

<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>MAC_01</div><div>MAC_02</div><div>MAC_03</div><div>MAC_04</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_mac_01 PASS

td_lorawan_mac_02 PASS

td_lorawan_mac_03 PASS

td_lorawan_mac_04 PASS

td_lorawan_mac_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: 722583348, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101802700E0C44532D53FBB (Size: 15 bytes)

PHY payload:

4001010101802700E0C44532D53FBB

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802700E0C445

MAC payload information

FHDR: 01010101802700

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 39 (0027)

---FOpts: None

FPort: 224

Encrypted FRMPayload: C445

=====

MIC: 32D53FBB

=====

Decrypted FRMPayload: 0007

(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_MAC_05: Step information

Completed Step: S7ActokFinalStep

Next step: No next step.

Received from DUT:

tmst: 717583484, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101802600E01689E14335D6 (Size: 15 bytes)

PHY payload:

4001010101802600E01689E14335D6

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802600E01689

MAC payload information

FHDR: 01010101802600

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 38 (0026)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 1689

=====

MIC: E14335D6

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 712583620, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101802500E03D15BD03BC54 (Size: 15 bytes)

PHY payload:

4001010101802500E03D15BD03BC54

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802500E03D15

MAC payload information

FHDR: 01010101802500

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 37 (0025)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 3D15

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MIC: BD03BC54

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.3. Forbidden: ([867.5]) Count 9 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 707583756, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101802400E0DB950BC8333B (Size: 15 bytes)

PHY payload:

4001010101802400E0DB950BC8333B

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802400E0DB95

MAC payload information

FHDR: 01010101802400

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 36 (0024)

---FOpts: None

FPort: 224

Encrypted FRMPayload: DB95

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MIC: 0BC8333B

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.5. Forbidden: ([867.5]) Count 8 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 702583900, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101802300E0A7085AF972DF (Size: 15 bytes)

PHY payload:

4001010101802300E0A7085AF972DF

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802300E0A708

MAC payload information

FHDR: 01010101802300

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 35 (0023)

---FOpts: None

FPort: 224

Encrypted FRMPayload: A708

=====

MIC: 5AF972DF

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.1. Forbidden: ([867.5]) Count 7 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 697584044, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101802200E084511174C017 (Size: 15 bytes)

PHY payload:

4001010101802200E084511174C017

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802200E08451

MAC payload information

FHDR: 01010101802200

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 34 (0022)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 8451

=====

MIC: 1174C017

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.1. Forbidden: ([867.5]) Count 6 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 692584180, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101802100E05153A1010632 (Size: 15 bytes)

PHY payload:

4001010101802100E05153A1010632

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802100E05153

MAC payload information

FHDR: 01010101802100

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 33 (0021)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 5153

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MIC: A1010632

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.3. Forbidden: ([867.5]) Count 5 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 687584324, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101802000E0ACD5F41E7F0D (Size: 15 bytes)

PHY payload:

4001010101802000E0ACD5F41E7F0D

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101802000E0ACD5

MAC payload information

FHDR: 01010101802000

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 32 (0020)

---FOpts: None

FPort: 224

Encrypted FRMPayload: ACD5

=====

MIC: F41E7F0D

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.1. Forbidden: ([867.5]) Count 4 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 682584460, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801F00E055194F43399B (Size: 15 bytes)

PHY payload:

4001010101801F00E055194F43399B

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801F00E05519

MAC payload information

FHDR: 01010101801F00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 31 (001F)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 5519

=====

MIC: 4F43399B

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.3. Forbidden: ([867.5]) Count 3 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 677584596, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101801E00E0A4292BBF585E (Size: 15 bytes)

PHY payload:

4001010101801E00E0A4292BBF585E

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801E00E0A429

MAC payload information

FHDR: 01010101801E00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 30 (001E)

---FOpts: None

FPort: 224

Encrypted FRMPayload: A429

=====

MIC: 2BBF585E

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.5. Forbidden: ([867.5]) Count 2 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S6ForbiddenFrequencyCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 672584732, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101801D00E028C66AF905BA (Size: 15 bytes)

PHY payload:

4001010101801D00E028C66AF905BA

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801D00E028C6

MAC payload information

FHDR: 01010101801D00

---DevAddr: 01010101

---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: 28C6

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MIC: 6AF905BA

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Received:868.3. Forbidden: ([867.5]) Count 1 of 9 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S5NewChannelAnsAcceptCheck

Next step: S6ForbiddenFrequencyCheck

Received from DUT:

tmst: 667584884, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101A21C000703E0330EA137E4A5 (Size: 17 bytes)

PHY payload:

4001010101A21C000703E0330EA137E4A5

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A21C000703E0330E

MAC payload information

FHDR: 01010101A21C000703

---DevAddr: 01010101

---FCtrl: 10100010

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 2

---FCnt: 28 (001C)

---FOpts: 0703

FPort: 224

Encrypted FRMPayload: 330E

Piggybacked MAC commands:

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

MIC: A137E4A5

=====

Decrypted FRMPayload: 0007

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S4ActokToNewChannelReq_RemoveChannel

Next step: S5NewChannelAnsAcceptCheck

Received from DUT:

tmst: 662585012, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101801B00E0764DC4255551 (Size: 15 bytes)

PHY payload:

4001010101801B00E0764DC4255551

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801B00E0764D

MAC payload information

FHDR: 01010101801B00

---DevAddr: 01010101

---FCtrl: 10000000

-----ADR: 1

-----ACK: 0

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

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

-----FOptsLen: 0

---FCnt: 27 (001B)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 764D

=====

MIC: C4255551

=====

Decrypted FRMPayload: 0006

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Sending MAC Command: 0x070300000000 Piggybacked: False In FRMPayload: True

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.5.

({868.1: 1, 868.3: 2, 868.5: 1, 867.5: 2})

Count 6 of 20 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.1.

({868.1: 1, 868.3: 2, 868.5: 0, 867.5: 2})

Count 5 of 20 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 0, 868.3: 2, 868.5: 0, 867.5: 2})

Count 4 of 20 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:867.5.

({868.1: 0, 868.3: 2, 868.5: 0, 867.5: 1})

Count 3 of 20 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.3.

(({868.1: 0, 868.3: 2, 868.5: 0, 867.5: 0}))

Count 2 of 20 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.3.

(({868.1: 0, 868.3: 1, 868.5: 0, 867.5: 0}))

Count 1 of 20 limit.

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S2NewChannelAnsAcceptCheck

Next step: S3VerifyFrequencies

Received from DUT:

tmst: 627585996, freq: 867.5, DR: SF8BW125

PHYPayload: 4001010101A214000703E0E87476550571 (Size: 17 bytes)

PHY payload:

4001010101A214000703E0E87476550571

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A214000703E0E874

MAC payload information

FHDR: 01010101A214000703

---DevAddr: 01010101

---FCtrl: 10100010

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 2

---FCnt: 20 (0014)

---FOpts: 0703

FPort: 224

Encrypted FRMPayload: E874

=====

Piggybacked MAC commands:

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

MIC: 76550571

=====

Decrypted FRMPayload: 0006

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_05: Step information

Completed Step: S1ActokToNewChannelReq_AddChannel

Next step: S2NewChannelAnsAcceptCheck

Received from DUT:

tmst: 622586124, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101801300E02ACCEDD37888 (Size: 15 bytes)

PHY payload:

4001010101801300E02ACCEDD37888

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801300E02ACC

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: 2ACC

=====

MIC: EDD37888

=====

Decrypted FRMPayload: 0005

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Sending MAC Command: 0x0703B85E8450 Piggybacked: False In FRMPayload: True

Hide

TEST CASE: td_lorawan_mac_05

Step 7: S7ActokFinalStep

Final step, check the last TAOK message.

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

Step 6: S6ForbiddenFrequencyCheck

Verifies that the removed frequency is not used after the reception of a given number of downlink messages.

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

Step 5: S5NewChannelAnsAcceptCheck

Verifies that the DUT accepted the channel removal.

- Reception from DUT: NewChannelAns MAC Command with Status OK.
- TAS sends: None.

Step 4: S4ActokToNewChannelReq_RemoveChannel

Removes the previously added channel. - Reception from DUT: TAOK message with the downlink counter.

- TAS sends: NewChannelReq removing the previously added channels.

Step 3: S3VerifyFrequencies.

Count TAOK messages to check that the new frequency is used.

- Reception from DUT: TAOK messages until all the configured frequencies (including the newly added) are used.
- TAS sends: None.

Step 2: S2NewChannelAnsAcceptCheck.

Verifies that the DUT accepted the new added channel.

- Reception from DUT: NewChannelAns MAC Command with Status OK.
- TAS sends: None.

Step 1: S1ActokToNewChannelReq_AddChannel.

Adds a single new channel in the channel index 3.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: NewChannelReq MAC Command adding a new channel.

Test ID: TD_LoRaWAN_MAC_05

Objective: Checks the channel addition implementation verifying that the new added frequencies are used. Addition of a single channel.

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_MAC_04: Step information

Completed Step: S4NewChannelAnsAcceptCheck

Next step: No next step.

Received from DUT:

tmst: 617596508, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101A61200070307030703E0CB4B24A7CBC0 (Size: 21 bytes)

PHY payload:

4001010101A61200070307030703E0CB4B24A7CBC0

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A61200070307030703E0CB4B

MAC payload information

FHDR: 01010101A61200070307030703

---DevAddr: 01010101

---FCtrl: 10100110

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 6

---FCnt: 18 (0012)

---FOpts: 070307030703

FPort: 224

Encrypted FRMPayload: CB4B

Piggybacked MAC commands:

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

MIC: 24A7CBC0

=====

Decrypted FRMPayload: 0005

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_04: Step information

Completed Step: S3ActokToNewChannelReq_RemoveChannels

Next step: S4NewChannelAnsAcceptCheck

Received from DUT:

tmst: 612586412, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101801100E0875DEF067936 (Size: 15 bytes)

PHY payload:

4001010101801100E0875DEF067936

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101801100E0875D

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: 875D

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MIC: EF067936

=====

Decrypted FRMPayload: 0004

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Sending MAC Command: 0x070300000000070400000000070500000000 Piggybacked: False In FRMPayload: True

Hide

TD_LORAWAN_MAC_04: Step information

Completed Step: S2NewChannelAnsAcceptCheck

Next step: S3ActokToNewChannelReq_RemoveChannels

Received from DUT:

tmst: 607596796, freq: 867.9, DR: SF8BW125

PHYPayload: 4001010101A61000070307030703E0551FF02469A1 (Size: 21 bytes)

PHY payload:

4001010101A61000070307030703E0551FF02469A1

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A61000070307030703E0551F

MAC payload information

FHDR: 01010101A61000070307030703

---DevAddr: 01010101

---FCtrl: 10100110

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 6

---FCnt: 16 (0010)

---FOpts: 070307030703

FPort: 224

Encrypted FRMPayload: 551F

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Piggybacked MAC commands:

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x03

DR OK: 1

Freq OK: 1

COMMAND SUCCEEDED

MIC: F02469A1

=====

Decrypted FRMPayload: 0004

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_04: Step information

Completed Step: S1ActokToNewChannelReq_AddChannels

Next step: S2NewChannelAnsAcceptCheck

Received from DUT:

tmst: 602586692, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101800F00E0F07F397A1DFF (Size: 15 bytes)

PHY payload:

4001010101800F00E0F07F397A1DFF

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800F00E0F07F

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: F07F

=====

MIC: 397A1DFF

=====

Decrypted FRMPayload: 0003

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Sending MAC Command: 0x0703B85E84500704886684500705586E8450 Piggybacked: False In FRMPayload: True

Hide

TEST CASE: td_lorawan_mac_04

Step 4: S4NewChannelAnsAcceptCheck

Verifies that the DUT sends a NewChannelAns MAC Command accepting the removed frequencies.

- Reception from DUT: message with NewChannelAns answer from the DUT accepting the removed channels (Status OK).
- TAS sends: None.

Step 3: S3ActokToNewChannelReq_RemoveChannels

Removes the previously added channels.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: NewChannelReq removing the previously added channels.

Step 2: S2NewChannelAnsAcceptCheck.

Verifies that the DUT sends a NewChannelAns MAC Command accepting the new added frequencies.

- Reception from DUT: message with NewChannelAns answer from the DUT accepting the added channels (Status OK).
- TAS sends: None.

Step 1: S1ActokToNewChannelReq_AddChannels.

Adds new frequencies using NewChannelReq MAC Commands.

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

- TAS sends: message with multiple NewChannelReq MAC Commands.

Test ID: TD_LoRaWAN_MAC_04

Objective: Checks the channel addition implementation verifying that the new added frequencies are used. Adds multiple channels in a single message.

References: LoRaWAN Specification v1.0.2.

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

Hide

TD_LORAWAN_MAC_03: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.1.

({868.1: 1, 868.3: 1, 868.5: 1})

Count 3 of 15 limit.

Hide

TD_LORAWAN_MAC_03: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.5.

({868.1: 0, 868.3: 1, 868.5: 1})

Count 2 of 15 limit.

Hide

TD_LORAWAN_MAC_03: Step information

Completed Step: S3VerifyFrequencies

Next step: S3VerifyFrequencies

Received from DUT:

Received:868.3.

({868.1: 0, 868.3: 1, 868.5: 0})

Count 1 of 15 limit.

Hide

TD_LORAWAN_MAC_03: Step information

Completed Step: S2NewChannelRejectedCheck

Next step: S3VerifyFrequencies

Received from DUT:

tmst: 582597484, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101A60B00070007000700E09C3E038707AC (Size: 21 bytes)

PHY payload:

4001010101A60B00070007000700E09C3E038707AC

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A60B00070007000700E09C3E

MAC payload information

FHDR: 01010101A60B00070007000700

---DevAddr: 01010101

---FCtrl: 10100110

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 6

---FCnt: 11 (000B)

---FOpts: 070007000700

FPort: 224

Encrypted FRMPayload: 9C3E

=====

Piggybacked MAC commands:

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x00

DR OK: 0

Freq OK: 0

COMMAND FAILED

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x00

DR OK: 0

Freq OK: 0

COMMAND FAILED

NewChannelAns MAC Command.

Command ID (CID): 0x07

Size: 2

Content: 0x00

DR OK: 0

Freq OK: 0

COMMAND FAILED

MIC: 038707AC

=====

Decrypted FRMPayload: 0003

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_03: Step information

Completed Step: S1ActokToNewChannelReq_DisableDefault

Next step: S2NewChannelRejectedCheck

Received from DUT:

tmst: 577587388, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101800A00E06DEA52488359 (Size: 15 bytes)

PHY payload:

4001010101800A00E06DEA52488359

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800A00E06DEA

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: 6DEA

=====

MIC: 52488359

=====

Decrypted FRMPayload: 0002

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Sending MAC Command: 0x070000000000070100000000070200000000 Piggybacked: False In FRMPayload: True

Hide

TEST CASE: td_lorawan_mac_03

Step 2: S3VerifyFrequencies

The previous step had verified that the NewChannelAns contained a Not OK status. Now, this step checks a set of messages and all the configured frequencies must be used.

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

Step 2: S2NewChannelRejectedCheck

Verifies that the default channel deletion was rejected by the DUT.

- Reception from DUT: message with the NewChannelAns with status Not OK.
- TAS sends: None.

Step 1: S1ActokToNewChannelReq_DisableDefault.

Checks the TAOK message and tries to disable a default channel of the current LoRaWAN region.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: NewChannelReq MAC Command disabling a default channel.

Test ID: TD_LoRaWAN_MAC_03

Objective: Check the channel addition implementation, try to remove a read-only default channel.

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_MAC_02: Step information

Completed Step: S4NoMACCommandCheck

Next step: No next step.

Received from DUT:

tmst: 572587524, freq: 868.1, DR: SF8BW125

PHYPayload: 4001010101A00900E042BAC434A5E7 (Size: 15 bytes)

PHY payload:

4001010101A00900E042BAC434A5E7

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A00900E042BA

MAC payload information

FHDR: 01010101A00900

---DevAddr: 01010101

---FCtrl: 10100000

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 0

---FCnt: 9 (0009)

---FOpts: None

FPort: 224

Encrypted FRMPayload: 42BA

=====

MIC: C434A5E7

=====

Decrypted FRMPayload: 0002

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_02: Step information

Completed Step: S3ActokToDevStatusReq_double

Next step: S4NoMACCommandCheck

Received from DUT:

tmst: 567587660, freq: 868.5, 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)

Additional information: Sending MAC Command: 0x06 Piggybacked: True In FRMPayload: True

Hide

TD_LORAWAN_MAC_02: Step information

Completed Step: S2NoMACCommandCheck

Next step: S3ActokToDevStatusReq_double

Received from DUT:

tmst: 562587804, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101A00700E0B1D6418B3924 (Size: 15 bytes)

PHY payload:

4001010101A00700E0B1D6418B3924

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A00700E0B1D6

MAC payload information

FHDR: 01010101A00700

---DevAddr: 01010101

---FCtrl: 10100000

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 0

---FCnt: 7 (0007)

---FOpts: None

FPort: 224

Encrypted FRMPayload: B1D6

=====

MIC: 418B3924

=====

Decrypted FRMPayload: 0002

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_02: Step information

Completed Step: S1ActokToDevStatusReq_double

Next step: S2NoMACCommandCheck

Received from DUT:

tmst: 557587948, freq: 868.3, DR: SF8BW125

PHYPayload: 4001010101800600E0F2BA68EEDC5E (Size: 15 bytes)

PHY payload:

4001010101800600E0F2BA68EEDC5E

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101800600E0F2BA

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: F2BA

MIC: 68EEDC5E

Decrypted FRMPayload: 0002

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Additional information: Sending MAC Command: 0x06 Piggybacked: True In FRMPayload: True

Hide

TEST CASE: td_lorawan_mac_02

Step 4: S4NoMACCommandCheck.

Verifies that the TAOK message doesn't have a DevStatusAns and sends other DevStatusReq in FRMPayload and in FOpts field. This message must be ignored.

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

- TAS sends: -

Step 3: S3ActokToDevStatusReq_double

After receiving a TAOK, two DevStatusReq are sent in the FRMPayload and in FOpts field. This message must be ignored.

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

- TAS sends: Two DevStatusReq mac commands, one in FRMPayload and other piggybacked.

Step 2: S2NoMACCommandCheck.

Verifies that the TAOK message doesn't have a DevStatusAns and sends another DevStatusReq in FRMPayload and in FOpts field. This message must be ignored.

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

- TAS sends: -

Step 1: S1ActokToDevStatusReq_double

After receiving a TAOK, two DevStatusReq are sent in the FRMPayload and in FOpts field. This message must be ignored.

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

- TAS sends: Two DevStatusReq mac commands, one in FRMPayload and other piggybacked.

Test ID: TD_LoRaWAN_MAC_02

Objective: Test that the DUT ignores a frame if MAC commands are present both in payload and in FOpts field.

References: LoRaWAN Specification v1.0.2.

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

Hide

TD_LORAWAN_MAC_01: Step information

Completed Step: S4DevStatusAnsFinal

Next step: No next step.

Received from DUT:

tmst: 552588084, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101A3050006FE1BE0A0DF3E00EB4C (Size: 18 bytes)

PHY payload:

4001010101A3050006FE1BE0A0DF3E00EB4C

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A3050006FE1BE0A0DF

MAC payload information

FHDR: 01010101A3050006FE1B

---DevAddr: 01010101

---FCtrl: 10100011

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 3

---FCnt: 5 (0005)

---FOpts: 06FE1B

FPort: 224

Encrypted FRMPayload: A0DF

=====

Piggybacked MAC commands:

DevStatusAns MAC Command.

Command ID (CID): 0x06

Size: 3

Content: 0xFE1B

Battery Level: 0xFE

Margin: 0x1B

MIC: 3E00EB4C

=====

Decrypted FRMPayload: 0002

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_01: Step information

Completed Step: S3ActokToDevStatusReq_FRMPayload

Next step: S4DevStatusAnsFinal

Received from DUT:

tmst: 547588228, freq: 868.3, 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: Sending MAC Command: 0x06 Piggybacked: False In FRMPayload: True

Hide

TD_LORAWAN_MAC_01: Step information

Completed Step: S2DevStatusAns

Next step: S3ActokToDevStatusReq_FRMPayload

Received from DUT:

tmst: 542588364, freq: 868.5, DR: SF8BW125

PHYPayload: 4001010101A3030006FE1FE04A5D0579A305 (Size: 18 bytes)

PHY payload:

4001010101A3030006FE1FE04A5D0579A305

MHDR bits: 01000000 (UNCONFIRMED_UP)

MACPayload: 01010101A3030006FE1FE04A5D

MAC payload information

FHDR: 01010101A3030006FE1F

---DevAddr: 01010101

---FCtrl: 10100011

-----ADR: 1

-----ACK: 1

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

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

-----FOptsLen: 3

---FCnt: 3 (0003)

---FOpts: 06FE1F

FPort: 224

Encrypted FRMPayload: 4A5D

=====

Piggybacked MAC commands:

DevStatusAns MAC Command.

Command ID (CID): 0x06

Size: 3

Content: 0xFE1F

Battery Level: 0xFE

Margin: 0x1F

MIC: 0579A305

=====

Decrypted FRMPayload: 0001

(Key FF7E151628AED2A6ABF7158809CF4F3C)

Hide

TD_LORAWAN_MAC_01: Step information

Completed Step: S1ActokToDevStatusReq_Piggybacked

Next step: S2DevStatusAns

Received from DUT:

tmst: 537588508, 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)

Additional information: Sending MAC Command: 0x06 Piggybacked: True In FRMPayload: False

Hide

TEST CASE: td_lorawan_mac_01

Step 4: S4DevStatusAnsFinal

Verifies the reception of the DevStatusAns.

- Reception from DUT: TAOK message with a DevStatusAns MAC Command.
- TAS sends: None.

Step 3: S3ActokToDevStatusReq_FRMPayload

After receiving a Act Ok message, a DevStatusReq is sent in FRMPayload using FPort=0.

- Reception from DUT:After receiving a Act Ok message, a DevStatusReq is sent in FRMPayload using FPort=0.
- TAS sends: DevStatusReq MAC command in FRMPayload using port 0.

Step 2: S2DevStatusAns

Verifies the reception of the DevStatusAns.

- Reception from DUT: TAOK message with a DevStatusAns MAC Command.
- TAS sends: None.

Step 1: S1ActokToDevStatusReq_Piggybacked

After receiving a Act Ok message, a DevStatusReq is sent piggybacked using the FOpts field.

- Reception from DUT: TAOK message with the downlink counter.
- TAS sends: DevStatusReq MAC command piggybacked in FOpts field.

Test ID: TD_LoRaWAN_

Objective: Test the DevStatusReq MAC Command, both piggybacked in FOpts field and sent in the FRMPayload using port 0.

References: LoRaWAN Specification v1.0.2.

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

Hide

TD_LORAWAN_ACT_01: Step information

Completed Step: S2ActokFinalStep

Next step: No next step.

Received from DUT:

tmst: 532588644, freq: 868.1, 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: 531382092, freq: 868.3, 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_mac_01 td_lorawan_mac_02 td_lorawan_mac_03 td_lorawan_mac_04 td_lorawan_mac_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