

<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>ACT_04</div><div>ACT_05</div><div>FUN_01</div><div>FUN_02</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\_act\_02 PASS

td\_lorawan\_act\_03 PASS

td\_lorawan\_act\_04 PASS

td\_lorawan\_act\_05 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: 505332964, freq: 868.5, DR: SF8BW125

PHYPayload: 40538C5B88800400E061B2AD01B7F3 (Size: 15 bytes)

-----

PHY payload:

40538C5B88800400E061B2AD01B7F3

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 538C5B88800400E061B2

-----

MAC payload information

FHDR: 538C5B88800400

---DevAddr: 885B8C53

---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: 61B2

=====

MIC: AD01B7F3

=====

Decrypted FRMPayload: 0002

(Key 0EE2D899F88B481C0B3A36BE0311C0AB)

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\_ACT\_05: Step information

Completed Step: S6PongFinalStep

Next step: No next step.

Received from DUT:

tmst: 500333108, freq: 868.1, DR: SF8BW125

PHYPayload: 40538C5B88800300E061C824DEC838 (Size: 15 bytes)

-----

PHY payload:

40538C5B88800300E061C824DEC838

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 538C5B88800300E061C8

-----

MAC payload information

FHDR: 538C5B88800300

---DevAddr: 885B8C53

---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: 61C8

=====

MIC: 24DEC838

=====

Decrypted FRMPayload: 040C

(Key 0EE2D899F88B481C0B3A36BE0311C0AB)

Hide

TD\_LORAWAN\_ACT\_05: Step information

Completed Step: S5PongToPing

Next step: S6PongFinalStep

Received from DUT:

tmst: 495333244, freq: 868.5, DR: SF8BW125

PHYPayload: 40538C5B88800200E0113112425B02E7F26F (Size: 18 bytes)

-----

PHY payload:

40538C5B88800200E0113112425B02E7F26F

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 538C5B88800200E0113112425B

-----

MAC payload information

FHDR: 538C5B88800200

---DevAddr: 885B8C53

---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: 113112425B

MIC: 02E7F26F

Decrypted FRMPayload: 04BEFD778C

(Key 0EE2D899F88B481C0B3A36BE0311C0AB)

Sending to DUT: 040B

Hide

TD\_LORAWAN\_ACT\_05: Step information

Completed Step: S4ActokToPing

Next step: S5PongToPing

Received from DUT:

tmst: 490333388, freq: 868.3, DR: SF8BW125

PHYPayload: 40538C5B88800100E06109516E20AF (Size: 15 bytes)

PHY payload:

40538C5B88800100E06109516E20AF

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 538C5B88800100E06109

MAC payload information

FHDR: 538C5B88800100

---DevAddr: 885B8C53

---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: 6109

MIC: 516E20AF

=====

Decrypted FRMPayload: 0000

(Key 0EE2D899F88B481C0B3A36BE0311C0AB)

Sending to DUT: 04BDFC768B

Hide

TD\_LORAWAN\_ACT\_05: Step information

Completed Step: S3DataToActivate

Next step: S4ActokToPing

Received from DUT:

tmst: 487039004, freq: 868.1, DR: SF8BW125

PHYPayload: 40538C5B88000000166DAA89D3BE41229A45D0AFC0D41E6FC912393F06 (Size: 29 bytes)

-----

PHY payload:

40538C5B88000000166DAA89D3BE41229A45D0AFC0D41E6FC912393F06

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 538C5B88000000166DAA89D3BE41229A45D0AFC0D41E6FC9

-----

MAC payload information

FHDR: 538C5B88000000

---DevAddr: 885B8C53

---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: 6DAA89D3BE41229A45D0AFC0D41E6FC9

=====

MIC: 12393F06

=====

Decrypted FRMPayload: 00000000000000FE3E090D0503AB0000

(Key 0EE2D899F88B481C0B3A36BE0311C0AB)

Sending to DUT: 01010101

Hide

TD\_LORAWAN\_ACT\_05: Step information

Completed Step: S2JoinrequestToAccept

Next step: S3DataToActivate

Received from DUT:

tmst: 476515380, freq: 868.5, DR: SF8BW125

PHYPayload: 000101010101010101010101010101017C18595A3EEE (Size: 23 bytes)

PHY payload:

000101010101010101010101010101017C18595A3EEE

MHDR bits: 00000000 (JOIN\_REQUEST)

MACPayload: 010101010101010101010101010101017C18

Join Request information

AppEUI: 0101010101010101

DevEUI: 0101010101010101

DevNonce: 187C

MIC: 595A3EEE

Sending to DUT: 20CA5C1054A97B6B104088955166175F34C3311AA10F0EC8273C299EDD9BA7F6B1

Additional information: Session Updated. DevAddr: 885B8C53 DevEUI: 0101010101010101 AppSKey: 0EE2D899F88B481C0B3A36BE0311C0AB NwkSKey: 96C25D08EE1D97364163584C5EBD238C AppKey: 2B7E151628AED2A6ABF7158809CF4F3C

Hide

TD\_LORAWAN\_ACT\_05: Step information

Completed Step: S1ActokToTriggerJoin

Next step: S2JoinrequestToAccept

Received from DUT:

tmst: 475263500, freq: 867.3, DR: SF8BW125

PHYPayload: 401E8D9278801D00E09AE73E04A1A3 (Size: 15 bytes)

PHY payload:

401E8D9278801D00E09AE73E04A1A3

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 1E8D9278801D00E09AE7

MAC payload information

FHDR: 1E8D9278801D00

---DevAddr: 78928D1E

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 29 (001D)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 9AE7

=====

MIC: 3E04A1A3

=====

Decrypted FRMPayload: E613

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 06

Hide

TEST CASE: td\_lorawan\_act\_05

Step 6: S6PongFinalStep

Checks the last PONG.

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

Step 5: S5PongToPing

Waits for the PONG message and sends another PING, now using RX2.

- Reception from DUT: PONG message.
- TAS sends: PING message using RX2.

Step 4: S4ActokToPing

After receiving an Activation OK message with the current downlink counter, a PING message will be sent.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message in RX1.

Step 3: S3DataToActivate

A data message is expected, and the Test Mode will be activated after its reception

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

Step 2: S2JoinRequestToAccept

Waits for a join request message. A Join Accept will be sent in response with the default configuration.

- Reception from DUT: Join Request message.

- TAS sends: Join Accept message.

Step 1: S1ActokToTriggerJoin

Waits and Activation Ok message with the current downlink counter of the session and, after it's received, a new session will be requested.

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

- TAS sends: Trigger join request with test ID 6.

Test ID: TD\_LoRaWAN\_ACT\_05

Objective: Uses Join-accept message to initiate a new session restoring the default LoRaWAN MAC parameters.

References: LoRaWAN Specification v1.0.2.

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

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TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.1.

({868.1: 4, 868.3: 2, 868.5: 4, 867.1: 1, 867.3: 4, 867.5: 6, 867.7: 3, 867.9: 4})

Count 28 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 4, 868.3: 2, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 6, 867.7: 3, 867.9: 4})

Count 27 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 4, 868.3: 2, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 5, 867.7: 3, 867.9: 4})

Count 26 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies



Received from DUT:

Received:867.9.

(({868.1: 4, 868.3: 2, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 4, 867.7: 3, 867.9: 4}))

Count 25 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.9.

(({868.1: 4, 868.3: 2, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 4, 867.7: 3, 867.9: 3}))

Count 24 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.3.

(({868.1: 4, 868.3: 2, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 4, 867.7: 3, 867.9: 2}))

Count 23 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.1.

(({868.1: 4, 868.3: 1, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 4, 867.7: 3, 867.9: 2}))

Count 22 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.3.

(({868.1: 3, 868.3: 1, 868.5: 4, 867.1: 0, 867.3: 4, 867.5: 4, 867.7: 3, 867.9: 2}))

Count 21 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.5.

({868.1: 3, 868.3: 1, 868.5: 4, 867.1: 0, 867.3: 3, 867.5: 4, 867.7: 3, 867.9: 2})

Count 20 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 3, 868.3: 1, 868.5: 3, 867.1: 0, 867.3: 3, 867.5: 4, 867.7: 3, 867.9: 2})

Count 19 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 3, 868.3: 1, 868.5: 3, 867.1: 0, 867.3: 3, 867.5: 3, 867.7: 3, 867.9: 2})

Count 18 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.9.

({868.1: 3, 868.3: 1, 868.5: 3, 867.1: 0, 867.3: 3, 867.5: 2, 867.7: 3, 867.9: 2})

Count 17 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.7.

(({868.1: 3, 868.3: 1, 868.5: 3, 867.1: 0, 867.3: 3, 867.5: 2, 867.7: 3, 867.9: 1}))

Count 16 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.5.

(({868.1: 3, 868.3: 1, 868.5: 3, 867.1: 0, 867.3: 3, 867.5: 2, 867.7: 2, 867.9: 1}))

Count 15 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.1.

(({868.1: 3, 868.3: 1, 868.5: 2, 867.1: 0, 867.3: 3, 867.5: 2, 867.7: 2, 867.9: 1}))

Count 14 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.3.

(({868.1: 2, 868.3: 1, 868.5: 2, 867.1: 0, 867.3: 3, 867.5: 2, 867.7: 2, 867.9: 1}))

Count 13 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.5.

(({868.1: 2, 868.3: 1, 868.5: 2, 867.1: 0, 867.3: 2, 867.5: 2, 867.7: 2, 867.9: 1}))

Count 12 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.7.

({868.1: 2, 868.3: 1, 868.5: 1, 867.1: 0, 867.3: 2, 867.5: 2, 867.7: 2, 867.9: 1})

Count 11 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.3.

({868.1: 2, 868.3: 1, 868.5: 1, 867.1: 0, 867.3: 2, 867.5: 2, 867.7: 1, 867.9: 1})

Count 10 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.9.

({868.1: 2, 868.3: 1, 868.5: 1, 867.1: 0, 867.3: 1, 867.5: 2, 867.7: 1, 867.9: 1})

Count 9 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.7.

({868.1: 2, 868.3: 1, 868.5: 1, 867.1: 0, 867.3: 1, 867.5: 2, 867.7: 1, 867.9: 0})

Count 8 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.3.

({868.1: 2, 868.3: 1, 868.5: 1, 867.1: 0, 867.3: 1, 867.5: 2, 867.7: 0, 867.9: 0})

Count 7 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.1.

({868.1: 2, 868.3: 0, 868.5: 1, 867.1: 0, 867.3: 1, 867.5: 2, 867.7: 0, 867.9: 0})

Count 6 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.3.

({868.1: 1, 868.3: 0, 868.5: 1, 867.1: 0, 867.3: 1, 867.5: 2, 867.7: 0, 867.9: 0})

Count 5 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.5.

({868.1: 1, 868.3: 0, 868.5: 1, 867.1: 0, 867.3: 0, 867.5: 2, 867.7: 0, 867.9: 0})

Count 4 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 1, 868.3: 0, 868.5: 0, 867.1: 0, 867.3: 0, 867.5: 2, 867.7: 0, 867.9: 0})

Count 3 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 1, 868.3: 0, 868.5: 0, 867.1: 0, 867.3: 0, 867.5: 1, 867.7: 0, 867.9: 0})

Count 2 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S4VerifyFrequencies

Next step: S4VerifyFrequencies

Received from DUT:

Received:868.1.

({868.1: 1, 868.3: 0, 868.5: 0, 867.1: 0, 867.3: 0, 867.5: 0, 867.7: 0, 867.9: 0})

Count 1 of 40 limit.

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S3DataToActivate

Next step: S4VerifyFrequencies

Received from DUT:

tmst: 331973044, freq: 867.9, DR: SF8BW125

PHYPayload: 401E8D927800000016E486230592AD3363AD97CEC1F367951C2E05D1DB (Size: 29 bytes)

PHY payload:

401E8D927800000016E486230592AD3363AD97CEC1F367951C2E05D1DB

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: 1E8D927800000016E486230592AD3363AD97CEC1F367951C

MAC payload information

FHDR: 1E8D9278000000

---DevAddr: 78928D1E

---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: E486230592AD3363AD97CEC1F367951C

=====

MIC: 2E05D1DB

=====

Decrypted FRMPayload: 00000000000000FE3E090D0503AB0000

(Key EEDB17AC1D5A1ED4BA501F876613FB8B)

Sending to DUT: 01010101

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S2JoinrequestToAccept

Next step: S3DataToActivate

Received from DUT:

tmst: 325494220, freq: 868.3, DR: SF8BW125

PHYPayload: 0001010101010101010101010101010101A8AA60D40EC5 (Size: 23 bytes)

-----

PHY payload:

0001010101010101010101010101010101A8AA60D40EC5

MHDR bits: 00000000 (JOIN\_REQUEST)

MACPayload: 01010101010101010101010101010101A8AA

-----

Join Request information

AppEUI: 0101010101010101

DevEUI: 0101010101010101

DevNonce: AAA8

=====

MIC: 60D40EC5

=====

Sending to DUT: 208C939ADE6717C7451AF0AD55F407A069625658A2E0FDE7A75C8097FCE26EEED7

Additional information: Session Updated. DevAddr: 78928D1E DevEUI: 0101010101010101 AppSKey: EEDB17AC1D5A1ED4BA501F876613FB8B NwksKey: E3D1D19AC2BF7BFF7FD8630C81D4AAE4 AppKey: 2B7E151628AED2A6ABF7158809CF4F3C

Hide

TD\_LORAWAN\_ACT\_04: Step information

Completed Step: S1ActokToTriggerJoin

Next step: S2JoinrequestToAccept

Received from DUT:

tmst: 322241412, freq: 868.3, DR: SF8BW125

PHYPayload: 40F46B6110800400E0018F4EBE75C5 (Size: 15 bytes)

-----

PHY payload:

40F46B6110800400E0018F4EBE75C5

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: F46B6110800400E0018F

MAC payload information

FHDR: F46B6110800400

---DevAddr: 10616BF4

---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: 018F

MIC: 4EBE75C5

Decrypted FRMPayload: E3A9

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 06

Hide

TEST CASE: td\_lorawan\_act\_04

Step 4: S4VerifyFrequencies

The test stays in this step and verifies that all the frequencies are being used.

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

Step 3: S3DataToActivate

A data message is expected, and the Test Mode will be activated after its reception.

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

Step 2: S2JoinRequestToAccept

Waits for a join request message. A Join Accept will be sent in response configuring new channels (using CFList).

- Reception from DUT: Join Request message.
- TAS sends: Join Accept message configuring CFList to add new channels.



Step 1: S1ActokToTriggerJoin

Waits and Activation Ok message with the current downlink counter ofthe session and, after it's received, a new session will be requested

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

- TAS sends: Trigger join request with test ID 6.

Test ID: TD\_LoRaWAN\_ACT\_04

Objective: Test Over the Air Activation configuring 5 new channels.

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\_ACT\_03: Step information

Completed Step: S6PongFinalStep

Next step: No next step.

Received from DUT:

tmst: 312262172, freq: 868.3, DR: SF8BW125

PHYPayload: 40F46B6110800300E06F09F64F459A14C223E9EEF236D84A4178 (Size: 26 bytes)

-----

PHY payload:

40F46B6110800300E06F09F64F459A14C223E9EEF236D84A4178

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: F46B6110800300E06F09F64F459A14C223E9EEF236

-----

MAC payload information

FHDR: F46B6110800300

---DevAddr: 10616BF4

---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: 6F09F64F459A14C223E9EEF236

=====

MIC: D84A4178

=====

Decrypted FRMPayload: 046FED35AF0A1FA77D3D8F5E78

(Key 61BA27975F234126F4330613A93AE3B3)

Hide

TD\_LORAWAN\_ACT\_03: Step information

Completed Step: S5PongToPing

Next step: S6PongFinalStep

Received from DUT:

tmst: 302262452, freq: 868.1, DR: SF8BW125

PHYPayload: 40F46B6110800200E05773B0F9D2BCE7552EC3E72813AFAFA24D (Size: 26 bytes)

-----

PHY payload:

40F46B6110800200E05773B0F9D2BCE7552EC3E72813AFAFA24D

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: F46B6110800200E05773B0F9D2BCE7552EC3E72813

-----

MAC payload information

FHDR: F46B6110800200

---DevAddr: 10616BF4

---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: 5773B0F9D2BCE7552EC3E72813

=====

MIC: AFAFA24D

=====

Decrypted FRMPayload: 041FB0AD4A166BF7C43C9F6814

(Key 61BA27975F234126F4330613A93AE3B3)

Sending to DUT: 046EEC34AE091EA67C3C8E5D77

Hide

TD\_LORAWAN\_ACT\_03: Step information

Completed Step: S4ActokToPing

Next step: S5PongToPing

Received from DUT:

tmst: 297242108, freq: 868.3, DR: SF8BW125

PHYPayload: 40F46B6110800100E06861E9B73F54 (Size: 15 bytes)

PHY payload:

40F46B6110800100E06861E9B73F54

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: F46B6110800100E06861

MAC payload information

FHDR: F46B6110800100

---DevAddr: 10616BF4

---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: 6861

MIC: E9B73F54

Decrypted FRMPayload: 0000

(Key 61BA27975F234126F4330613A93AE3B3)

Sending to DUT: 041EAFAC49156AF6C33B9E6713

Hide

TD\_LORAWAN\_ACT\_03: Step information

Completed Step: S3DataToActivate

Next step: S4ActokToPing

Received from DUT:

tmst: 291946812, freq: 868.1, DR: SF8BW125

PHYPayload: 40F46B611000000016D32954CE3373935882C4EA91FDC8BA8EAE4C847C (Size: 29 bytes)

PHY payload:

40F46B611000000016D32954CE3373935882C4EA91FDC8BA8EAE4C847C

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: F46B611000000016D32954CE3373935882C4EA91FDC8BA8E

-----

MAC payload information

FHDR: F46B6110000000

---DevAddr: 10616BF4

---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: D32954CE3373935882C4EA91FDC8BA8E

=====

MIC: AE4C847C

=====

Decrypted FRMPayload: 00000000000000FE3E090D0503AB0000

(Key 61BA27975F234126F4330613A93AE3B3)

Sending to DUT: 01010101

Hide

TD\_LORAWAN\_ACT\_03: Step information

Completed Step: S2JoinrequestToAccept

Next step: S3DataToActivate

Received from DUT:

tmst: 284837156, freq: 868.5, DR: SF8BW125

PHYPayload: 000101010101010101010101010101010195B21F29F43B (Size: 23 bytes)

-----

PHY payload:

000101010101010101010101010101010195B21F29F43B

MHDR bits: 00000000 (JOIN\_REQUEST)

MACPayload: 010101010101010101010101010101010195B2

-----

Join Request information

AppEUI: 0101010101010101

DevEUI: 0101010101010101

DevNonce: B295

=====

MIC: 1F29F43B

=====

Sending to DUT: 209A51F68A0C7C5665F027F054EDDCB0572A225F5C72B4B5B420F705F8C536AD14

Additional information: Session Updated. DevAddr: 10616BF4 DevEUI: 0101010101010101 AppSKey: 61BA27975F234126F4330613A93AE3B3 NwkSKey: 53BD806D9B31FFF66E54233C5C24E42E AppKey: 2B7E151628AED2A6ABF7158809CF4F3C

Hide

TD\_LORAWAN\_ACT\_03: Step information

Completed Step: S1ActokToTriggerJoin

Next step: S2JoinrequestToAccept

Received from DUT:

tmst: 283373364, freq: 868.5, DR: SF8BW125

PHYPayload: 40DE8D6845800400E05D950ECC0DCE (Size: 15 bytes)

-----

PHY payload:

40DE8D6845800400E05D950ECC0DCE

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: DE8D6845800400E05D95

-----

MAC payload information

FHDR: DE8D6845800400

---DevAddr: 45688DDE

---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: 5D95

=====

MIC: 0ECC0DCE

=====

Decrypted FRMPayload: A82A

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Sending to DUT: 06

Hide

TEST CASE: td\_lorawan\_act\_03

Step 6: S6PongFinalStep

Checks the last PONG.

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

Step 5: S5PongToPing

Waits for the PONG message and sends another PING, now using RX2.

- Reception from DUT: PONG message.
- TAS sends: PING message using RX2.

Step 4: S4ActokToPing

After receiving an TAOK message with the current downlink counter, a PING message will be sent.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message in RX1 with the configured 3 seconds delay.

Step 3: S3DataToActivate

A data message is expected, and the Test Mode will be activated after its reception.-

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

Step 2: S2JoinRequestToAccept

Waits for a join request message. A Join Accept will be sent in response configuring RxDelay=3s.

- Reception from DUT: Join Request message.
- TAS sends: Join Accept message configuring RXDalay=3s.

Step 1: S1ActokToTriggerJoin

Waits for a TAOK (Activation Ok) message with the current downlink counter of the session and, after it's received, a new session will be requested.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: Trigger join request with test ID 6.

Test ID: TD\_LoRaWAN\_ACT\_03

Objective: Test Over the Air Activation modifying the RX windows delay. Check that the node can join using OTAA in RX1 and RX2.

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\_ACT\_02: Step information

Completed Step: S6PongFinalStep

Next step: No next step.

Received from DUT:

tmst: 278404220, freq: 868.3, DR: SF8BW125

PHYPayload: 40DE8D6845800300E0869DBA2A734C34585A435C09C5A0D4CE4E0C52C010 (Size: 30 bytes)

-----

PHY payload:

40DE8D6845800300E0869DBA2A734C34585A435C09C5A0D4CE4E0C52C010

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: DE8D6845800300E0869DBA2A734C34585A435C09C5A0D4CE4E

-----

MAC payload information

FHDR: DE8D6845800300

---DevAddr: 45688DDE

---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: 869DBA2A734C34585A435C09C5A0D4CE4E

=====

MIC: 0C52C010

=====

Decrypted FRMPayload: 042C5EB622C13F387AE85AD901F4A0B86B

(Key D6BDB9F0E13C11C8B1F62C81B0118BD4)

Hide

TD\_LORAWAN\_ACT\_02: Step information

Completed Step: S5PongToPing

Next step: S6PongFinalStep

Received from DUT:

tmst: 273394124, freq: 868.1, DR: SF8BW125

PHYPayload: 40DE8D6845800200E09DB66D48402E2E83FE2CA862EAA0BB (Size: 24 bytes)

-----

PHY payload:

40DE8D6845800200E09DB66D48402E2E83FE2CA862EAA0BB

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: DE8D6845800200E09DB66D48402E2E83FE2CA8

-----

MAC payload information

FHDR: DE8D6845800200

---DevAddr: 45688DDE

---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: 9DB66D48402E2E83FE2CA8

=====

MIC: 62EAA0BB

=====

Decrypted FRMPayload: 042515151B248635FA3781

(Key D6BDB9F0E13C11C8B1F62C81B0118BD4)

Sending to DUT: 042B5DB521C03E3779E759D800F39FB76A

Hide

TD\_LORAWAN\_ACT\_02: Step information

Completed Step: S4ActokToPing

Next step: S5PongToPing

Received from DUT:

tmst: 268373780, freq: 868.3, DR: SF8BW125

PHYPayload: 40DE8D6845800100E03A10A55CBCD6 (Size: 15 bytes)

-----

PHY payload:

40DE8D6845800100E03A10A55CBCD6

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: DE8D6845800100E03A10

-----

MAC payload information

FHDR: DE8D6845800100

---DevAddr: 45688DDE

---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: 3A10

=====

MIC: A55CBCD6

=====

Decrypted FRMPayload: 0000

(Key D6BDB9F0E13C11C8B1F62C81B0118BD4)

Sending to DUT: 042414141A238534F93680

Hide

TD\_LORAWAN\_ACT\_02: Step information

Completed Step: S3DataToActivate

Next step: S4ActokToPing

Received from DUT:

tmst: 266926028, freq: 868.1, DR: SF8BW125

PHYPayload: 40DE8D684500000016BA33AEF3E65FE010D527B400D86D9EF0890D29D3 (Size: 29 bytes)

-----

PHY payload:

40DE8D684500000016BA33AEF3E65FE010D527B400D86D9EF0890D29D3

MHDR bits: 01000000 (UNCONFIRMED\_UP)

MACPayload: DE8D684500000016BA33AEF3E65FE010D527B400D86D9EF0

-----

MAC payload information

FHDR: DE8D6845000000

---DevAddr: 45688DDE

---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: BA33AEF3E65FE010D527B400D86D9EF0

=====

MIC: 890D29D3

=====

Decrypted FRMPayload: 00000000000000FE3E090D0503AB0000

(Key D6BDB9F0E13C11C8B1F62C81B0118BD4)

Sending to DUT: 01010101

Hide

TD\_LORAWAN\_ACT\_02: Step information

Completed Step: S2JoinRequestToAccept

Next step: S3DataToActivate

Received from DUT:

tmst: 259367172, freq: 868.3, DR: SF8BW125

PHYPayload: 00010101010101010101010101010101014619658BABBE (Size: 23 bytes)

-----

PHY payload:

00010101010101010101010101010101014619658BABBE

MHDR bits: 00000000 (JOIN\_REQUEST)

MACPayload: 01010101010101010101010101010101014619

-----

Join Request information

AppEUI: 0101010101010101

DevEUI: 0101010101010101

DevNonce: 1946

=====

MIC: 658BABBE

=====

Sending to DUT: 20CFEC1837822CBC93583F76F2C1CE6C8A88C7EB5B064A7A79273DFD87C16FF7B6

Additional information: Session Updated. DevAddr: 45688DDE DevEUI: 0101010101010101 AppSKey: D6BDB9F0E13C11C8B1F62C81B0118BD4 NwksKey: DBD5B5D75E9D94A7A5DCBA79824D9F98 AppKey: 2B7E151628AED2A6ABF7158809CF4F3C

Hide

TD\_LORAWAN\_ACT\_02: Step information

Completed Step: S1ActokToTriggerJoin

Next step: S2JoinRequestToAccept

Received from DUT:

tmst: 258115276, 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: 06

Hide

TEST CASE: td\_lorawan\_act\_02

Step 6: S6PongFinalStep

Checks the last PONG.

- Reception from DUT: PONG message.

- TAS sends: none.

Step 5: S5PongToPing

Waits for the PONG message and sends another PING, now using RX2.

- Reception from DUT: PONG message.

- TAS sends: PING message using RX2.

Step 4: S4ActokToPing

After receiving an TAOK (Activation OK) message with the current downlink counter, a PING message will be sent.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: PING message in RX1 using a DR offset of 2.

Step 3: S3DataToActivate

A data message is expected, and the Test Mode will be activated after its reception.

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

Step 2: S2JoinRequestToAccept

Updates the session information of the device.

- Reception from DUT: Join Request message.
- TAS sends: Join Accept message configuring DLSettings (RX1DRoffset=2 and RX2DR=3).

Step 1: S1ActokToTriggerJoin

Waits a TAOK (Activation Ok) message with the current downlink counter ofthe session and, after it's received, a new session request will be triggered.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: Trigger join request with Test ID 6.

Test ID: TD\_LoRaWAN\_ACT\_02

Objective: Test Over the Air Activation, changing DR of RX windows. Check that the node can join using OTAA in RX1 and RX2.

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\_ACT\_01: Step information

Completed Step: S2ActokFinalStep

Next step: No next step.

Received from DUT:

tmst: 253115412, freq: 868.3, 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: 251908868, 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.

Hide

Device Personalization Information.

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

Hide

Test Cases to be excecuted.

TCs list: td\_lorawan\_act\_01 td\_lorawan\_act\_02 td\_lorawan\_act\_03 td\_lorawan\_act\_04 td\_lorawan\_act\_05 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