

<div><div>Send Config</div><div>Personalize DUT</div><div><div>Start Session</div><div>Hide Controls</div></div></div>	<div>DevEUI:</div> <div>0101010101010101</div> <div>Device Address:</div> <div>01010101</div> <div>Application Key:</div> <div>2b7e151628aed2a6abf7158809cf4f3c</div>	<div><div>FUN_03</div><div>FUN_04</div><div>FUN_05</div><div>FUN_06</div><div>SEC_01</div></div>
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Alerts:

Ready to start: make launch_test_session

Hide

Tests details:

Results summary of the tests.

td_lorawan_act_01 PASS

td_lorawan_fun_01 PASS

td_lorawan_fun_02 PASS

td_lorawan_fun_03 PASS

td_lorawan_fun_04 PASS

td_lorawan_fun_05 PASS

td_lorawan_fun_06 PASS

td_lorawan_deactivate PASS

TEST VERDICT: PASS

Hide

TD_LORAWAN_DEACTIVATE: Step information

Completed Step: S1ActOkToDeactivate

Next step: No next step.

Received from DUT:

tmst: 933752924, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801700E0FB1CBB19E51B (Size: 15 bytes)

PHY payload:

4001010101801700E0FB1CBB19E51B

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801700E0FB1C

MAC payload information

FHDR: 01010101801700

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 23 (0017)

---FOpts: None

FPort: 224

Encrypted FRMPayload: FB1C

=====

MIC: BB19E51B

=====

Decrypted FRMPayload: 000A

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 00

Hide

TEST CASE: td_lorawan_deactivate

Step 1: S1ActOkToDeactivate

Verifies TAOK and deactivates Test Mode.

- Reception from DUT: TAOK message with the downlink counter.

- TAS sends: Test Mode deactivation (payload 0x00).

Test ID: TD_LoRaWAN_DEACTIVATE

Objective: Deactivates test mode.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions: The DUT is in Test Mode.

Hide

TD_LORAWAN_FUN_06: Step information

Completed Step: S2CheckRetransmissions

Next step: S2CheckRetransmissions

Received from DUT:

tmst: 927755052, freq: 868.1, DR: SF8BW125

PHYPayload: 8001010101801600E009FAF9BBF00C (Size: 15 bytes)

PHY payload:

8001010101801600E009FAF9BBF00C

MHDR bits: 10000000 (CONFIRMED_UP)

MACPayload: 01010101801600E009FA

MAC payload information

FHDR: 01010101801600

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 22 (0016)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 09FA

=====

MIC: F9BBF00C

=====

Decrypted FRMPayload: 0009

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 2/2.

Hide

TD_LORAWAN_FUN_06: Step information

Completed Step: S2CheckRetransmissions

Next step: S2CheckRetransmissions

Received from DUT:

tmst: 923753212, freq: 868.3, DR: SF8BW125

PHYPayload: 8001010101801600E009FAF9BBF00C (Size: 15 bytes)

PHY payload:

8001010101801600E009FAF9BBF00C

MHDR bits: 10000000 (CONFIRMED_UP)

MACPayload: 01010101801600E009FA

MAC payload information

FHDR: 01010101801600

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 22 (0016)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 09FA

=====

MIC: F9BBF00C

=====

Decrypted FRMPayload: 0009

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 1/2.

Hide

TD_LORAWAN_FUN_06: Step information

Completed Step: S1ActOKToSetConfirmed

Next step: S2CheckRetransmissions

Received from DUT:

tmst: 918753348, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801500E0542156AEED6E (Size: 15 bytes)

PHY payload:

4001010101801500E0542156AEED6E

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801500E05421

MAC payload information

FHDR: 01010101801500

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 21 (0015)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 5421

=====

MIC: 56AEED6E

=====

Decrypted FRMPayload: 0008

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 02

Hide

TEST CASE: td_lorawan_fun_06

Step 2: S2CheckRetransmissions

The TAS don't send the acknowledgment of the uplink messages to verify the node retransmissions. After checking 2 retransmissions the UNCONFIRMED messages are configured again for all subsequent uplink communication.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: ACK the messages and configures the UNCONFIRMED uplink frames (plain text FRMPayload=0x03).

Step 1: S1ActOKToSetConfirmed

Checks the downlink counter of the TAOK message and configures the node to use CONFIRMED uplink frames sending a test ID 2.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: Triggers the usage of CONFIRMED uplink frames (plain text FRMPayload=0x02).

Test ID: TD_LoRaWAN_

Objective: Test the handling of the ACK bit in the confirmed message exchange, verifying the uplink retransmission of a message when the server does not send the acknowledgement.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions: The DUT has an active session with the TAS and is in Test Mode.

Hide

TD_LORAWAN_FUN_05: Step information

Completed Step: S2CheckConfirmedAndACK

Next step: No next step.

Received from DUT:

tmst: 913753484, freq: 868.5, DR: SF8BW125

PHYPayload: 8001010101801400E0E87586229810 (Size: 15 bytes)

PHY payload:

8001010101801400E0E87586229810

MHDR bits: 10000000 (CONFIRMED_UP)

MACPayload: 01010101801400E0E875

MAC payload information

FHDR: 01010101801400

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 20 (0014)

---FOpts: None

FPort: 224

Encrypted FRMPayload: E875

=====

MIC: 86229810

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_05: Step information

Completed Step: S1ActOKToSetConfirmed

Next step: S2CheckConfirmedAndACK

Received from DUT:

tmst: 908753628, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801300E02ACF5A4B4EB8 (Size: 15 bytes)

PHY payload:

4001010101801300E02ACF5A4B4EB8

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801300E02ACF

MAC payload information

FHDR: 01010101801300

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 19 (0013)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 2ACF

=====

MIC: 5A4B4EB8

=====

Decrypted FRMPayload: 0006

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 02

Hide

TEST CASE: td_lorawan_fun_05

Step 2: S2CheckConfirmedAndACK

Configures again the usage of UNCONFIRMED frames and sends the ACK.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: ACK the messages and configures the UNCONFIRMED uplink frames (plain text FRMPayload=0x03).

Step 1: S1ActOKToSetConfirmed

Checks the downlink counter of the TAOK message and configures the node to use CONFIRMED uplink frames sending a test ID 2.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: Triggers the usage of CONFIRMED uplink frames (plain text FRMPayload=0x02).

Test ID: TD_LoRaWAN_FUN_05

Objective: Test the implementation of confirmed packets, verifies the handling of the ACK bit in the uplink messages.

References: LoRaWAN Specification v1.0.2.

The DUT has an active session with the TAS and is in Test Mode.

Hide

TD_LORAWAN_FUN_04: Step information

Completed Step: S2ActokFinal

Next step: No next step.

Received from DUT:

tmst: 903753764, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101801200E0CB48A166099D (Size: 15 bytes)

PHY payload:

4001010101801200E0CB48A166099D

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801200E0CB48

MAC payload information

FHDR: 01010101801200

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 18 (0012)

---FOpts: None

FPort: 224

Encrypted FRMPayload: CB48

=====

MIC: A166099D

=====

Decrypted FRMPayload: 0006

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_04: Step information

Completed Step: S1ActokToWrongFCnt

Next step: S2ActokFinal

Received from DUT:

tmst: 898753908, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801100E0875F6FB84916 (Size: 15 bytes)

PHY payload:

4001010101801100E0875F6FB84916

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801100E0875F

MAC payload information

FHDR: 01010101801100

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 17 (0011)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 875F

=====

MIC: 6FB84916

=====

Decrypted FRMPayload: 0006

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 00

Additional information: This message should be ignored. Bad FCnt dl: 7 ->5

Hide

TEST CASE: td_lorawan_fun_04

Step 2: S2ActokFinal

Waits and Activation Ok message with the current downlink counter.

- Reception from DUT:
- TAS sends: None.

Step 1: S1ActokToWrongFCnt.

Waits and Activation Ok message with the current downlink counter of the session and after it's received a message with a decreasing frame downlink counter will be sent. This messages must be ignored.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: message with wrong frame downlink counter.

Test ID: TD_LoRaWAN_FUN_04

Objective: Checks that a message with decreasing downlink frame counter is ignored.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions: The DUT has an active session with the TAS and is in Test Mode.

Step 2: s2_actok_final

Waits and Activation Ok message with the current downlink counter.

Hide

TD_LORAWAN_FUN_03: Step information

Completed Step: S1CountCheckFCntUp

Next step: S1CountCheckFCntUp

Received from DUT:

tmst: 893754044, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801000E0551EC9776D5C (Size: 15 bytes)

PHY payload:

4001010101801000E0551EC9776D5C

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801000E0551E

MAC payload information

FHDR: 01010101801000

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 16 (0010)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 551E

MIC: C9776D5C

Decrypted FRMPayload: 0005

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 3/3.

Hide

TD_LORAWAN_FUN_03: Step information

Completed Step: S1CountCheckFCntUp

Next step: S1CountCheckFCntUp

Received from DUT:

tmst: 888754196, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800F00E0F07952152E75 (Size: 15 bytes)

PHY payload:

4001010101800F00E0F07952152E75

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800F00E0F079

MAC payload information

FHDR: 01010101800F00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 15 (000F)

---FOpts: None

FPort: 224

Encrypted FRMPayload: F079

=====

MIC: 52152E75

=====

Decrypted FRMPayload: 0005

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 2/3.

Hide

TD_LORAWAN_FUN_03: Step information

Completed Step: S1CountCheckFCntUp

Next step: S1CountCheckFCntUp

Received from DUT:

tmst: 883754324, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101800E00E0016CEA0544E9 (Size: 15 bytes)

PHY payload:

4001010101800E00E0016CEA0544E9

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800E00E0016C

MAC payload information

FHDR: 01010101800E00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 14 (000E)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 016C

=====

MIC: EA0544E9

=====

Decrypted FRMPayload: 0005

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 1/3.

Hide

TEST CASE: td_lorawan_fun_03

Step 1: S1CountCheckFCntUp

Count TAOK messages with the current downlink counter of the session and check that the uplink frame counter is incremented.

- Reception from DUT: TAOK message with the downlink counter.

- TAS sends: None.

Test ID: TD_LoRaWAN_FUN_03

Objective: Check the handling of the uplink sequence number.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions: The DUT is in Test Mode.

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S8WaitPong

Next step: No next step.

Received from DUT:

tmst: 878754468, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101800D00E0BB32EDCB3C959A8C (Size: 17 bytes)

PHY payload:

4001010101800D00E0BB32EDCB3C959A8C

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800D00E0BB32EDCB

MAC payload information

FHDR: 01010101800D00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 13 (000D)

---FOpts: None

FPort: 224

Encrypted FRMPayload: BB32EDCB

=====

MIC: 3C959A8C

=====

Decrypted FRMPayload: 04D9DE23

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S7ActokToPingDelayMinus20

Next step: S8WaitPong

Received from DUT:

tmst: 873754612, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101800C00E0BC060C692DDA (Size: 15 bytes)

PHY payload:

4001010101800C00E0BC060C692DDA

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800C00E0BC06

MAC payload information

FHDR: 01010101800C00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 12 (000C)

---FOpts: None

FPort: 224

Encrypted FRMPayload: BC06

=====

MIC: 0C692DDA

=====

Decrypted FRMPayload: 0004

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 04D8DD22

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S6WaitPong

Next step: S7ActokToPingDelayMinus20

Received from DUT:

tmst: 868764988, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101800B00E0987A9C5960E654205EB990B7 (Size: 21 bytes)

PHY payload:

4001010101800B00E0987A9C5960E654205EB990B7

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800B00E0987A9C5960E65420

MAC payload information

FHDR: 01010101800B00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 11 (000B)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 987A9C5960E65420

=====

MIC: 5EB990B7

=====

Decrypted FRMPayload: 044718B649A9A344

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S5ActokToPingDelay

Next step: S6WaitPong

Received from DUT:

tmst: 863754892, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101800A00E06DEBDA1D844C (Size: 15 bytes)

PHY payload:

4001010101800A00E06DEBDA1D844C

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800A00E06DEB

MAC payload information

FHDR: 01010101800A00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 10 (000A)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 6DEB

=====

MIC: DA1D844C

=====

Decrypted FRMPayload: 0003

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 044617B548A8A243

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S4WaitPong

Next step: S5ActokToPingDelay

Received from DUT:

tmst: 858755028, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101800900E0469FB480C0C3BE56A6 (Size: 18 bytes)

PHY payload:

4001010101800900E0469FB480C0C3BE56A6

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800900E0469FB480C0

MAC payload information

FHDR: 01010101800900

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 9 (0009)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 469FB480C0

=====

MIC: C3BE56A6

=====

Decrypted FRMPayload: 0427BCBFCD

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S3ActokToPingDelayPlus20

Next step: S4WaitPong

Received from DUT:

tmst: 853755172, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800800E00EDF60B25FFF (Size: 15 bytes)

PHY payload:

4001010101800800E00EDF60B25FFF

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800800E00EDF

MAC payload information

FHDR: 01010101800800

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 8 (0008)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 0EDF

=====

MIC: 60B25FFF

=====

Decrypted FRMPayload: 0002

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 0426BBBECC

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S2WaitPong

Next step: S3ActokToPingDelayPlus20

Received from DUT:

tmst: 848775780, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101800700E0B5BF4B3C6FBE9822BF7D6A10E2B4 (Size: 23 bytes)

PHY payload:

4001010101800700E0B5BF4B3C6FBE9822BF7D6A10E2B4

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800700E0B5BF4B3C6FBE9822BF7D

MAC payload information

FHDR: 01010101800700

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 7 (0007)

---FOpts: None

FPort: 224

Encrypted FRMPayload: B5BF4B3C6FBE9822BF7D

=====

MIC: 6A10E2B4

=====

Decrypted FRMPayload: 046BD5FD788492801A9C

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_02: Step information

Completed Step: S1ActokToPingDelayPlus20

Next step: S2WaitPong

Received from DUT:

tmst: 843755452, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800600E0F2B9EBE56D9D (Size: 15 bytes)

PHY payload:

4001010101800600E0F2B9EBE56D9D

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800600E0F2B9

MAC payload information

FHDR: 01010101800600

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 6 (0006)

---FOpts: None

FPort: 224

Encrypted FRMPayload: F2B9

=====

MIC: EBE56D9D

=====

Decrypted FRMPayload: 0001

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 046AD4FC7783917F199B

Hide

TEST CASE: td_lorawan_fun_02

Step 8: 8WaitPong

Checks the reception of the PONG message.

- Reception from DUT: PONG message.
- TAS sends: None.

Step 7: S7ActokToPingDelayMinus20

Waits and Activation Ok message with the current downlink counter of the session and after it's received a PING PONG exchange will be initiated, using RX2 with a timing error of -20 micro seconds.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message with a -20 micro seconds delay in RX2.

Step 6: 6WaitPong

Checks the reception of the PONG message.

- Reception from DUT: PONG message.
- TAS sends: None.

Step 5: S5ActokToPingDelayMinus20

Waits and Activation Ok message with the current downlink counter of the session and after it's received a PING PONG exchange will be initiated, using RX1 with a timing error of -20 micro seconds.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message with a -20 micro seconds delay in RX1.

Step 4: S4WaitPong

Checks the reception of the PONG message.

- Reception from DUT: PONG message.
- TAS sends: None.

Step 2: S3ActokToPingDelayPlus20

Waits and Activation Ok message with the current downlink counter of the session and after it's received a PING PONG exchange will be initiated, using RX2 with a timing error of +20 micro seconds.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message with a +20 micro seconds delay in RX2.

Step 2: S2WaitPong

Checks the reception of the PONG message.

- Reception from DUT: PONG message.
- TAS sends: None.

Step 1: S1ActokToPingDelayPlus20

Waits and Activation Ok message with the current downlink counter of the session and after it's received a PING PONG exchange will be initiated, using RX1 with a timing error of +20 micro seconds.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message with a +20 micro seconds delay in RX1.

Test ID: TD_LoRaWAN_FUN_02

Objective: Test the node's tolerance to timing errors in the download reception windows. Verifies that downlink messages with +/- 20us in RX1 and RX2 are correctly received.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions: The DUT is in Test Mode and supports Over The Air Activation (OTAA).

Hide

TD_LORAWAN_FUN_01: Step information

Completed Step: S3CountFinalStep

Next step: S3CountFinalStep

Received from DUT:

tmst: 838755588, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101800500E0A0DCE800BF55 (Size: 15 bytes)

PHY payload:

4001010101800500E0A0DCE800BF55

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800500E0A0DC

MAC payload information

FHDR: 01010101800500

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 5 (0005)

---FOpts: None

FPort: 224

Encrypted FRMPayload: A0DC

=====

MIC: E800BF55

=====

Decrypted FRMPayload: 0001

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 2/2.

Hide

TD_LORAWAN_FUN_01: Step information

Completed Step: S3CountFinalStep

Next step: S3CountFinalStep

Received from DUT:

tmst: 833755732, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800400E0000095DAC741 (Size: 15 bytes)

PHY payload:

4001010101800400E0000095DAC741

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800400E00000

MAC payload information

FHDR: 01010101800400

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 4 (0004)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 0000

=====

MIC: 95DAC741

=====

Decrypted FRMPayload: 0001

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received 1/2.

Hide

TD_LORAWAN_FUN_01: Step information

Completed Step: S2ProcessPong

Next step: S3CountFinalStep

Received from DUT:

tmst: 828786588, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800300E04E0DDF0175D304020581F2AEB414E53F28874F (Size: 28 bytes)

PHY payload:

4001010101800300E04E0DDF0175D304020581F2AEB414E53F28874F

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800300E04E0DDF0175D304020581F2AEB414E5

MAC payload information

FHDR: 01010101800300

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 3 (0003)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 4E0DDF0175D304020581F2AEB414E5

MIC: 3F28874F

Decrypted FRMPayload: 0451430FD2D027390009977951A6D7

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_FUN_01: Step information

Completed Step: S1ActokToPing

Next step: S2ProcessPong

Received from DUT:

tmst: 823756020, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800200E0E0C27B735131 (Size: 15 bytes)

PHY payload:

4001010101800200E0E0C27B735131

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800200E0E0C2

MAC payload information

FHDR: 01010101800200

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 2 (0002)

---FOpts: None

FPort: 224

Encrypted FRMPayload: E0C2

=====

MIC: 7B735131

=====

Decrypted FRMPayload: 0000

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 0450420ED1CF2638FF08967850A5D6

Hide

TEST CASE: td_lorawan_fun_01

Step 3: S3CountFinalStep.

Count a predefined amount (2) of TAOK messages.

- Reception from DUT: TAOK message with the downlink counter.

- TAS sends: None.

Step 2: S2ProcessPong

After the PONG message is received, a count is started.

- Reception from DUT: PONG message.

- TAS sends: None.

Step 1: S1ActokToPing

Waits for a TAOK (Activation Ok) message with the current downlink counter of the session and after it's received a PING PONG exchange will be initiated.

- Reception from DUT: TAOK message with the downlink counter.

- TAS sends: PING message.

Test ID: TD_LoRaWAN_FUN_01

Objective: Basic test application functionality with a message exchange. Initiates a PING PONG echo exchange and verifies the TAOK downlink counter.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions: The DUT has an active session with the TAS and is in Test Mode.

Hide

TD_LORAWAN_ACT_01: Step information

Completed Step: S2ActokFinalStep

Next step: No next step.

Received from DUT:

tmst: 818756148, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101800100E0FD51D4B7BBEA (Size: 15 bytes)

PHY payload:

4001010101800100E0FD51D4B7BBEA

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800100E0FD51

MAC payload information

FHDR: 01010101800100

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 1 (0001)

---FOpts: None

FPort: 224

Encrypted FRMPayload: FD51

=====

MIC: D4B7BBEA

=====

Decrypted FRMPayload: 0000

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_ACT_01: Step information

Completed Step: S1DataToActivate

Next step: S2ActokFinalStep

Received from DUT:

tmst: 817549596, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101000000164A3BB6E8FA72BBC111A6E183DC041807843AFEE1 (Size: 29 bytes)

PHY payload:

4001010101000000164A3BB6E8FA72BBC111A6E183DC041807843AFEE1

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101000000164A3BB6E8FA72BBC111A6E183DC041807

MAC payload information

FHDR: 01010101000000

---DevAddr: 01010101

---FCtrl: 00000000

-----ADR: 0

-----ACK: 0

-----ADRACKReq (Only for UL): 0

-----FPending (Only for DL): None

-----FOptsLen: 0

---FCnt: 0 (0000)

---FOpts: None

FPort: 22

Encrypted FRMPayload: 4A3BB6E8FA72BBC111A6E183DC041807

=====

MIC: 843AFEE1

=====

Decrypted FRMPayload: 00000000000000FE3E090D0503AB0000

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 01010101

Hide

TEST CASE: td_lorawan_act_01

Step 2: S2ActokFinalStep

The test is expecting a Test Activation Ok message with the current downlink counter

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: none

Step 1: S1DataToActivate

Wait any data from the DUT to activate Test Mode.

- Reception from DUT: DATA packet.
- TAS sends: Test Mode activation message to the DUT (DL packet with payload 0x01010101 sent to port 224). The payload is encrypted with the AppSKey.

Test ID: TD_LoRaWAN_ACT_01

Objective: Check that the node can join using ABP and enter Test Mode Activation.

References: LoRaWAN Specification v1.0.2.

Pre-test conditions:

The end device has a pre-configured DevAddr, NwkSKey and AppSKey.

The Test Application Server has the end device registered in its device list

and knows its NwkSkey, AppSKey and DevAddr.

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Device Personalization Information.

DevAddr: ('01010101',) DevEUI: ('0101010101010101',) AppKey: ('2B7E151628AED2A6ABF7158809CF4F3C',) AppSKey: ('FF7E151628AED2A6ABF7158809CF4F3C',) NwkSKey: 007E151628AED2A6ABF7158809CF4F3C

Hide

Test Cases to be executed.

TCs list: td_lorawan_act_01 td_lorawan_fun_01 td_lorawan_fun_02 td_lorawan_fun_03 td_lorawan_fun_04 td_lorawan_fun_05 td_lorawan_fun_06 td_lorawan_deactivate

Hide

Agent configuration tutorial.

1-Configure the Packet Forwarder on the LoRa Gateway.: e.g. Agent UDP port (default 1700) and the host IP on gateway's local.conf file

2-Set AMQP Broker URL: e.g.: export AMQP_URL=amqp://guest:guest@localhost:5672/

3-Set Packet Forwarder UDP PORT (LoRa Gateway UDP Port): e.g.: export AGENT_PORT=1700

4-Start Agent Service: make start_agent

Hide