a. STEP 1 - Mode S All-Call Address Announced (AA) Field

Interrogate the transponder with a Mode S - Only All-Call interrogation with PR, IC and CL Fields set to 0. Record that the AA field of the transponder reply contains the address which has been set at the transponder interface.

Repeat with twenty-four different transponder addresses each consisting of 23 ZEROs and a single ONE.

[Under environmental conditions, it is sufficient to use addresses consisting of AAAAAA Hex and 555555 Hex.]

b. STEP 2 - Mode S Discrete Address

Interrogate the transponder with a Mode S surveillance-altitude interrogation (UF=4) with the PC, RR, DI and SD fields set to 0 and an address consisting of ONE followed by 23 ZEROs.

Record that the transponder replies with appropriate bits set in the AP field when the same address is set at the transponder interface, and does not respond when each of the other combination of 23 ZEROs and a single ONE are entered as addresses.

e. Step 5 – Invalid AA

a. Put the transponder in the Power Off Condition and set the AA to all ZEROs. Turn on the transponder and verify that a transponder error condition is set and a failure is declared.

Repeat this test a. with the AA set to all ONEs.

Note : In both cases the transponder will normally either go into Standby State, revert to a pure Mode A/C transponder or return to the Power Off Condition.

~~Repeat this test with the AA set to all ONEs.~~

b. Put the transponder in the Power On Condition with an AA set to ONE for the first bit and ZEROs for all other bits. Verify that the transponder replies to all properly addressed interrogations ~~functions normally as indicated in steps 1 and 2~~.

Without putting the transponder in Power Off Condition change the AA to all ZEROs. Verify that the transponder generates a diagnostic error message for maintenance and that it keeps operating using the initial AA read during the power-on initialisation process (first bit set to ONE and all other bits set to ZEROs).

c. Repeat b. with the remaining twenty-three different transponder addresses each consisting of 23 ZEROs and a single ONE

~~c.~~d. Repeat ~~this~~ tests b. and c. with the AA set to all ONEs, instead of ALL ZEROs.

~~d. Repeat with the remaining twenty-three different transponder addresses each consisting of 23 ZEROs and a single ONE~~

5.5.8.9 PROCEDURE #9 Address Tests
(Paragraph 3.22.2.2 - address discrimination)
(Paragraph 3.17.1 - address reporting)
(Paragraphs 3.17.1 and 3.22.2.1 c address encoding)
(Paragraph 3.22.2.11 - address interface)

This test procedure verifies that the address set into the address interface of the transponder is actually the address to which the transponder responds, and the address which the transponder reports in DF=11. It is also verified that this address pattern is used in generating the AP field of replies and that the transponder does reply only to this address.

5.5.8.9.1 Pattern Selection

Because more than 16 million addresses are possible, exhaustive testing is not practical. Several a~~A~~ddress test patterns (#1 and #2) must be randomly chosen so that the most likely failure modes (incorrect wiring of the interface connector, register malfunction, etc.) can be found.

~~As a minimum the 276 address patterns consisting of two ONEs and 22 ZEROs (Pattern group A) and the 276 patterns having two ZEROs and 22 ONEs (Pattern group B) shall be used for verification.~~

~~5.5.8.9.2 Transponder Designs~~

~~Design No. of UFs Number of Tests~~
~~Level 1 3 1656~~
~~Level 2 6 3312~~
~~All Others 7 3864~~

5.5.8.9.3 Test Sequence

~~Set transponder address selector device to each address (#1) in pattern group A in turns.~~
~~Interrogate with the selected address #1 from pattern group A and observe:~~
~~a. Acceptance for all formats.~~
~~b. Correct report in AA field of DF=11.~~
~~c. Correct encoding of AP in replies.~~
~~Interrogate with each address in pattern group B and observe:~~
~~Non-acceptance of all formats.~~
~~Set transponder address selector device to each address in pattern group B in turns.~~
~~Interrogate with the selectedaddress from pattern group B and observe:~~
~~(1) Acceptance for all formats.~~
~~(2) Correct report in AA field of DF=11.~~
~~(3) Correct encoding of AP in replies.~~

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Test Sequence:

1. Remove power from the transponder under test.
2. Set the transponder address selector device to any valid ~~Mode S~~ 24 bit aircraft address (not ~~all 0's or all 1's~~a single 0 or 1), referred to as "address #1."
3. Apply power to the transponder under test and wait a minimum of 2 seconds.
4. Interrogate the transponder with address #1 and observe:

Acceptance for all formats.
Correct reporting of address # 1 in AA field of DF=11.
Correct encoding of address # 1 in AP field of replies.

5. Interrogate the transponder with any Mode S address other than address #1 and observe:

Non-acceptance of all formats.

6. Set the transponder address selector device to a different randomly chosen valid Mode S address (not a single 0 or 1),referred to as "address #2."
7. Verify correct reporting of address # 1 in AA field of DF=11.
8. If the transponder is designed to monitor the Mode S address, then:
9. Verify that the transponder generates an appropriate diagnostic error message to indicate that the transponder address has changed.
10. Interrogate the transponder with address #2 and observe:

Non-acceptance of all formats.
11. Interrogate the transponder with address #1 and observe:
Acceptance of all formats.
Correct reporting of address # 1 in AA field of DF=11.
Correct encoding of address # 1 in AP field of replies.

Repeat this test with several randomly chosen valid 24 bit aircraft addresses (not a single 1 or 0) as address #1 and address #2~~, so that the most likely failure modes (incorrect wiring of the interface connector, register malfunction, etc.) can be found~~.