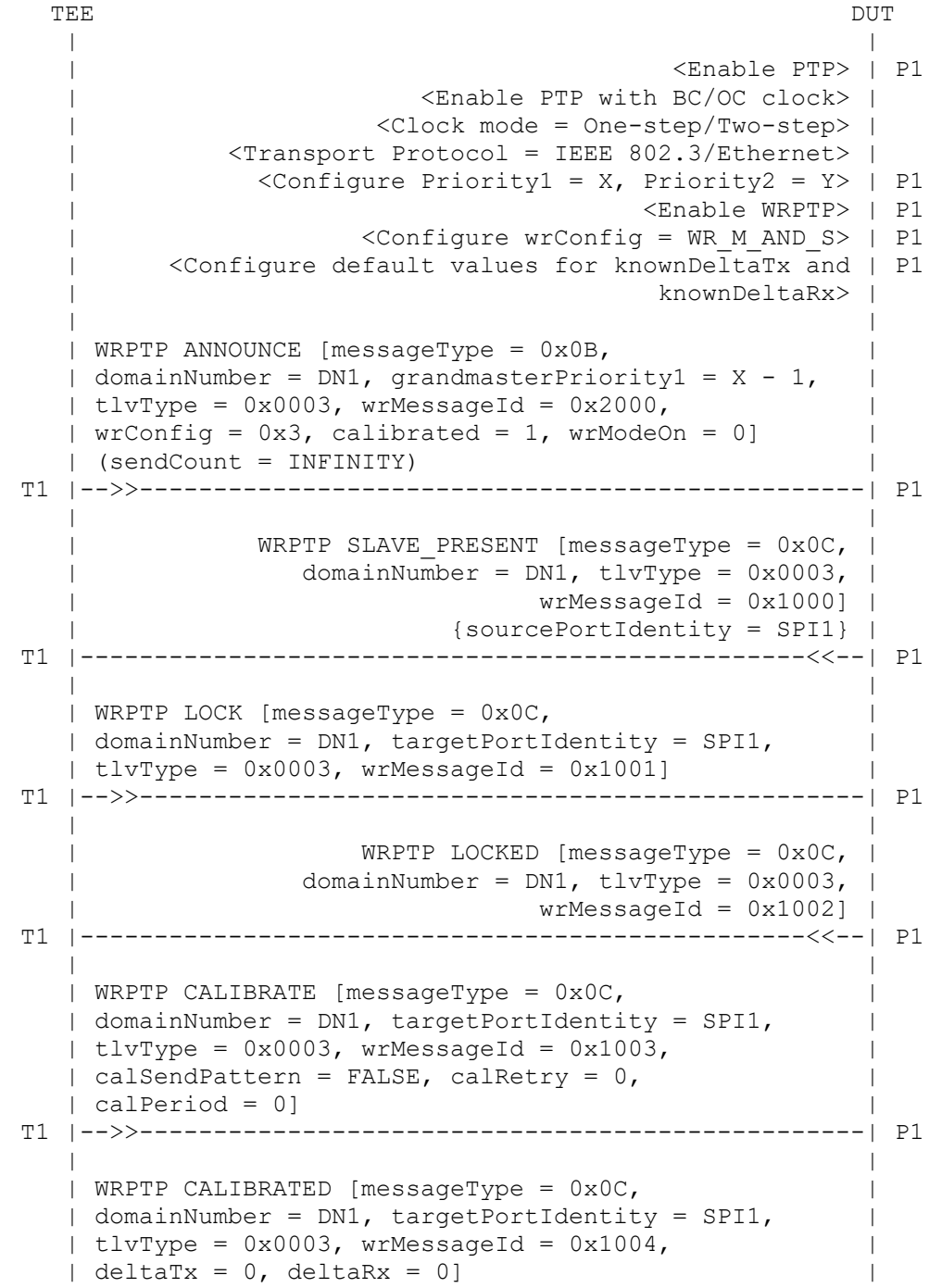
Topology



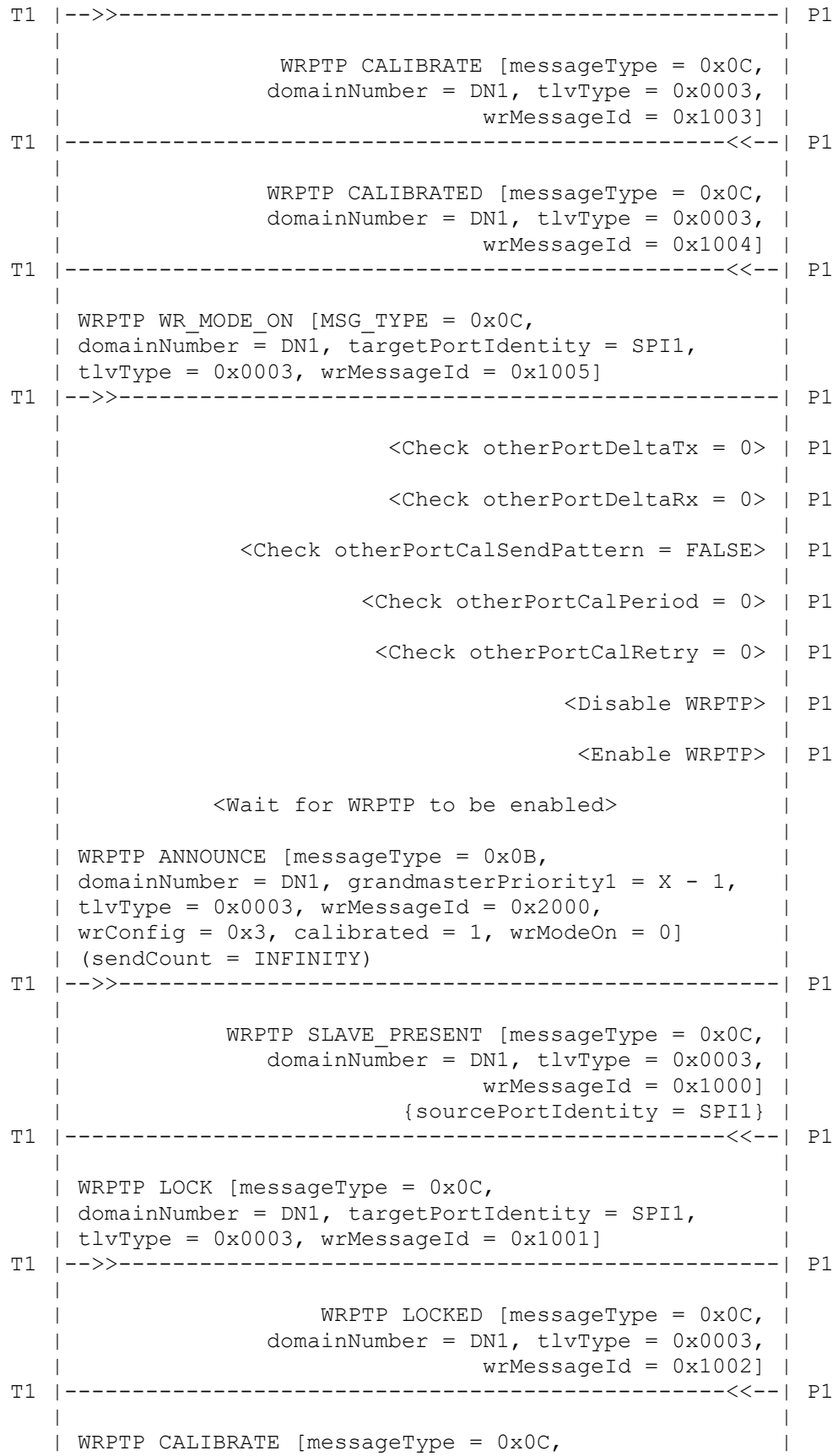
Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN

```
          | domainNumber = DN1, targetPortIdentity = SPI1,       |
          | tlvType = 0x0003, wrMessageId = 0x1003,              |
          | calSendPattern = TRUE, calRetry = 3,                 |
          | calPeriod = 3000us]                                  |
       T1 |-->>--------------------------------------------------| P1
          |                                                      |
          | WRPTP CALIBRATED [messageType = 0x0C,                |
          | domainNumber = DN1, targetPortIdentity = SPI1,       |
          | tlvType = 0x0003, wrMessageId = 0x1004,              |
          | deltaTx = 226214, deltaRx = 226758]                  |
       T1 |-->>--------------------------------------------------| P1
          |                                                      |
          |                WRPTP CALIBRATE [messageType = 0x0C,  |
          |               domainNumber = DN1, tlvType = 0x0003,  |
          |                                wrMessageId = 0x1003] |
       T1 |--------------------------------------------------<<--| P1
          |                                                      |
          |               WRPTP CALIBRATED [messageType = 0x0C,  |
          |               domainNumber = DN1, tlvType = 0x0003,  |
          |                                wrMessageId = 0x1004] |
       T1 |--------------------------------------------------<<--| P1
          |                                                      |
          | WRPTP WR_MODE_ON [MSG_TYPE = 0x0C,                   |
          | domainNumber = DN1, targetPortIdentity = SPI1,       |
          | tlvType = 0x0003, wrMessageId = 0x1005]              |
       T1 |-->>--------------------------------------------------| P1
          |                                                      |
          |                   <Check otherPortDeltaTx = 226214>  | P1
          |                                                      |
          |                   <Check otherPortDeltaRx = 226758>  | P1
          |                                                      |
          |              <Check otherPortCalSendPattern = TRUE>  | P1
          |                                                      |
          |                 <Check otherPortCalPeriod = 3000us>  | P1
          |                                                      |
          |                       <Check otherPortCalRetry = 3>  | P1
          |                                                      |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

© Copyrights 2018 - 2019, CERN

```
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
```

© Copyrights 2018 - 2019, CERN

```
                tlvType             = 0x0003
                wrMessageID         = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004
                deltaTx             = 0
                deltaRx             = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003

Step 10: Observe that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004

Step 11: Send WRPTP WR_MODE_ON message on the port T1 with following
         parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
```

© Copyrights 2018 - 2019, CERN

```
                wrMessageId          = 0x1005

Step 12: Verify otherPortDeltaTx = 0 on port P1.

Step 13: Verify otherPortDeltaRx = 0 on port P1.

Step 14: Verify otherPortCalSendPattern = FALSE on port P1.

Step 15: Verify otherPortCalPeriod = 0 on port P1.

Step 16: Verify otherPortCalRetry = 0 on port P1.

(Part 2)

Step 17: Disable WRPTP on port P1.

Step 18: Enable WRPTP on port P1.

Step 19: Wait for WRPTP te be enabled.

Step 20: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 21: Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 22: Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 23: Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002
```

Step 24: Send WRPTP CALIBRATE message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = TRUE
                calRetry             = 3
                calPeriod            = 3000us
```

Step 25: Send WRPTP CALIBRATED message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 226214
                deltaRx              = 226758
```

Step 26: Observe that the DUT transmits WRPTP CALIBRATE message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
```

Step 27: Observe that the DUT transmits WRPTP CALIBRATED message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
```

Step 28: Send WRPTP WR_MODE_ON message on the port T1 with following parameters.

```
            PTP Header
```

© Copyrights 2018 - 2019, CERN

```
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1005

Step 29: Verify otherPortDeltaTx = 226214 on port P1.

Step 30: Verify otherPortDeltaRx = 226758 on port P1.

Step 31: Verify otherPortCalSendPattern = TRUE on port P1.

Step 32: Verify otherPortCalPeriod = 3000us on port P1.

Step 33: Verify otherPortCalRetry = 3 on port P1.
```

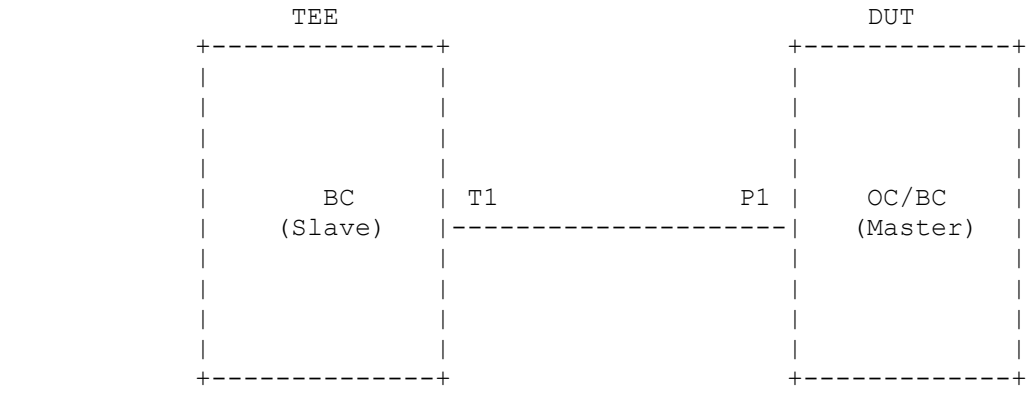
3. WRPTP Configuration Group (WCG)

3.1. tc_conf_wrptp_wcg_001

```
Test Case         : tc_conf_wrptp_wcg_001
Test Case Version : 1.5
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP Configuration Group (WCG)

Title             : Default initialization values for WRPTP attributes

Purpose           : To verify that a WRPTP enabled device stores all
                    attributes with default initialization values. Checking
                    that the following attributes have correct default
                    values.
                      1) defaultDS.domainNumber = 0
                      2) defaultDS.priority1 = 64
                      3) defaultDS.priority2 = 128
                      4) portDS.logSyncInterval = 0
                      5) portDS.knownDeltaTx = Default value
                      6) portDS.knownDeltaRx = Default value
                      7) portDS.wrConfig = WR_M_AND_S
                      8) portDS.calPeriod = 3000us
                      9) portDS.calRetry = 0
                     10) WR_PRESENT_TIMEOUT = 1000ms
                     11) WR_M_LOCK_TIMEOUT = 15000ms
                     12) WR_LOCKED_TIMEOUT = 300ms
                     13) WR_RESP_CALIB_REQ_TIMEOUT = 300ms
                     14) WR_CALIBRATED_TIMEOUT = 300ms
                     15) WR_STATE_RETRY = 3
                    Note: The default values of these attributes can be
                    changed through ATTEST GUI (Go to Configuration Manager
                    and select desired configuration, go to
                    Protocol Options > WRPTP > WRPTP Attributes).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.3
                    Page 16

Conformance Type  : MUST
```

© Copyrights 2018 - 2019, CERN

Topology

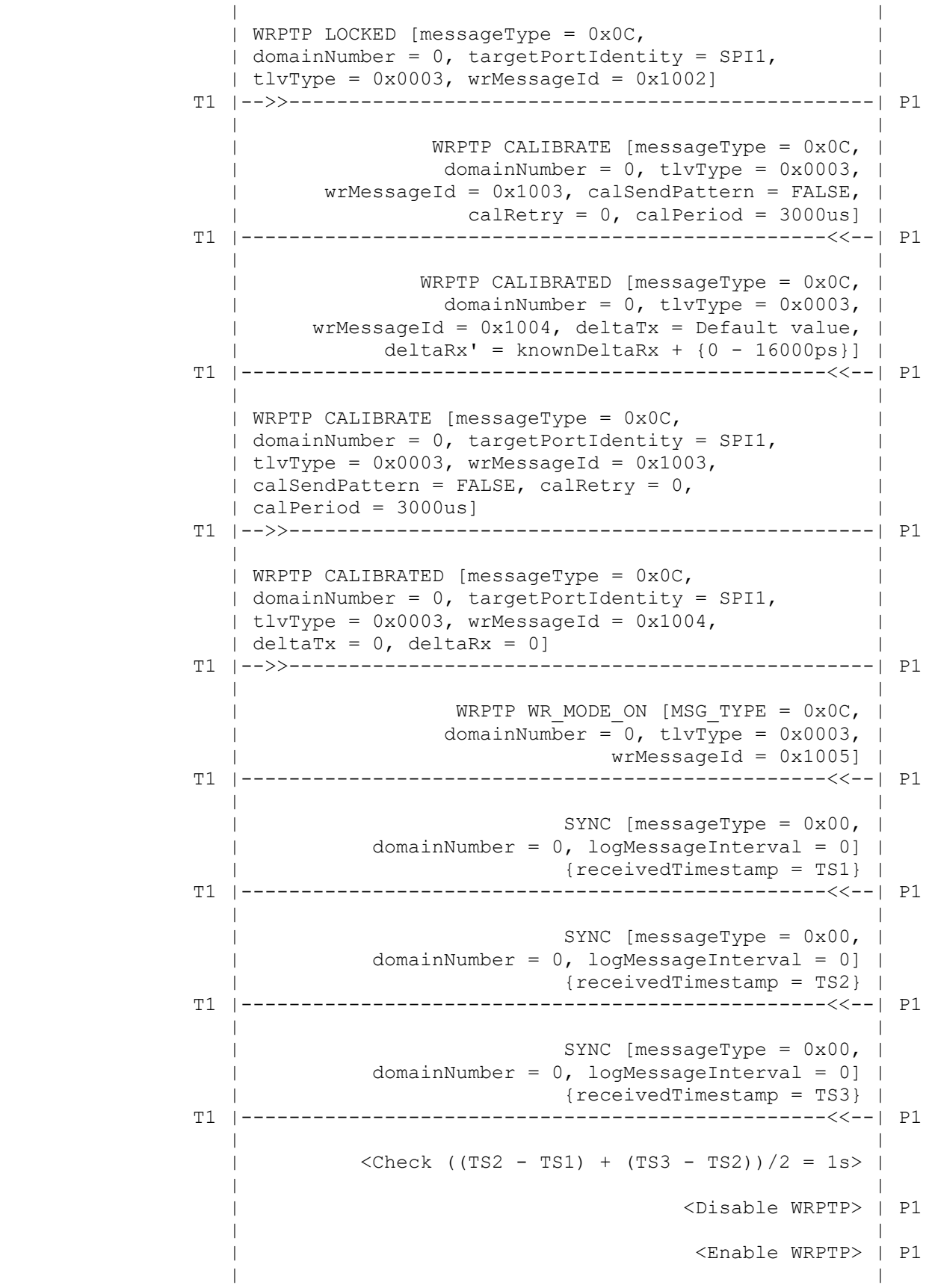


Legends:

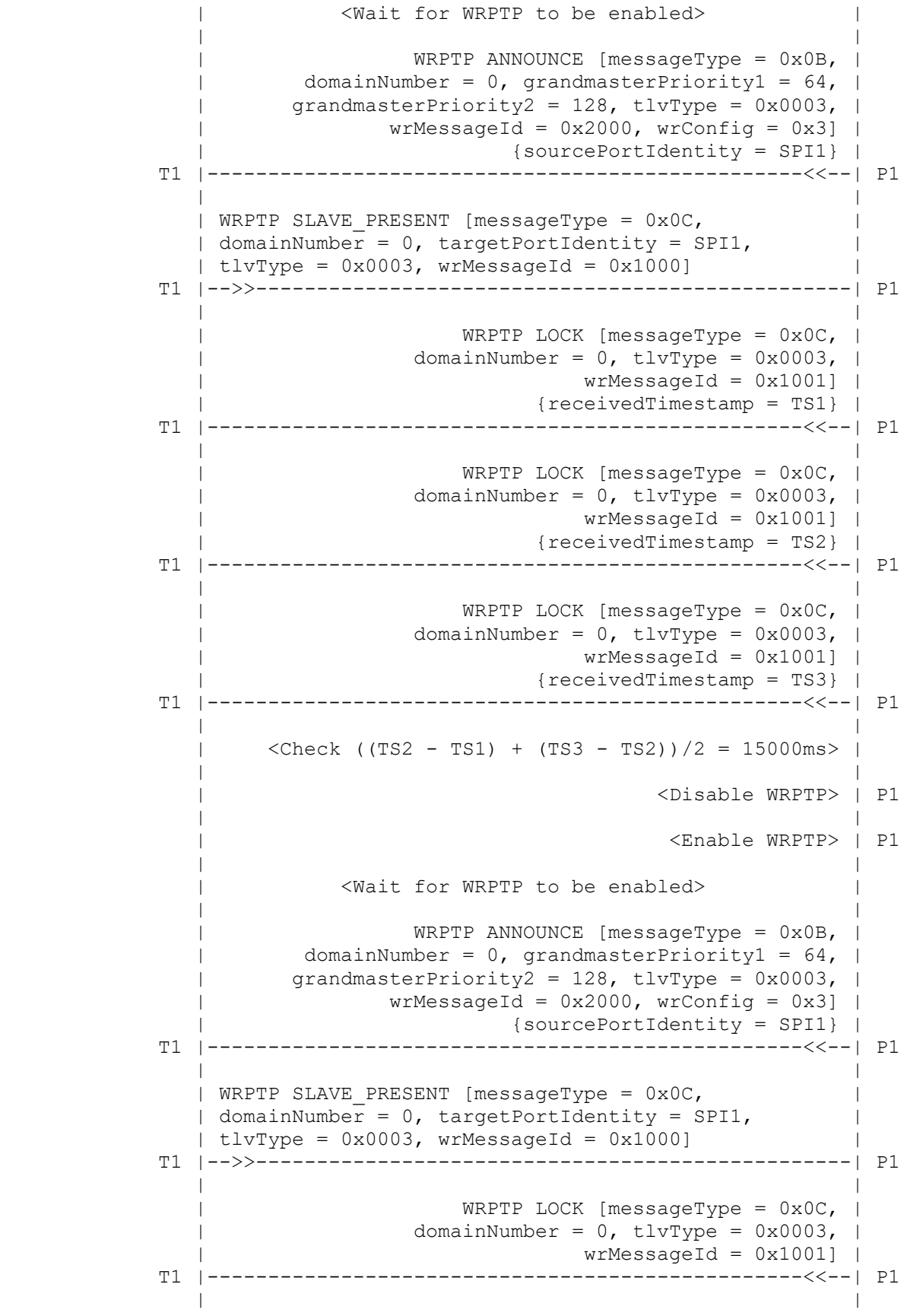
TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :

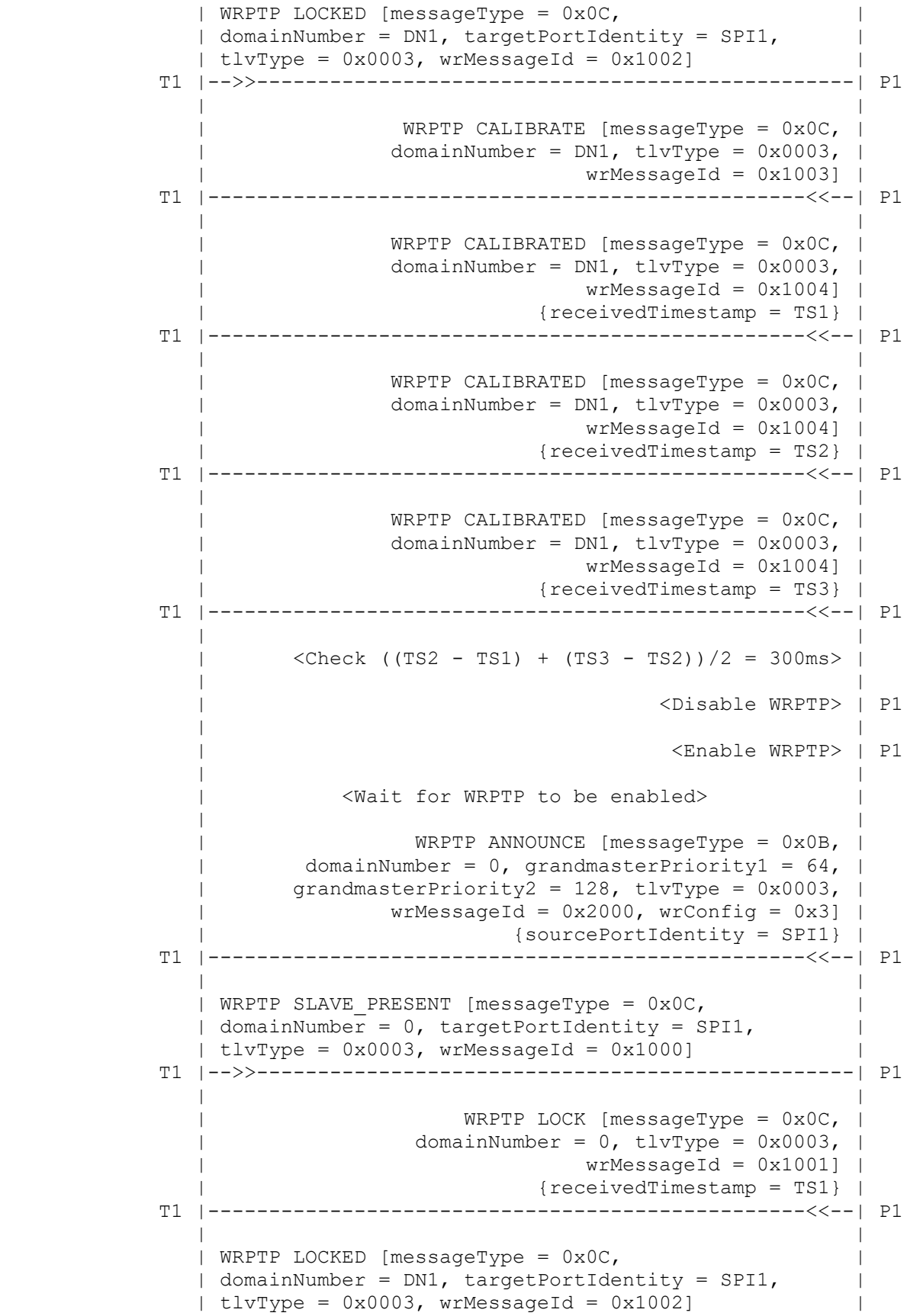
© Copyrights 2018 - 2019, CERN



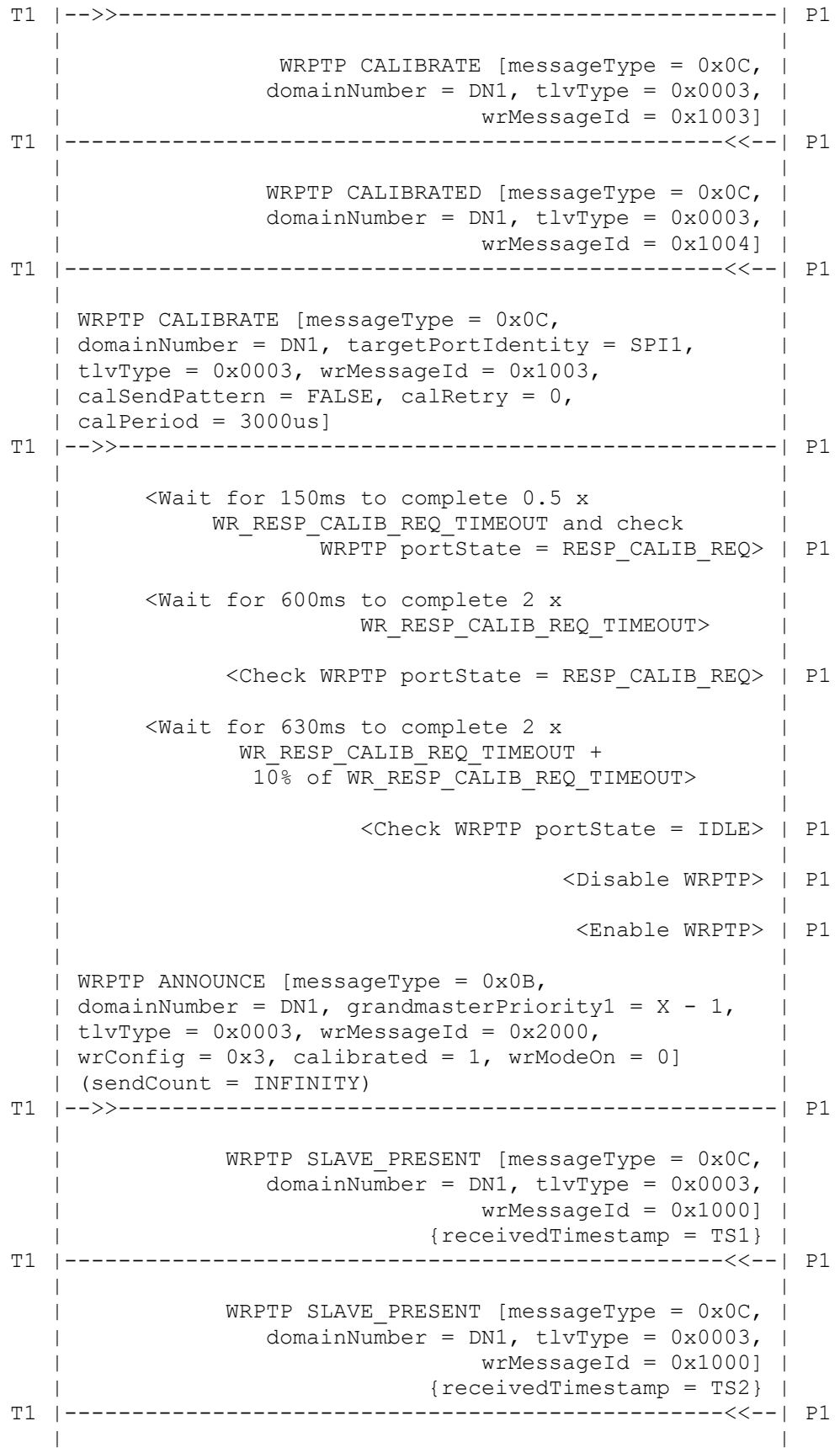
© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN

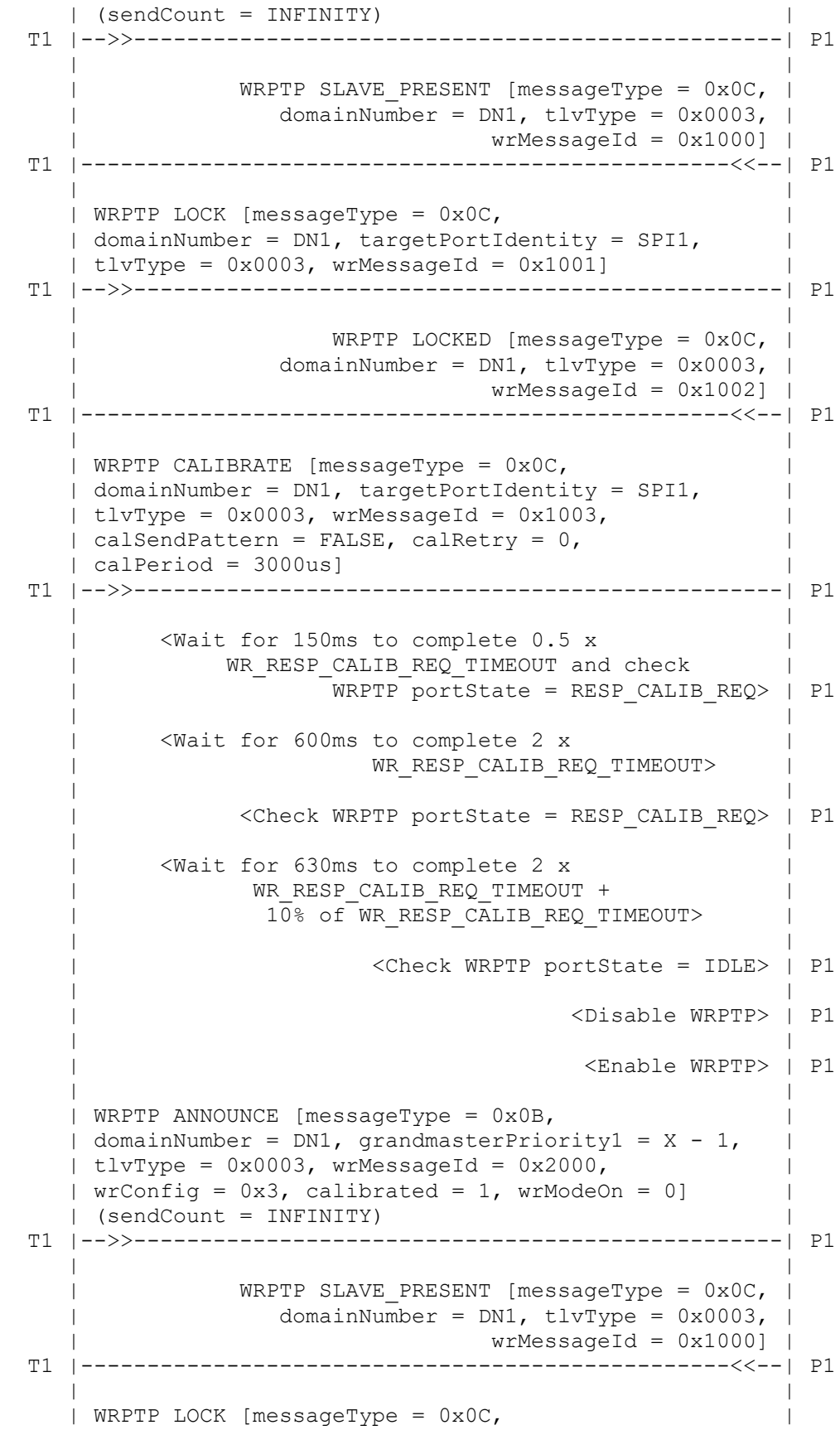


© Copyrights 2018 - 2019, CERN

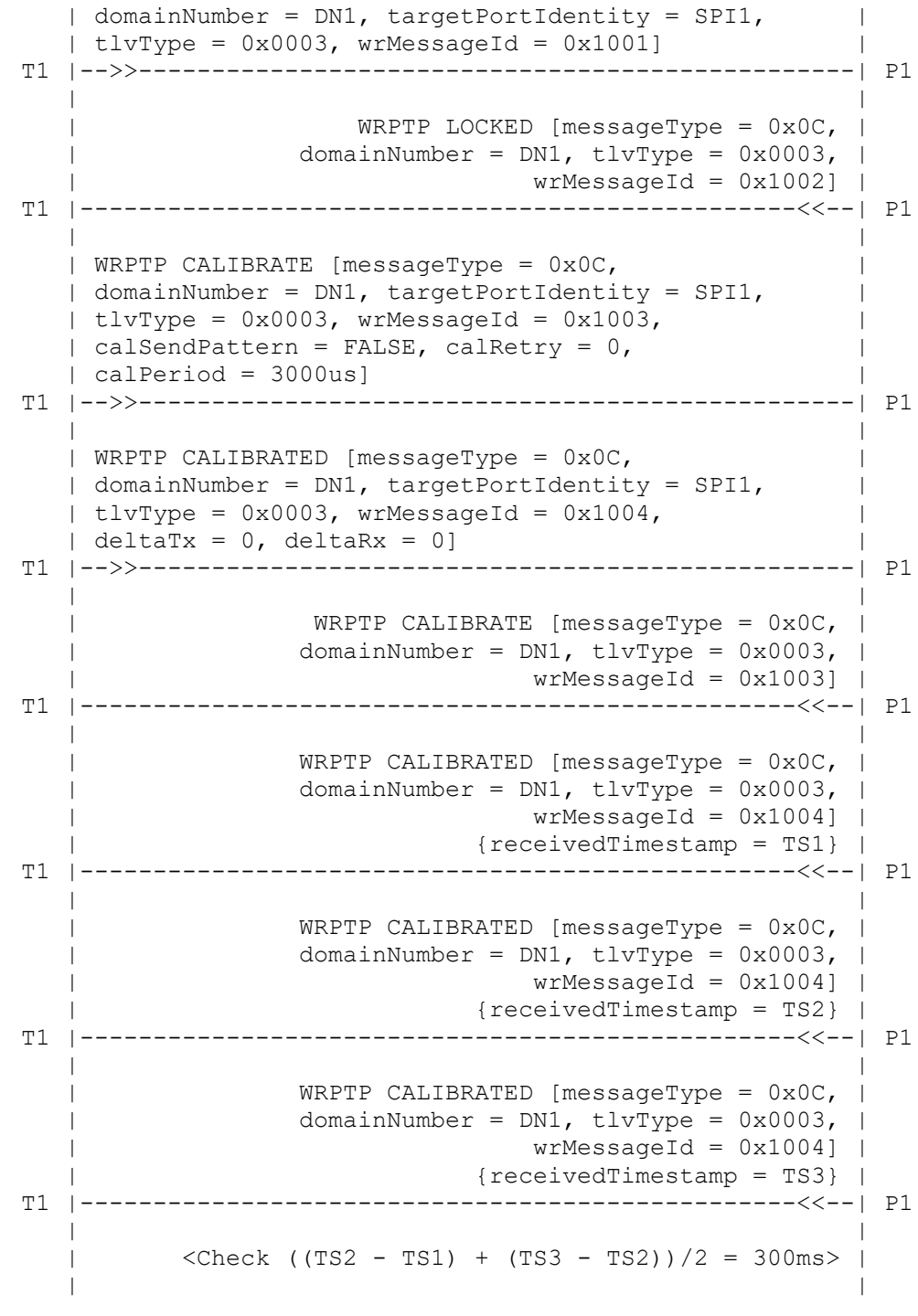


© Copyrights 2018 - 2019, CERN

© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN



Legends :

TEE = Test Execution Engine
DUT = Device Under Test
T1 = TEE's port 1
P1 = DUT's port 1
PTP = Precision Time Protocol
WRPTP = White Rabbit Precision Time Protocol
OC = Ordinary Clock

© Copyrights 2018 - 2019, CERN

```
    BC        = Boundary Clock
    TS1 - TS3 = Timestamps 1 - 3


Procedure         :

(Initial Part)

Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Enable WRPTP on port P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = 0
                 grandmasterPriority1 = 64
                 grandmasterPriority2 = 128
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = 0
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002

Step 7 : Verify that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = 0
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 3000us

Step 8 : Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = 0
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = Default value
                deltaRx'             = knownDeltaRx + {0 - 16000ps}

Step 9 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = 0
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 3000us

Step 10: Send WRPTP CALIBRATED message on port T1 with following parameters

            PTP Header
                messageType          = 0x0C
                domainNumber         = 0
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
```

© Copyrights 2018 - 2019, CERN

```
                deltaRx             = 0

Step 11 : Observe that DUT transmits WRPTP WR_MODE_ON message on the port P1
          with following parameters.

              PTP Header
                  messageType           = 0x0C
                  domainNumber          = 0
                  targetPortIdentity    = SPI1
              TLV
                  tlvType               = 0x0003
                  wrMessageId           = 0x1005

Step 12: Observe that DUT transmits SYNC message on port P1 with following
         parameters and store the received timestamp as TS1.

              PTP Header
                  messageType           = 0x00
                  domainNumber          = 0
                  logMessageInterval    = 0

Step 13: Observe that DUT transmits SYNC message on port P1 with following
         parameters and store the received timestamp as TS2.

              PTP Header
                  messageType           = 0x00
                  domainNumber          = 0
                  logMessageInterval    = 0

Step 14: Observe that DUT transmits SYNC message on port P1 with following
         parameters and store the received timestamp as TS3.

              PTP Header
                  messageType           = 0x00
                  domainNumber          = 0
                  logMessageInterval    = 0

Step 15: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 1s.

Step 16: Disable WRPTP on port P1.

Step 17: Enable WRPTP on port P1.

Step 18: Wait for WRPTP to be enabled.

Step 19: Verify that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

              PTP Header
                  messageType           = 0x0B
                  domainNumber          = 0
                  grandmasterPriority1  = 64
                  grandmasterPriority2  = 128
              TLV
                  tlvType               = 0x0003
                  wrMessageId           = 0x2000
                  wrConfig              = 0x3
```

© Copyrights 2018 - 2019, CERN

```
Step 20: Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 21: Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters and store the received timestamp as TS1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 22: Verify that DUT transmits WRPTP LOCK message on port P1 with
         following parameters and store the received timestamp as TS2.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 23: Verify that DUT transmits WRPTP LOCK message on port P1 with
         following parameters and store the received timestamp as TS3.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 24: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 15000ms (WR_M_LOCK_TIMEOUT).

Step 25: Disable WRPTP on port P1.

Step 26: Enable WRPTP on port P1.

Step 27: Wait for WRPTP to be enabled.

Step 28: Verify that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = 0
                 grandmasterPriority1 = 64
```

© Copyrights 2018 - 2019, CERN

```
            grandmasterPriority2 = 128
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x2000
            wrConfig             = 0x3
```

Step 29: Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = 0
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageID          = 0x1000
```

Step 30: Observe that DUT transmits WRPTP LOCK message on port P1 with following parameters.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = 0
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1001
```

Step 31: Send WRPTP LOCKED message on port T1 with following parameters.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1002
```

Step 32: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with following parameters.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003
```

Step 33: Observe that DUT transmits WRPTP CALIBRATED message on port P1 with following parameters and store the received timestamp as TS1.

```
        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004
```

© Copyrights 2018 - 2019, CERN

```
Step 34: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters and store the received timestamp as TS2.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 35: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters and store the received timestamp as TS3.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004

Step 36: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms
         (WR_CALIBRATED_TIMEOUT).

Step 37: Disable WRPTP on port P1.

Step 38: Enable WRPTP on port P1.

Step 39: Wait for WRPTP to be enabled.

Step 40: Verify that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = 0
                 grandmasterPriority1 = 64
                 grandmasterPriority2 = 128
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3

Step 41: Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = 0
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 42: Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
```

© Copyrights 2018 - 2019, CERN

```
            messageType          = 0x0C
            domainNumber         = 0
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1001

Step 43: Send WRPTP LOCKED message on port T1 with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1002

Step 44: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003

Step 45: Observe that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004

Step 46: Send WRPTP CALIBRATE message on port T1 with following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
            targetPortIdentity   = SPI1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003
            calSendPattern       = FALSE
            calRetry             = 0
            calPeriod            = 3000us

Step 47: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that
         WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 48: Wait for 600ms to complete 2 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 49: Verify that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 50: Wait for 630ms to complete 2 x WR_RESP_CALIB_REQ_TIMEOUT + 10% of
```

© Copyrights 2018 - 2019, CERN

WR_RESP_CALIB_REQ_TIMEOUT.

Step 51: Verify that WRPTP portState of port P1 is in IDLE state.

Step 52: Disable WRPTP on port P1.

Step 53: Enable WRPTP on port P1.

Step 54: Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

```
PTP Header
    messageType          = 0x0B
    domainNumber         = DN1
    grandmasterPriority1 = X - 1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x2000
    wrConfig             = 0x3
    calibrated           = 1
    wrModeOn             = 0
```

Step 55: Wait until completion of BMCA and observe that DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters. Store the received timestamp as TS1.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
TLV
    tlvType              = 0x0003
    wrMessageID          = 0x1000
```

Step 56: Verify that the DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters and store the received timestamp as TS2.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
TLV
    tlvType              = 0x0003
    wrMessageID          = 0x1000
```

Step 57: Verify that the DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters and store the received timestamp as TS3.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
TLV
    tlvType              = 0x0003
    wrMessageID          = 0x1000
```

Step 58: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 1000ms (WR_PRESENT_TIMEOUT).

© Copyrights 2018 - 2019, CERN

Step 59: Disable WRPTP on port P1.

Step 60: Enable WRPTP on port P1.

Step 61: Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

```
    PTP Header
        messageType          = 0x0B
        domainNumber         = DN1
        grandmasterPriority1 = X - 1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x2000
        wrConfig             = 0x3
        calibrated           = 1
        wrModeOn             = 0
```

Step 62: Wait until completion of BMCA and observe that DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageID          = 0x1000
```

Step 63: Send WRPTP LOCK message on port T1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
        targetPortIdentity   = SPI1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1001
```

Step 64: Observe that the DUT transmits WRPTP LOCKED message on port P1 with following parameters and store the received timestamp as TS1.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageID          = 0x1002
```

Step 65: Verify that the DUT transmits WRPTP LOCKED message on port P1 with following parameters and store the received timestamp as TS2.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageID          = 0x1002
```

© Copyrights 2018 - 2019, CERN

```
Step 66: Verify that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters and store the received timestamp as TS3.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1002

Step 67: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms (WR_LOCKED_TIMEOUT).

Step 68: Disable WRPTP on port P1.

Step 69: Enable WRPTP on port P1.

Step 70: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 71: Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 72: Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 73: Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN

```
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002
```

Step 74: Send WRPTP CALIBRATE message on port T1 with following parameters.

```
            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 3000us
```

Step 75: Wait for 150ms (0.5 x WR_RESP_CALIB_REQ_TIMEOUT) and observe that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 76: Wait for 600ms to complete 2 x WR_RESP_CALIB_REQ_TIMEOUT.

Step 77: Verify that WRPTP portState of port P1 is in RESP_CALIB_REQ state.

Step 78: Wait for 630ms to complete 2 x WR_RESP_CALIB_REQ_TIMEOUT + 10% of WR_RESP_CALIB_REQ_TIMEOUT.

Step 79: Verify that WRPTP portState of port P1 is in IDLE state.

Step 80: Disable WRPTP on port P1.

Step 81: Enable WRPTP on port P1.

Step 82: Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

```
            PTP Header
                messageType         = 0x0B
                domainNumber        = DN1
                grandmasterPriority1 = X - 1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x2000
                wrConfig            = 0x3
                calibrated          = 1
                wrModeOn            = 0
```

Step 83: Wait until completion of BMCA and observe that DUT transmits WRPTP SLAVE_PRESENT message on port P1 with following parameters.

```
            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1000
```

© Copyrights 2018 - 2019, CERN

Step 84: Send WRPTP LOCK message on port T1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1001
```

Step 85: Observe that the DUT transmits WRPTP LOCKED message on port P1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
TLV
    tlvType              = 0x0003
    wrMessageID          = 0x1002
```

Step 86: Send WRPTP CALIBRATE message on port T1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1003
    calSendPattern       = FALSE
    calRetry             = 0
    calPeriod            = 3000us
```

Step 87: Send WRPTP CALIBRATED message on port T1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
    targetPortIdentity   = SPI1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1004
    deltaTx              = 0
    deltaRx              = 0
```

Step 88: Observe that the DUT transmits WRPTP CALIBRATE message on port P1 with following parameters.

```
PTP Header
    messageType          = 0x0C
    domainNumber         = DN1
TLV
    tlvType              = 0x0003
    wrMessageId          = 0x1003
```

Step 89: Observe that the DUT transmits WRPTP CALIBRATED message on port P1 with following parameters and store the received timestamp as TS1.

© Copyrights 2018 - 2019, CERN

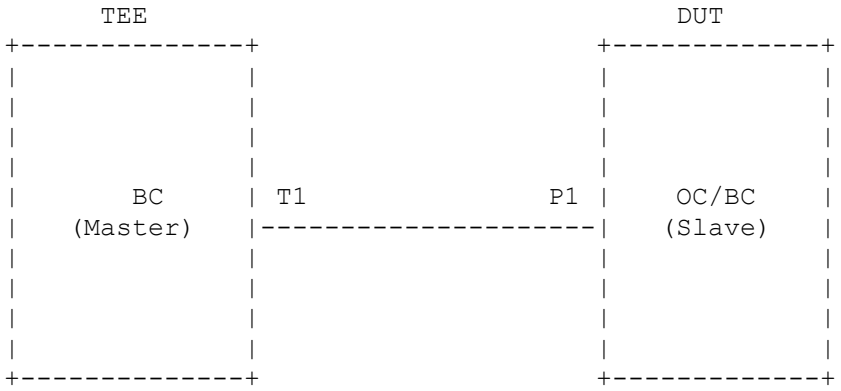
```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004

Step 90: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters and store the received timestamp as TS2.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004

Step 91: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters and store the received timestamp as TS3.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004

Step 92: Verify ((TS2 - TS1) + (TS3 - TS2))/2 = 300ms
         (WR_CALIBRATED_TIMEOUT).

Note :

  Values mentioned in above steps are examples based on default values.
  However, the test will be executed using the values given in ATTEST GUI
  (Selected configuration in ATTEST Configuration Manager > Protocol
  Options > WRPTP > WRPTP Attributes). Hence, the values displayed in test
  logs may differ from those mentioned in the steps.
```

3.2. tc_conf_wrptp_wcg_002

```
Test Case         : tc_conf_wrptp_wcg_002
Test Case Version : 1.4
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP Configuration Group (WCG)

Title             : wrConfig

Purpose           : To verify that a WRPTP enabled device supports to
                    configure wrConfig data set member (allowable values:
                    WR_S_ONLY, WR_M_ONLY and WR_M_AND_S).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.3
                    Page 16
```

Conformance Type : MUST

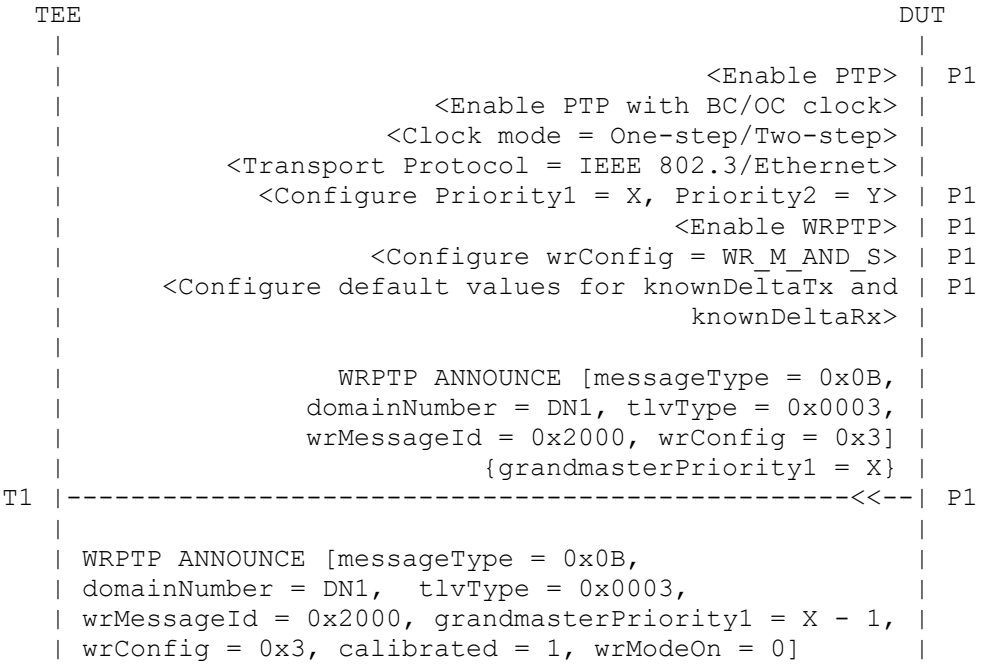
Topology



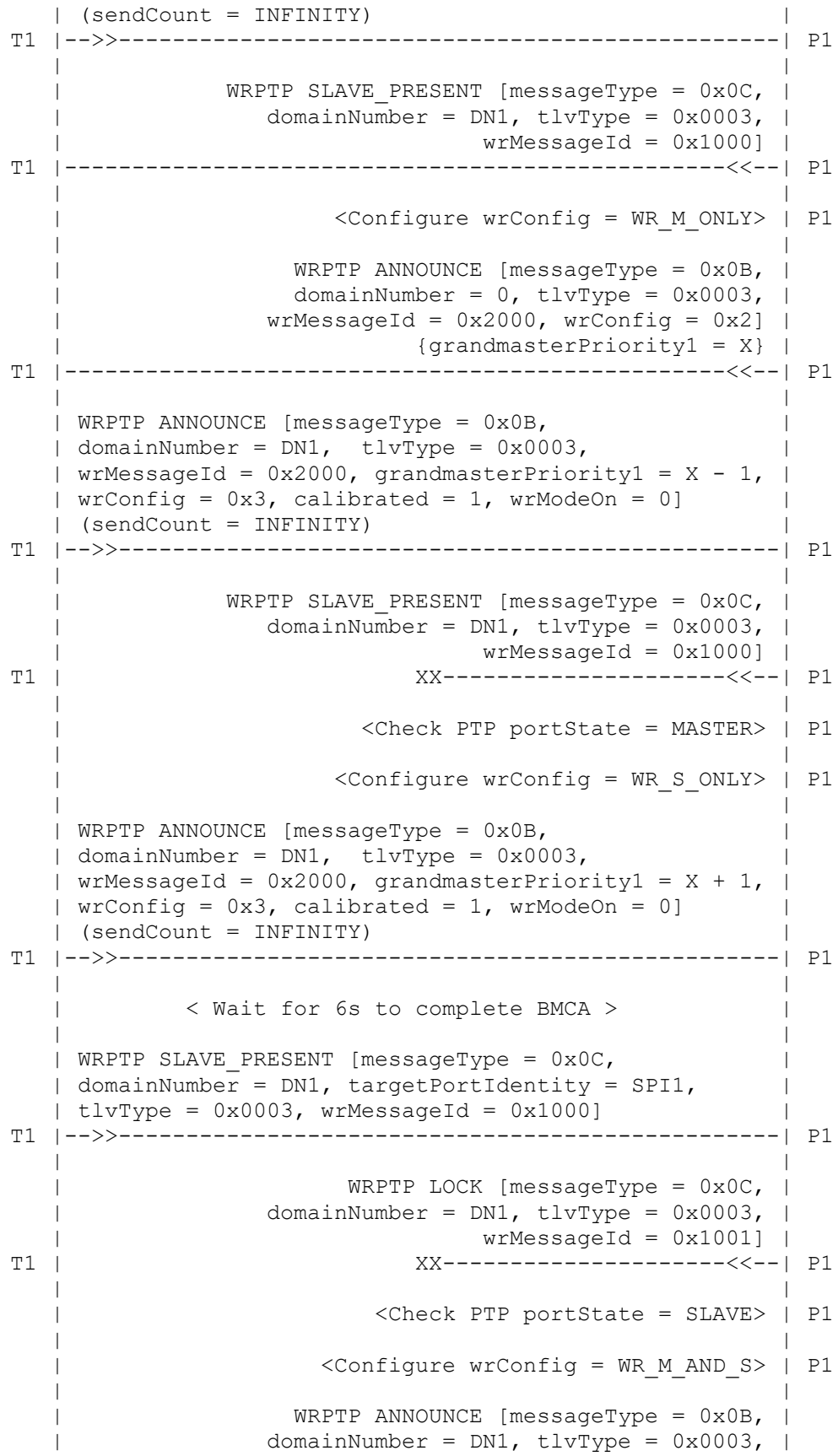
Legends:

TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :



© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

© Copyrights 2018 - 2019, CERN

```
(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store grandmasterPriority1 as X.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3

Step 4 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 5 : Wait until completion of BMCA and verify that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

(Part 2)

Step 6 : Configure wrConfig = WR_M_ONLY.

Step 7 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store grandmasterPriority1 as X.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x2

Step 8 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
```

© Copyrights 2018 - 2019, CERN

```
                messageType          = 0x0B
                domainNumber         = DN1
                grandmasterPriority1 = X - 1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000
                wrConfig             = 0x3
                calibrated           = 1
                wrModeOn             = 0

Step 9 : Wait until completion of BMCA and verify that DUT does not transmit
         WRPTP SLAVE_PRESENT message on port P1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 10: Verify that PTP portState of port P1 is MASTER.

(Part 3)

Step 11: Configure wrConfig = WR_S_ONLY.

Step 12: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
                grandmasterPriority1 = X + 1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000
                wrConfig             = 0x3
                calibrated           = 1
                wrModeOn             = 0

Step 13: Wait for 6s to complete BMCA.

Step 14: Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 15: Verify that DUT does not transmit WRPTP LOCK message on port P1
         with following parameters.

            PTP Header
```

© Copyrights 2018 - 2019, CERN

```
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001
```

Step 16: Verify that PTP portState of port P1 is SLAVE.

(Part 4)

Step 17: Configure wrConfig = WR_M_AND_S.

Step 18: Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store grandmasterPriority1 as X.

```
            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000
                wrConfig             = 0x3
```

Step 19: Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
                grandmasterPriority1 = X + 1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000
                wrConfig             = 0x3
                calibrated           = 1
                wrModeOn             = 0
```

Step 20: Wait for 6s to complete BMCA.

Step 21: Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000
```

Step 22: Verify that DUT transmits WRPTP LOCK message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
```

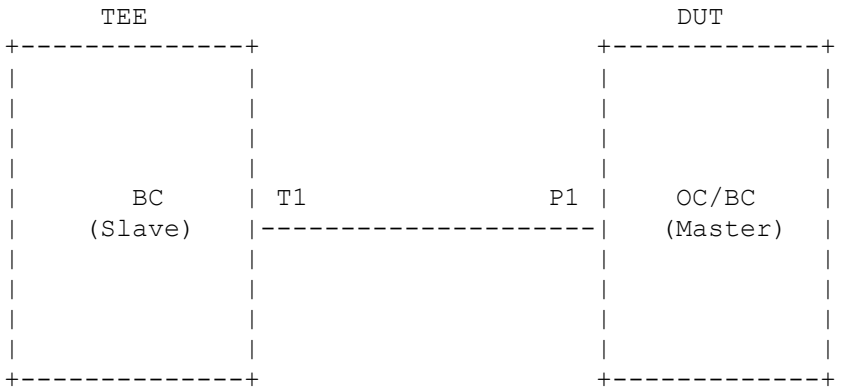
© Copyrights 2018 - 2019, CERN

```
                tlvType             = 0x0003
                wrMessageId         = 0x1001

 Step 23: Verify that PTP portState of port P1 is M_LOCK.
```

3.3. tc_conf_wrptp_wcg_003

```
 Test Case         : tc_conf_wrptp_wcg_003
 Test Case Version : 1.2
 Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
 Module Name       : WRPTP Configuration Group (WCG)

 Title             : knownDeltaTx in WR Master

 Purpose           : To verify that a WRPTP enabled device with it's port in
                     PTP Master sends CALIBRATED message with configured
                     knownDeltaTx (allowed range: UInteger64).

 Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.3
                     Page 16

 Conformance Type  : MUST
```

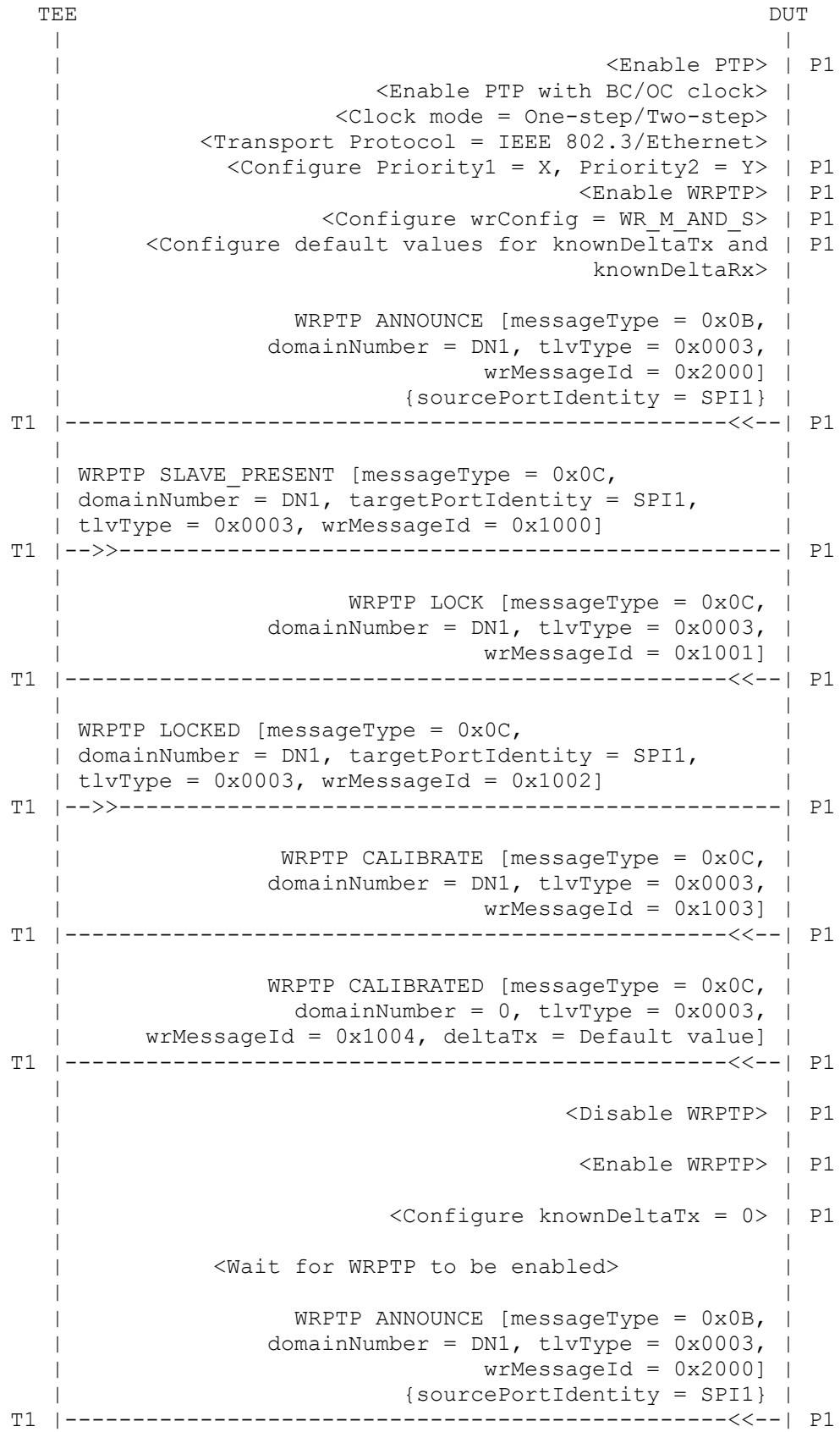
Topology



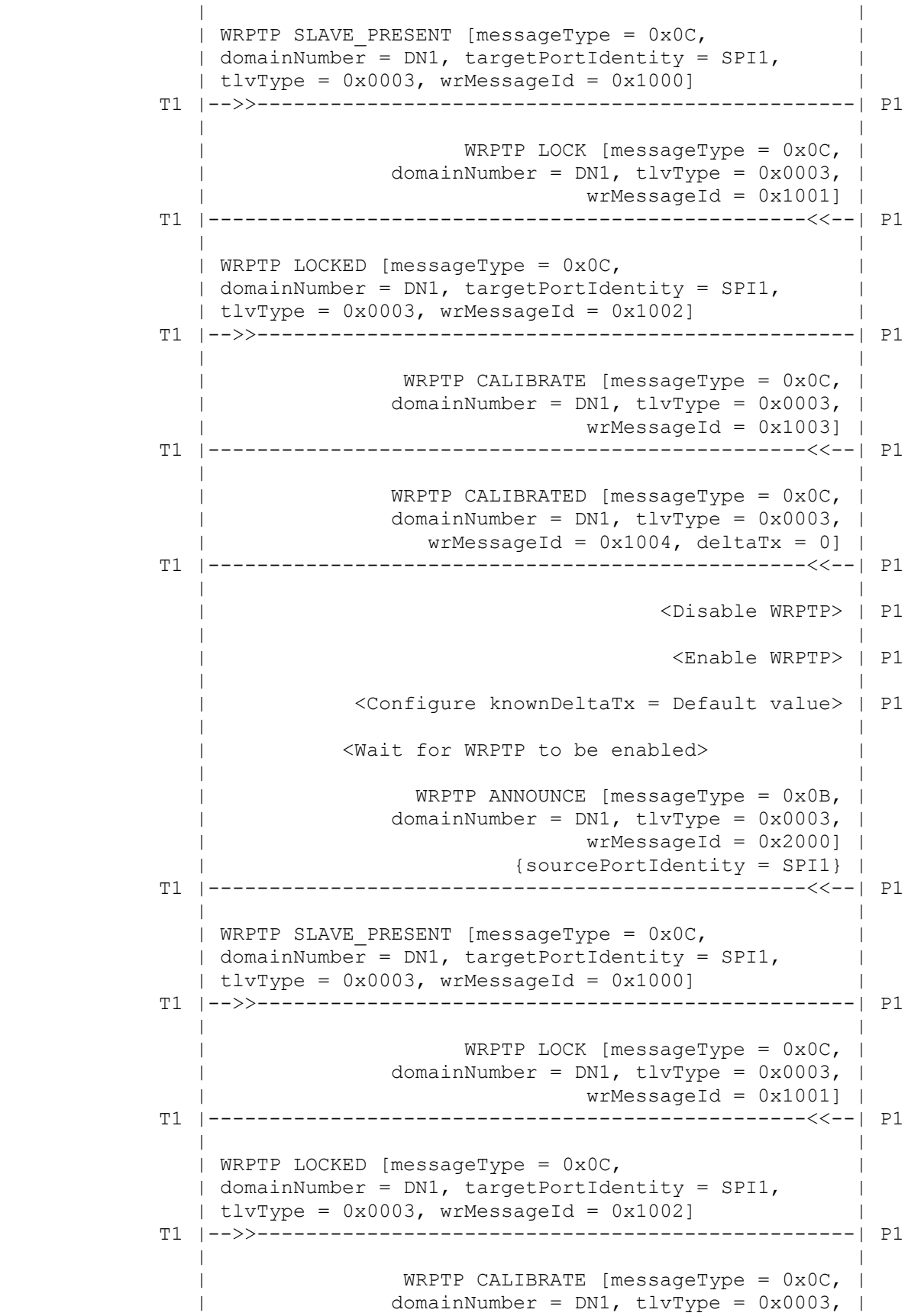
Legends:

```
    TEE     : Test Execution Engine
    DUT     : Device Under Test
    OC      : Ordinary Clock
    BC      : Boundary Clock
    T1      : Port 1 at TEE
    P1      : Port 1 at DUT
```

```
 Ladder Diagram    :
```



© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN

```
          |                              wrMessageId = 0x1003] |
       T1 |-------------------------------------------------<<--| P1
          |                                                     |
          |               WRPTP CALIBRATED [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |      wrMessageId = 0x1004, deltaTx = Default value] |
       T1 |-------------------------------------------------<<--| P1
          |                                                     |
```

Legends :

```
    TEE       = Test Execution Engine
    DUT       = Device Under Test
    T1        = TEE's port 1
    P1        = DUT's port 1
    PTP       = Precision Time Protocol
    WRPTP     = White Rabbit Precision Time Protocol
    OC        = Ordinary Clock
    BC        = Boundary Clock
    DN1       = Domain Number 1
```

Procedure :

(Initial Part)

```
Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.
```

(Part 1)

```
Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
```

```
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003

Step 8 : Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = Default value

(Part 2)

Step 9 : Disable WRPTP on port P1.

Step 10: Configure knownDeltaTx = 0 on port P1.

Step 11: Enable WRPTP on port P1.

Step 12: Wait for WRPTP te be enabled.
```

© Copyrights 2018 - 2019, CERN

```
Step 13: Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 14: Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 15: Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 16: Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1002

Step 17: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Step 18: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
```

© Copyrights 2018 - 2019, CERN

```
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1004
            deltaTx               = 0
```

(Part 3)

Step 19: Disable WRPTP on port P1.

Step 20: Configure knownDeltaTx = Default value on port P1.

Step 21: Enable WRPTP on port P1.

Step 22: Wait for WRPTP te be enabled.

Step 23: Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

```
        PTP Header
            messageType           = 0x0B
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x2000
```

Step 24: Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

```
        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
            targetPortIdentity    = SPI1
        TLV
            tlvType               = 0x0003
            wrMessageID           = 0x1000
```

Step 25: Observe that DUT transmits WRPTP LOCK message on port P1 with following parameters.

```
        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1001
```

Step 26: Send WRPTP LOCKED message on port T1 with following parameters.

```
        PTP Header
            messageType           = 0x0C
            domainNumber          = DN1
            targetPortIdentity    = SPI1
        TLV
            tlvType               = 0x0003
            wrMessageId           = 0x1002
```

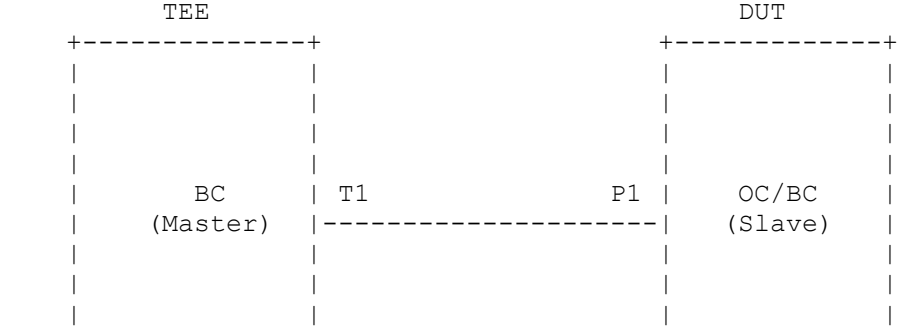
© Copyrights 2018 - 2019, CERN

```
Step 27: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Step 28: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = Default value
```

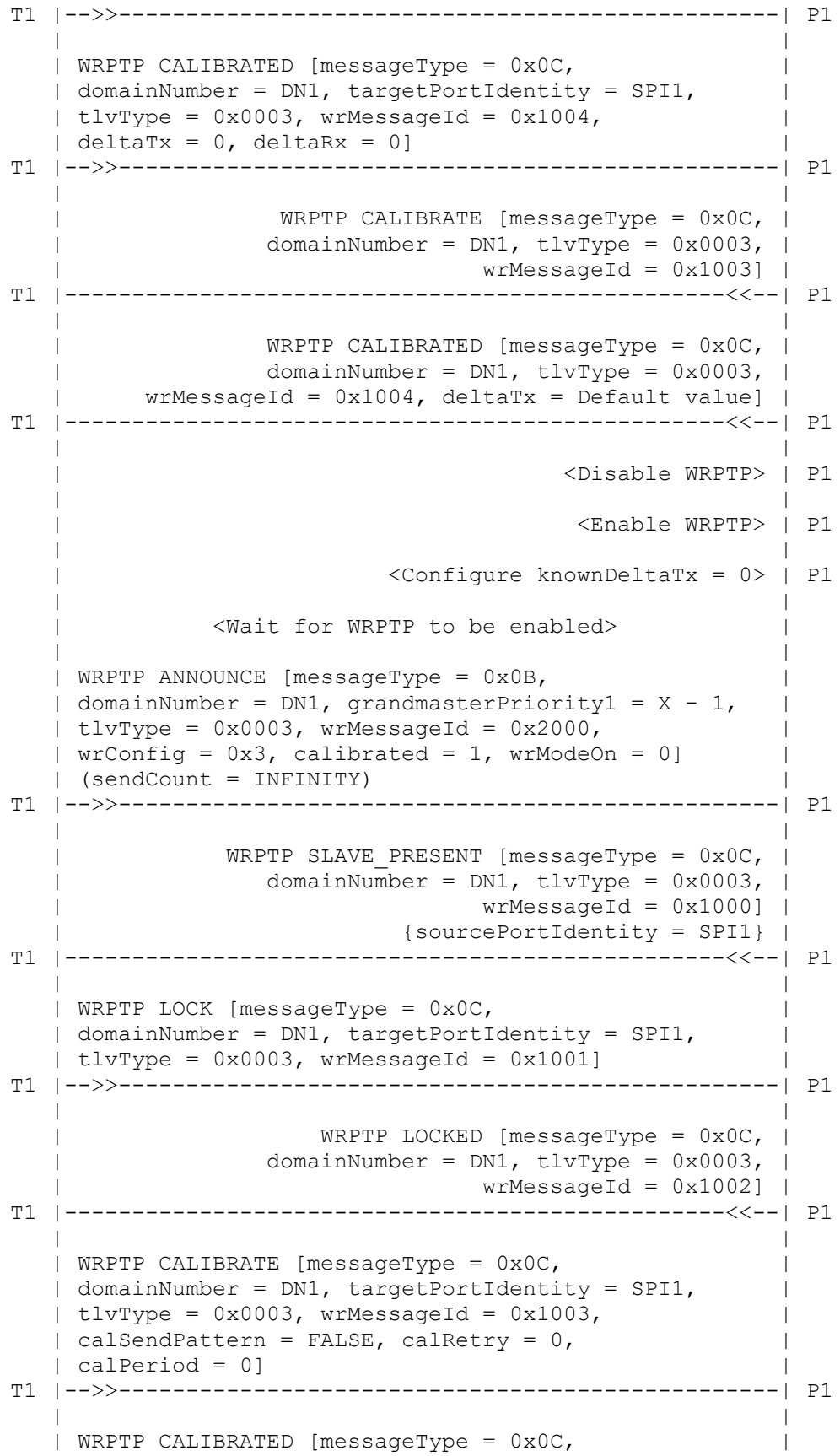
3.4. tc_conf_wrptp_wcg_004

```
Test Case         : tc_conf_wrptp_wcg_004
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP Configuration Group (WCG)

Title             : knownDeltaTx in WR Slave

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave sends CALIBRATED message with configured
                    knownDeltaTx (allowed range: UInteger64).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.3
                    Page 16

Conformance Type  : MUST
```

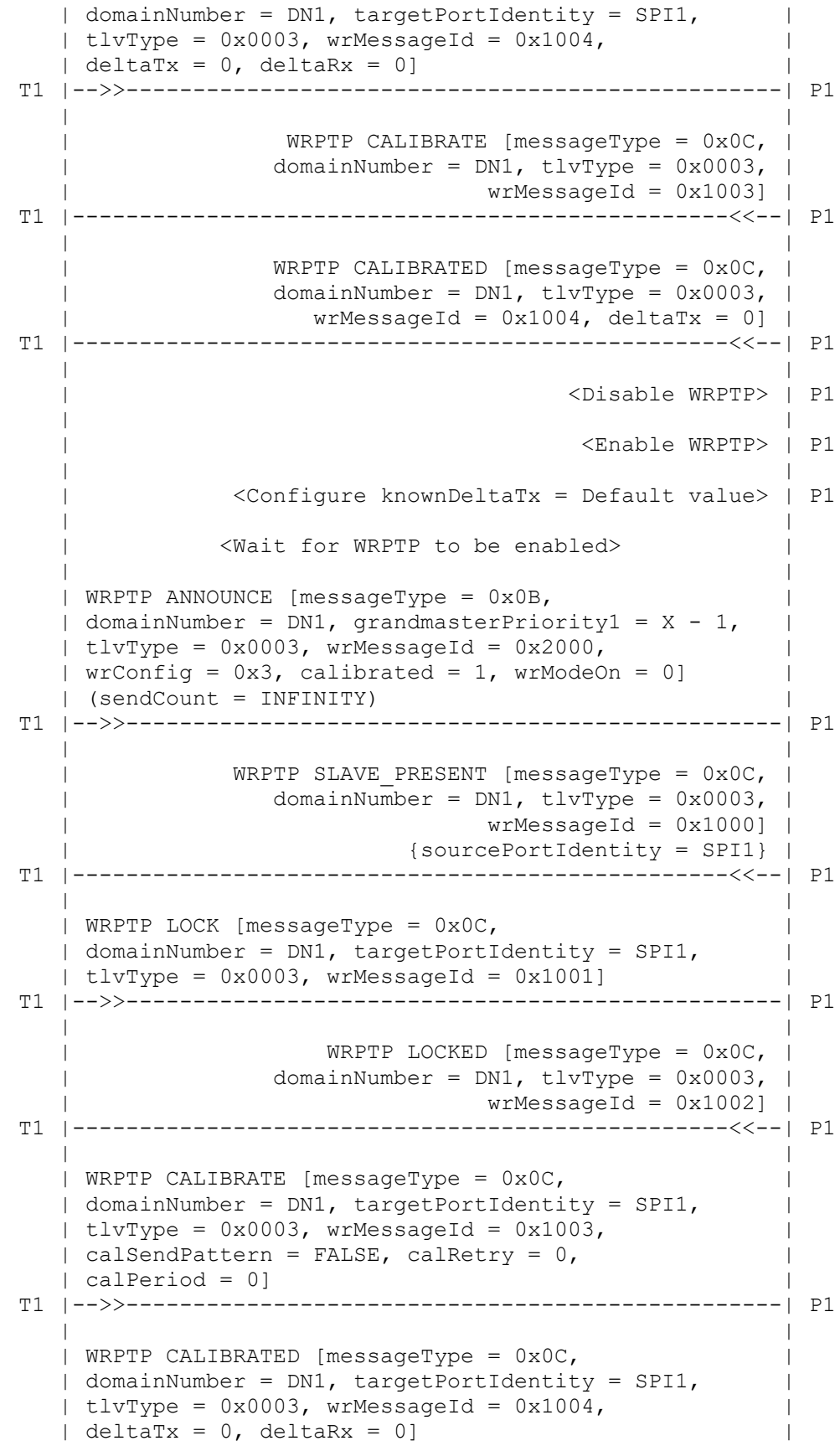
Topology



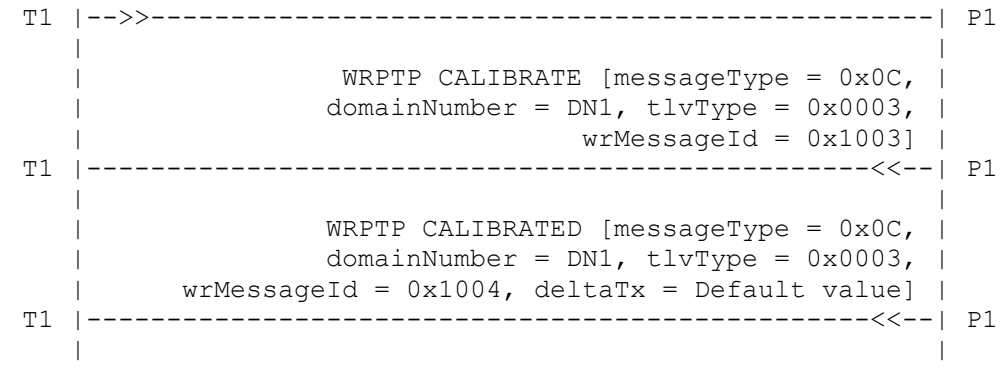
```
          |              |                    |             |
          +--------------+                    +-------------+


   Legends:

       TEE     : Test Execution Engine
       DUT     : Device Under Test
       OC      : Ordinary Clock
       BC      : Boundary Clock
       T1      : Port 1 at TEE
       P1      : Port 1 at DUT


Ladder Diagram    :

         TEE                                                   DUT
          |                                                     |
          |                                       <Enable PTP> | P1
          |                       <Enable PTP with BC/OC clock> |
          |                    <Clock mode = One-step/Two-step> |
          |          <Transport Protocol = IEEE 802.3/Ethernet> |
          |            <Configure Priority1 = X, Priority2 = Y> | P1
          |                                      <Enable WRPTP> | P1
          |                   <Configure wrConfig = WR_M_AND_S> | P1
          |      <Configure default values for knownDeltaTx and | P1
          |                                       knownDeltaRx> |
          |                                                     |
          | WRPTP ANNOUNCE [messageType = 0x0B,                 |
          | domainNumber = DN1, grandmasterPriority1 = X - 1,   |
          | tlvType = 0x0003, wrMessageId = 0x2000,             |
          | wrConfig = 0x3, calibrated = 1, wrModeOn = 0]       |
          | (sendCount = INFINITY)                              |
       T1 |-->>-------------------------------------------------| P1
          |                                                     |
          |            WRPTP SLAVE_PRESENT [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                                wrMessageId = 0x1000] |
          |                         {sourcePortIdentity = SPI1} |
       T1 |-------------------------------------------------<<--| P1
          |                                                     |
          | WRPTP LOCK [messageType = 0x0C,                     |
          | domainNumber = DN1, targetPortIdentity = SPI1,      |
          | tlvType = 0x0003, wrMessageId = 0x1001]             |
       T1 |-->>-------------------------------------------------| P1
          |                                                     |
          |                   WRPTP LOCKED [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                                wrMessageId = 0x1002] |
       T1 |-------------------------------------------------<<--| P1
          |                                                     |
          | WRPTP CALIBRATE [messageType = 0x0C,                |
          | domainNumber = DN1, targetPortIdentity = SPI1,      |
          | tlvType = 0x0003, wrMessageId = 0x1003,             |
          | calSendPattern = FALSE, calRetry = 0,               |
          | calPeriod = 0]                                      |
```



© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

PTP Header		
	messageType	= 0x0B
	domainNumber	= DN1
	grandmasterPriority1	= X - 1
TLV		
	tlvType	= 0x0003
	wrMessageId	= 0x2000

© Copyrights 2018 - 2019, CERN

```
                wrConfig            = 0x3
                calibrated          = 1
                wrModeOn            = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004
```

© Copyrights 2018 - 2019, CERN

```
                deltaTx             = 0
                deltaRx             = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

             PTP Header
                 messageType        = 0x0C
                 domainNumber       = DN1
             TLV
                 tlvType            = 0x0003
                 wrMessageId        = 0x1003

Step 10: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

             PTP Header
                 messageType        = 0x0C
                 domainNumber       = DN1
             TLV
                 tlvType            = 0x0003
                 wrMessageId        = 0x1004
                 deltaTx            = Default value

(Part 2)

Step 11: Disable WRPTP on port P1.

Step 12: Configure knownDeltaTx = 0 on port P1.

Step 13: Enable WRPTP on port P1.

Step 14: Wait for WRPTP te be enabled.

Step 15: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType        = 0x0B
                 domainNumber       = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType            = 0x0003
                 wrMessageId        = 0x2000
                 wrConfig           = 0x3
                 calibrated         = 1
                 wrModeOn           = 0

Step 16: Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType        = 0x0C
                 domainNumber       = DN1
             TLV
                 tlvType            = 0x0003
```

© Copyrights 2018 - 2019, CERN

```
                wrMessageID          = 0x1000

Step 17: Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 18: Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 19: Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0

Step 20: Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 21: Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
```

© Copyrights 2018 - 2019, CERN

```
Step 22: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaTx              = 0

(Part 3)

Step 23: Disable WRPTP on port P1.

Step 24: Configure knownDeltaTx = Default value on port P1.

Step 25: Enable WRPTP on port P1.

Step 26: Wait for WRPTP te be enabled.

Step 27: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 28: Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 29: Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 30: Observe that the DUT transmits WRPTP LOCKED message on port P1 with
```

© Copyrights 2018 - 2019, CERN

following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageID          = 0x1002
```

Step 31: Send WRPTP CALIBRATE message on port T1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
        targetPortIdentity   = SPI1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1003
        calSendPattern       = FALSE
        calRetry             = 0
        calPeriod            = 0
```

Step 32: Send WRPTP CALIBRATED message on port T1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
        targetPortIdentity   = SPI1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1004
        deltaTx              = 0
        deltaRx              = 0
```

Step 33: Observe that the DUT transmits WRPTP CALIBRATE message on port P1 with following parameters.

```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1003
```

Step 34: Verify that the DUT transmits WRPTP CALIBRATED message on port P1 with following parameters.

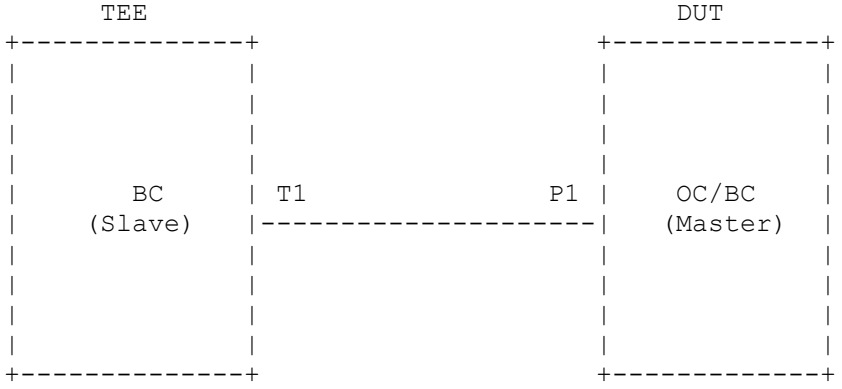
```
    PTP Header
        messageType          = 0x0C
        domainNumber         = DN1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x1004
        deltaTx              = Default value
```

© Copyrights 2018 - 2019, CERN

3.5. tc_conf_wrptp_wcg_005

```
Test Case         : tc_conf_wrptp_wcg_005
Test Case Version : 1.4
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP Configuration Group (WCG)

Title             : knownDeltaRx in WR Master

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Master sends CALIBRATED message with configured
                    knownDeltaRx (allowed range: UInteger64).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.3
                    Page 16

Conformance Type  : MUST
```

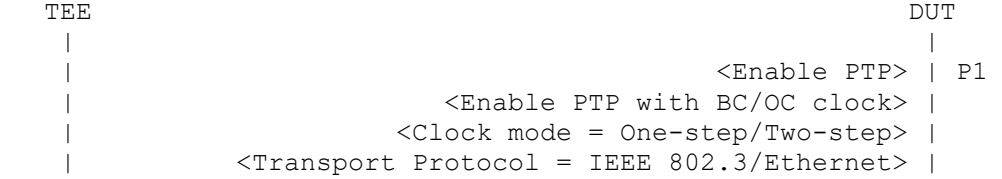
Topology



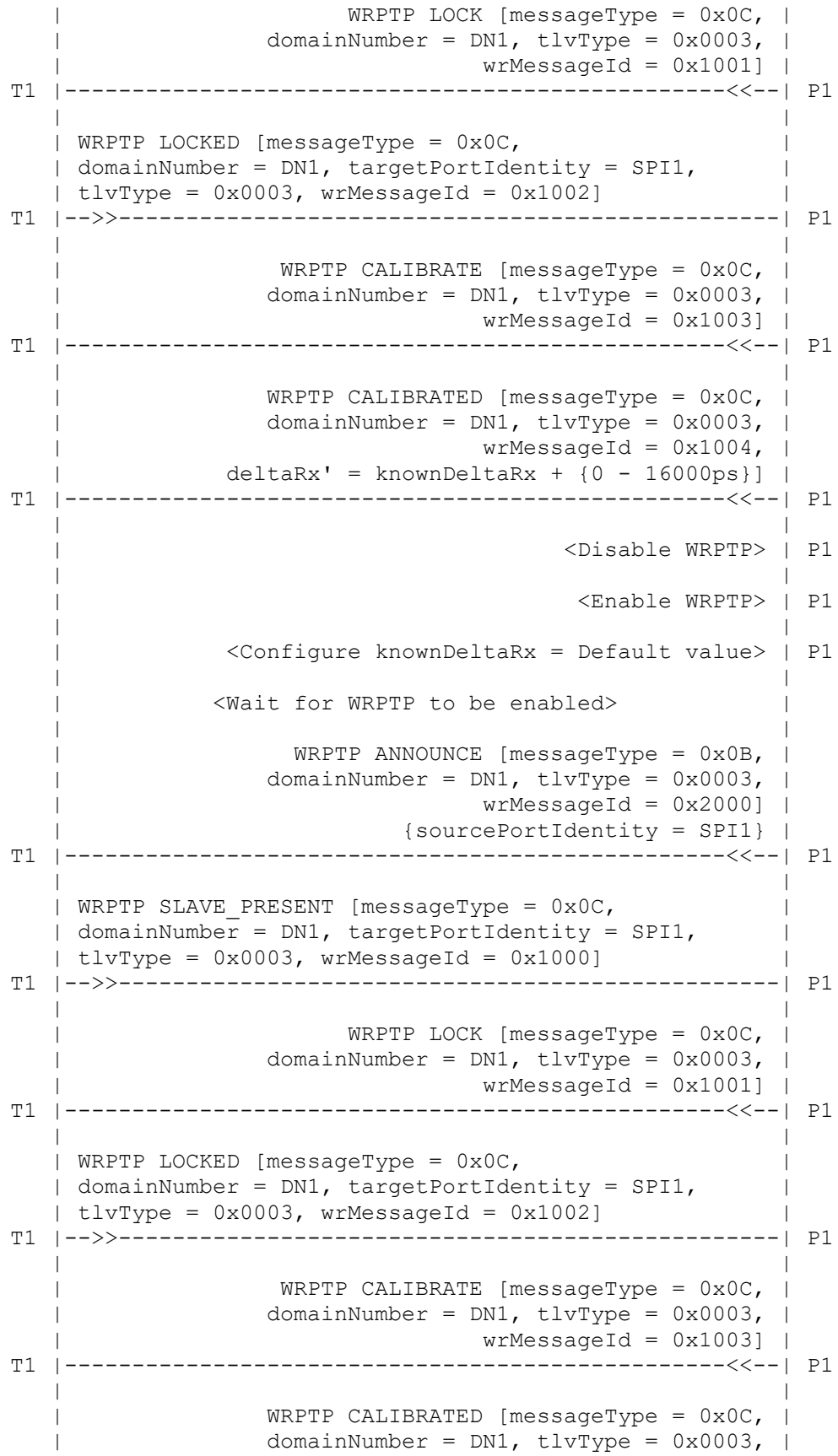
Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

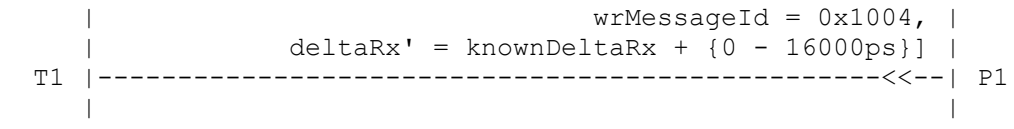
Ladder Diagram :



```
    |            <Configure Priority1 = X, Priority2 = Y> | P1
    |                                      <Enable WRPTP> | P1
    |                  <Configure wrConfig = WR_M_AND_S> | P1
    |      <Configure default values for knownDeltaTx and | P1
    |                                       knownDeltaRx> |
    |                                                     |
    |                WRPTP ANNOUNCE [messageType = 0x0B, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                wrMessageId = 0x2000] |
    |                          {sourcePortIdentity = SPI1} |
T1  |-----------------------------------------------<<--| P1
    |                                                     |
    | WRPTP SLAVE_PRESENT [messageType = 0x0C,            |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1000]             |
T1  |-->>-----------------------------------------------| P1
    |                                                     |
    |                     WRPTP LOCK [messageType = 0x0C, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                wrMessageId = 0x1001] |
T1  |-----------------------------------------------<<--| P1
    |                                                     |
    | WRPTP LOCKED [messageType = 0x0C,                   |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1002]             |
T1  |-->>-----------------------------------------------| P1
    |                                                     |
    |                WRPTP CALIBRATE [messageType = 0x0C, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                wrMessageId = 0x1003] |
T1  |-----------------------------------------------<<--| P1
    |                                                     |
    |               WRPTP CALIBRATED [messageType = 0x0C, |
    |                 domainNumber = 0, tlvType = 0x0003, |
    |                                wrMessageId = 0x1004, |
    |            deltaRx' = knownDeltaRx + {0 - 16000ps}] |
T1  |-----------------------------------------------<<--| P1
    |                                                     |
    |                                    <Disable WRPTP> | P1
    |                                                     |
    |                                     <Enable WRPTP> | P1
    |                                                     |
    |                         <Configure knownDeltaRx = 0> | P1
    |                                                     |
    |           <Wait for WRPTP to be enabled>            |
    |                                                     |
    |                WRPTP ANNOUNCE [messageType = 0x0B, |
    |               domainNumber = DN1, tlvType = 0x0003, |
    |                                wrMessageId = 0x2000] |
    |                          {sourcePortIdentity = SPI1} |
T1  |-----------------------------------------------<<--| P1
    |                                                     |
    | WRPTP SLAVE_PRESENT [messageType = 0x0C,            |
    | domainNumber = DN1, targetPortIdentity = SPI1,      |
    | tlvType = 0x0003, wrMessageId = 0x1000]             |
T1  |-->>-----------------------------------------------| P1
    |                                                     |
```



© Copyrights 2018 - 2019, CERN



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1 with following parameters and store sourcePortIdentity as SPI1.

PTP Header		
	messageType	= 0x0B
	domainNumber	= DN1
TLV		
	tlvType	= 0x0003
	wrMessageId	= 0x2000

Step 4 : Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

PTP Header		
	messageType	= 0x0C
	domainNumber	= DN1
	targetPortIdentity	= SPI1
TLV		

© Copyrights 2018 - 2019, CERN

```
                tlvType             = 0x0003
                wrMessageID         = 0x1000

Step 5 : Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Send WRPTP LOCKED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1002

Step 7 : Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003

Step 8 : Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004
                deltaRx'            = knownDeltaRx + {0 - 16000ps}

(Part 2)

Step 9 : Disable WRPTP on port P1.

Step 10: Configure knownDeltaRx = 0 on port P1.

Step 11: Enable WRPTP on port P1.

Step 12: Wait for WRPTP te be enabled.

Step 13: Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0B
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x2000
```

Step 14: Send WRPTP SLAVE_PRESENT message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1000
```

Step 15: Observe that DUT transmits WRPTP LOCK message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001
```

Step 16: Send WRPTP LOCKED message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1002
```

Step 17: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
```

Step 18: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
```

© Copyrights 2018 - 2019, CERN

```
                deltaRx'            = knownDeltaRx + {0 - 16000ps}

(Part 3)

Step 19: Disable WRPTP on port P1.

Step 20: Configure knownDeltaRx = Default value on port P1.

Step 21: Enable WRPTP on port P1.

Step 22: Wait for WRPTP te be enabled.

Step 23: Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 24: Send WRPTP SLAVE_PRESENT message on port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 25: Observe that DUT transmits WRPTP LOCK message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 26: Send WRPTP LOCKED message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1002

Step 27: Observe that DUT transmits WRPTP CALIBRATE message on port P1 with
         following parameters.

             PTP Header
```

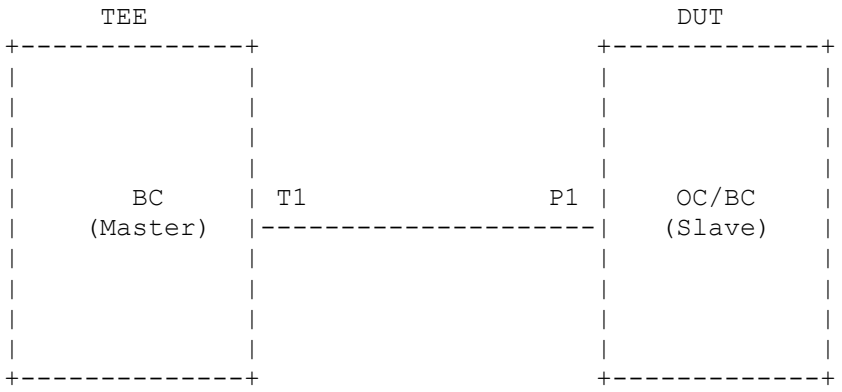
© Copyrights 2018 - 2019, CERN

```
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1003

Step 28: Verify that DUT transmits WRPTP CALIBRATED message on port P1 with
         following parameters.

        PTP Header
            messageType          = 0x0C
            domainNumber         = DN1
        TLV
            tlvType              = 0x0003
            wrMessageId          = 0x1004
            deltaRx'             = knownDeltaRx + {0 - 16000ps}
```

3.6. tc_conf_wrptp_wcg_006

```
Test Case         : tc_conf_wrptp_wcg_006
Test Case Version : 1.3
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : WRPTP Configuration Group (WCG)

Title             : knownDeltaRx in WR Slave

Purpose           : To verify that a WRPTP enabled device with it's port in
                    PTP Slave sends CALIBRATED message with configured
                    knownDeltaRx (allowed range: UInteger64).

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.3
                    Page 16

Conformance Type  : MUST
```

Topology

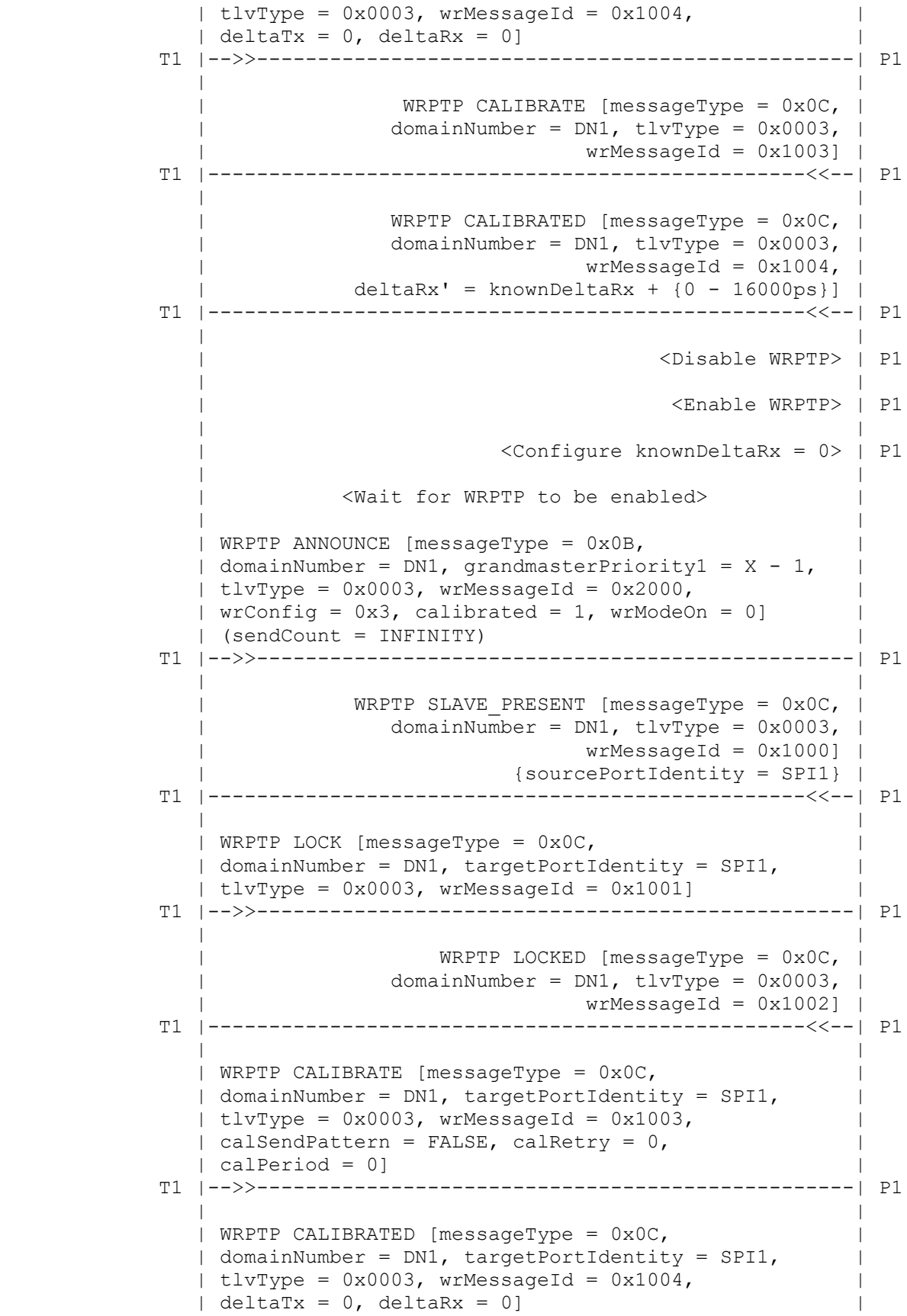


Legends:

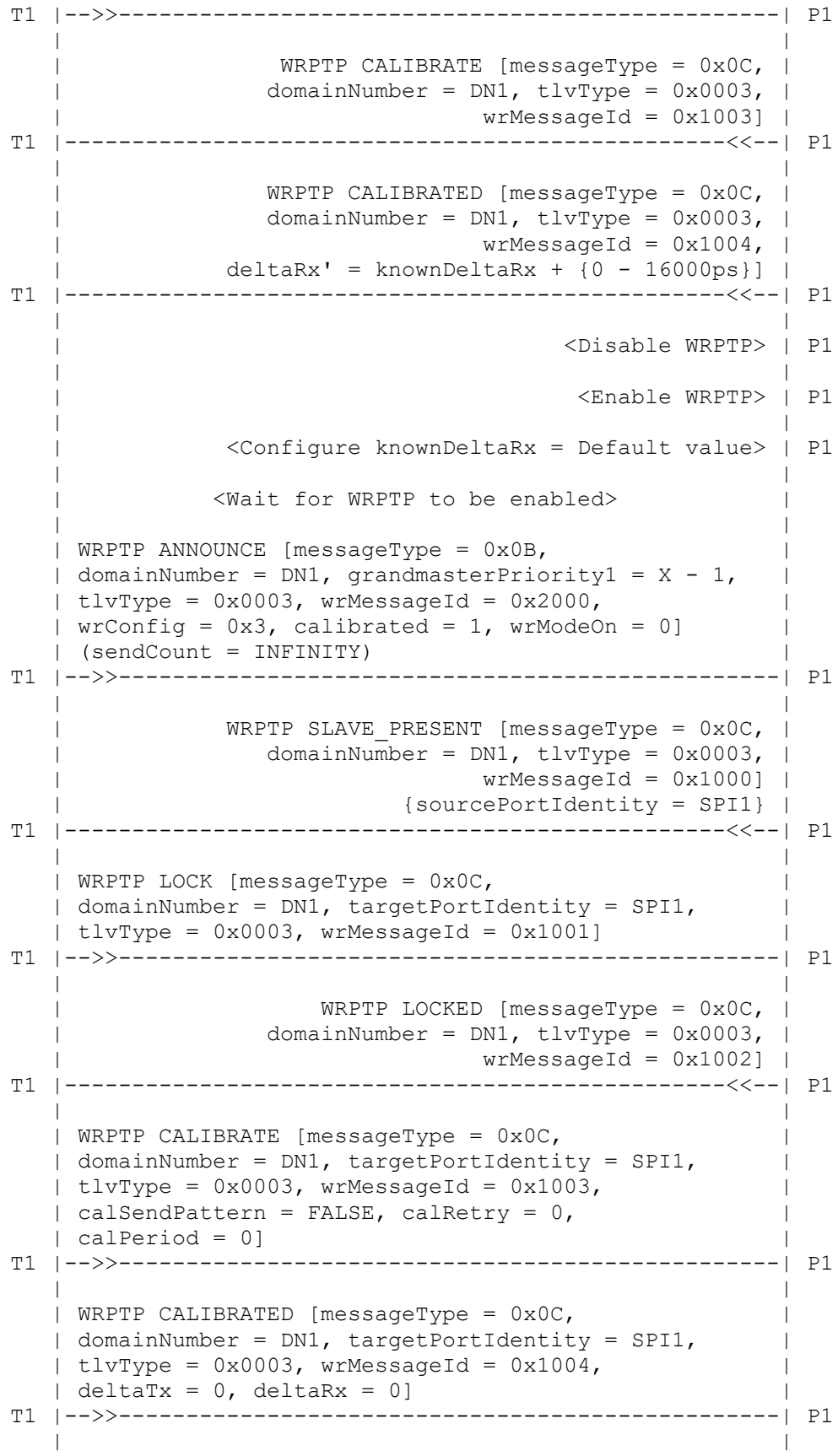
TEE : Test Execution Engine
DUT : Device Under Test
OC : Ordinary Clock
BC : Boundary Clock
T1 : Port 1 at TEE
P1 : Port 1 at DUT

Ladder Diagram :

© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN



© Copyrights 2018 - 2019, CERN

```
          |                WRPTP CALIBRATE [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                                 wrMessageId = 0x1003] |
       T1 |-------------------------------------------------<<--| P1
          |                                                      |
          |               WRPTP CALIBRATED [messageType = 0x0C, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                                 wrMessageId = 0x1004, |
          |            deltaRx' = knownDeltaRx + {0 - 16000ps}] |
       T1 |-------------------------------------------------<<--| P1
          |                                                      |
```

Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.
iv. Configure clock mode as One-step/Two-step.
v. Configure Network Transport Protocol as IEEE 802.3/Ethernet.
vi. Configure default values for Priority1 = X and Priority2 = Y.
vii. Enable WRPTP on port P1.
viii. Configure wrConfig = WR_M_AND_S.
ix. Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE

i. Add port T1 at TEE.

(Part 1)

Step 3 : Send periodic WRPTP ANNOUNCE messages on the port T1 with following parameters.

```
    PTP Header
        messageType          = 0x0B
        domainNumber         = DN1
        grandmasterPriority1 = X - 1
    TLV
        tlvType              = 0x0003
        wrMessageId          = 0x2000
        wrConfig             = 0x3
```

```
                calibrated          = 1
                wrModeOn            = 0

Step 4 : Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1000

Step 5 : Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1001

Step 6 : Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
            TLV
                tlvType             = 0x0003
                wrMessageID         = 0x1002

Step 7 : Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1003
                calSendPattern      = FALSE
                calRetry            = 0
                calPeriod           = 0

Step 8 : Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType         = 0x0C
                domainNumber        = DN1
                targetPortIdentity  = SPI1
            TLV
                tlvType             = 0x0003
                wrMessageId         = 0x1004
                deltaTx             = 0
```

© Copyrights 2018 - 2019, CERN

```
                deltaRx             = 0

Step 9 : Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1003

Step 10: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaRx'             = knownDeltaRx + {0 - 16000ps}

(Part 2)

Step 11: Disable WRPTP on port P1.

Step 12: Configure knownDeltaRx = 0 on port P1.

Step 13: Enable WRPTP on port P1.

Step 14: Wait for WRPTP te be enabled.

Step 15: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 16: Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000
```

© Copyrights 2018 - 2019, CERN

```
Step 17: Send WRPTP LOCK message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1001

Step 18: Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002

Step 19: Send WRPTP CALIBRATE message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0

Step 20: Send WRPTP CALIBRATED message on port T1 with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0

Step 21: Observe that the DUT transmits WRPTP CALIBRATE message on port P1
         with following parameters.

            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003

Step 22: Verify that the DUT transmits WRPTP CALIBRATED message on port P1
```

© Copyrights 2018 - 2019, CERN

```
         with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1004
                 deltaRx'             = knownDeltaRx + {0 - 16000ps}

(Part 3)

Step 23: Disable WRPTP on port P1.

Step 24: Configure knownDeltaRx = Default value on port P1.

Step 25: Enable WRPTP on port P1.

Step 26: Wait for WRPTP te be enabled.

Step 27: Send periodic WRPTP ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 grandmasterPriority1 = X - 1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000
                 wrConfig             = 0x3
                 calibrated           = 1
                 wrModeOn             = 0

Step 28: Wait until completion of BMCA and observe that DUT transmits WRPTP
         SLAVE_PRESENT message on port P1 with following parameters. Store
         sourcePortIdentity as SPI1.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageID          = 0x1000

Step 29: Send WRPTP LOCK message on port T1 with following parameters.

             PTP Header
                 messageType          = 0x0C
                 domainNumber         = DN1
                 targetPortIdentity   = SPI1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x1001

Step 30: Observe that the DUT transmits WRPTP LOCKED message on port P1 with
         following parameters.
```

© Copyrights 2018 - 2019, CERN

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageID          = 0x1002
```

Step 31: Send WRPTP CALIBRATE message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
                calSendPattern       = FALSE
                calRetry             = 0
                calPeriod            = 0
```

Step 32: Send WRPTP CALIBRATED message on port T1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
                targetPortIdentity   = SPI1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaTx              = 0
                deltaRx              = 0
```

Step 33: Observe that the DUT transmits WRPTP CALIBRATE message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1003
```

Step 34: Verify that the DUT transmits WRPTP CALIBRATED message on port P1 with following parameters.

```
            PTP Header
                messageType          = 0x0C
                domainNumber         = DN1
            TLV
                tlvType              = 0x0003
                wrMessageId          = 0x1004
                deltaRx'             = knownDeltaRx + {0 - 16000ps}
```

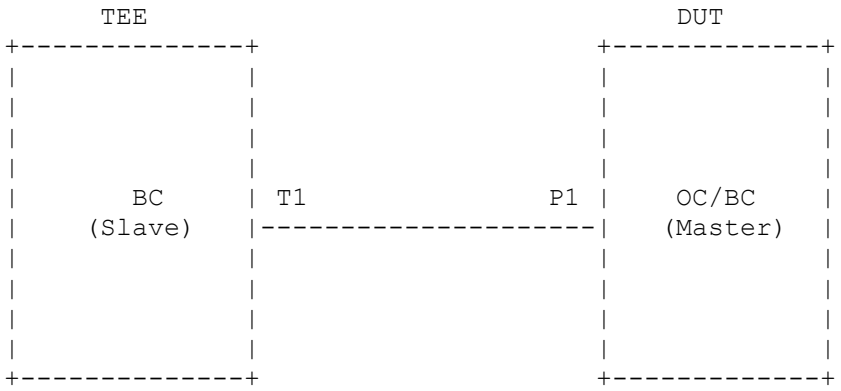
© Copyrights 2018 - 2019, CERN

4. Inter-operability Group (IOG)

4.1. tc_conf_wrptp_iog_001

```
Test Case         : tc_conf_wrptp_iog_001
Test Case Version : 1.0
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : Inter-operability Group (IOG)

Title             : Working of WR Master with non-WR device

Purpose           : To verify that a WRPTP enabled device in WR_MASTER mode
                    moves to standard PTP Master mode when it is connected
                    to non-WR device.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.1
                    Page 13, Figure 28 Page 63

Conformance Type  : MUST
```

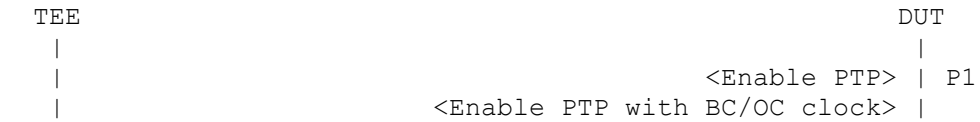
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



Legends :

TEE	= Test Execution Engine
DUT	= Device Under Test
T1	= TEE's port 1
P1	= DUT's port 1
PTP	= Precision Time Protocol
WRPTP	= White Rabbit Precision Time Protocol
OC	= Ordinary Clock
BC	= Boundary Clock
DN1	= Domain Number 1

Procedure :

(Initial Part)

Step 1 : Initialization of DUT

i. Enable DUT's port P1.
ii. Enable PTP on port P1.
iii. Enable PTP globally with device type as Boundary/Ordinary clock.

© Copyrights 2018 - 2019, CERN

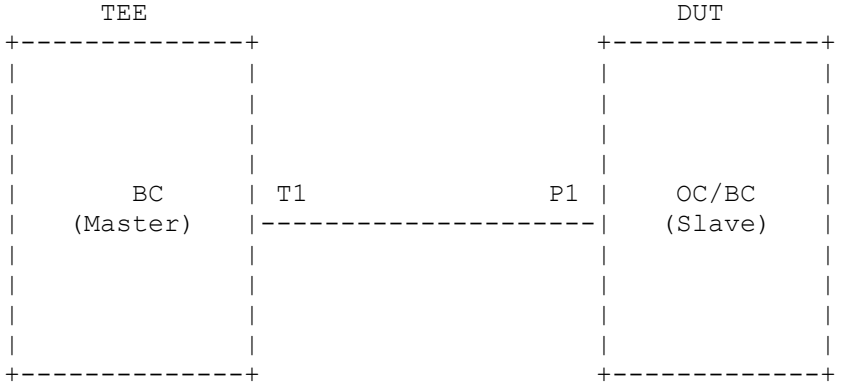
```
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store grandmasterPriority1 as X.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send periodic ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 correctionField      = 0
                 controlField         = 0x05
                 logMessageInterval   = 1
                 grandmasterPriority1 = X + 1

Step 5 : Verify that DUT transmits SYNC message on port P1 with following
         parameters.

             PTP Header
                 messageType          = 0x00
                 domainNumber         = DN1

Step 6 : Send DELAY_REQ message on the port T1 with following parameters.

             PTP Header
                 messageType          = 0x01
                 domainNumber         = DN1
                 correctionField      = 0
                 controlField         = 0x01
                 logMessageInterval   = 0x7F

Step 7 : Verify that DUT transmits DELAY_RESP message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x09
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN

4.2. tc_conf_wrptp_iog_002

```
Test Case         : tc_conf_wrptp_iog_002
Test Case Version : 1.2
Component Name    : ATTEST WRPTP CONFORMANCE TEST SUITE
Module Name       : Inter-operability Group (IOG)

Title             : Working of WR Slave with non-WR device

Purpose           : To verify that a WRPTP enabled device in WR_SLAVE mode
                    moves to standard PTP Slave mode when it is connected to
                    non-WR device.

Reference         : White Rabbit Specification v2.0 July 2011, Clause 6.1
                    Page 13, Figure 28 Page 63

Conformance Type  : MUST
```

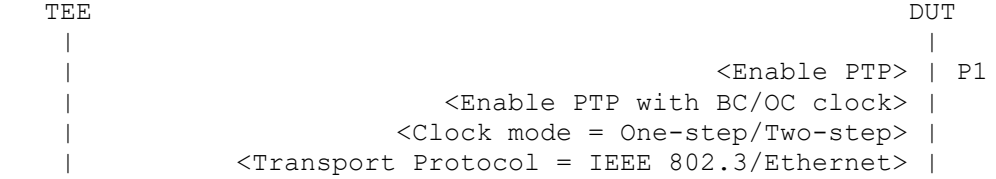
Topology



Legends:

```
TEE     : Test Execution Engine
DUT     : Device Under Test
OC      : Ordinary Clock
BC      : Boundary Clock
T1      : Port 1 at TEE
P1      : Port 1 at DUT
```

Ladder Diagram :



© Copyrights 2018 - 2019, CERN

```
          |            <Configure Priority1 = X, Priority2 = Y> | P1
          |                                      <Enable WRPTP> | P1
          |                    <Configure wrConfig = WR_M_AND_S> | P1
          |      <Configure default values for knownDeltaTx and | P1
          |                                        knownDeltaRx> |
          |                                                      |
          |                 WRPTP ANNOUNCE [messageType = 0x0B, |
          |               domainNumber = DN1, tlvType = 0x0003, |
          |                               wrMessageId = 0x2000] |
          |                          {grandmasterPriority1 = X} |
       T1 |-----------------------------------------------<<--| P1
          |                                                      |
          | ANNOUNCE [messageType = 0x0B,                        |
          | domainNumber = DN1, correctionField = 0,             |
          | controlField = 0x05, logMessageInterval = 1,         |
          | grandmasterPriority1 = X - 1]                        |
          | (sendCount = INFINITY)                               |
       T1 |-->>-----------------------------------------------| P1
          |                                                      |
          | SYNC [messageType = 0x00,                            |
          | domainNumber = DN1, correctionField = 0,             |
          | controlField = 0x00, logMessageInterval = 0]         |
          | (sendCount = INFINITY)                               |
       T1 |-->>-----------------------------------------------| P1
          |                                                      |
          | If Two-step clock, FOLLOW_UP                         |
          | [messageType = 0x08, domainNumber = DN1]             |
          | correctionField = 0, controlField = 0x02,            |
          | logMessageInterval = 0]                              |
          | (sendCount = INFINITY)                               |
       T1 |-->>-----------------------------------------------| P1
          |                                                      |
          |         < Wait for 6s to complete BMCA >             |
          |                                                      |
          |                      DELAY_REQ [messageType = 0x01, |
          |                                 domainNumber = DN1] |
       T1 |-----------------------------------------------<<--| P1
          |                                                      |
```

Legends :

TEE	=	Test Execution Engine
DUT	=	Device Under Test
T1	=	TEE's port 1
P1	=	DUT's port 1
PTP	=	Precision Time Protocol
WRPTP	=	White Rabbit Precision Time Protocol
OC	=	Ordinary Clock
BC	=	Boundary Clock
DN1	=	Domain Number 1

Procedure :

(Initial Part)

© Copyrights 2018 - 2019, CERN

```
Step 1 : Initialization of DUT
    i.   Enable DUT's port P1.
   ii.   Enable PTP on port P1.
  iii.   Enable PTP globally with device type as Boundary/Ordinary clock.
   iv.   Configure clock mode as One-step/Two-step.
    v.   Configure Network Transport Protocol as IEEE 802.3/Ethernet.
   vi.   Configure default values for Priority1 = X and Priority2 = Y.
  vii.   Enable WRPTP on port P1.
 viii.   Configure wrConfig = WR_M_AND_S.
   ix.   Configure default values for knownDeltaTx and knownDeltaRx on P1.

Step 2 : Initialization of TEE
    i.   Add port T1 at TEE.

(Part 1)

Step 3 : Observe that DUT transmits WRPTP ANNOUNCE message on the port P1
         with following parameters and store grandmasterPriority1 as X.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
             TLV
                 tlvType              = 0x0003
                 wrMessageId          = 0x2000

Step 4 : Send periodic ANNOUNCE messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x0B
                 domainNumber         = DN1
                 correctionField      = 0
                 controlField         = 0x05
                 logMessageInterval   = 1
                 grandmasterPriority1 = X - 1

Step 5 : Send periodic SYNC messages on the port T1 with following
         parameters.

             PTP Header
                 messageType          = 0x00
                 domainNumber         = DN1
                 correctionField      = 0
                 controlField         = 0x00
                 logMessageInterval   = 0

Step 5a: If Two-step clock, send periodic FOLLOW_UP messages on port T1 with
         following parameters.

             PTP Header
                 messageType          = 0x08
                 domainNumber         = DN1
                 correctionField      = 0
                 controlField         = 0x02
                 logMessageInterval   = 0
```

© Copyrights 2018 - 2019, CERN

```
Step 6 : Wait for 6s to complete BMCA.

Step 7 : Verify that DUT transmits DELAY_REQ message on port P1 with
         following parameters.

             PTP Header
                 messageType          = 0x01
                 domainNumber         = DN1
```

© Copyrights 2018 - 2019, CERN