

Deviation Request ETSO-C166b#10 for an ETSO approval for CS-ETSO applicable to Extended Squitter ADS-B TIS-B 1090MHz (ETSO-C166b) Consultation Paper

1 Introductory Note

The hereby presented deviation requests shall be subject to public consultation, in accordance with EASA Management Board Decision No 7-2004 as amended by EASA Management Board [Decision No 12-2007](#) products certification procedure dated 11th September 2007, Article 3 (2.) of which states:

“2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency.”

2 ETSO-C166b#10 Extended Squitter ADS-B TIS-B 1090MHz

2.1 Summary of Deviation

Deviate from ED-102A to resolve contradictions between given test procedures and corresponding requirements.

2.2 Original Requirement

Refer to Appendix A Table 1 column ‘ED-102A Original Requirement’.

2.3 Industry

Refer to Appendix A Table 1 column ‘Original Text in ED-102A’ and column ‘Industry’.

2.4 Equivalent Level of Safety

If tests would be performed as described, it would contradict its MOPS requirement.

2.5 EASA position

We accept the deviation.

Appendix A

Table 1

Item	ED-102A Original Requirement	Original Text in ED-102A	Industry	Justification
1	2.2.3.3.2.4 c When neither the Airborne Position Message nor the Surface Position Message is being transmitted, then the Aircraft Identification and Category Message shall be broadcast at the rate specified in subparagraph a.	<u>ED-102A chapter 2.4.3.3.2.4</u> Step 3: On the Ground (§2.2.3.3.2.4.c) Ensure that the equipment is set to the “On the Ground” condition and that the appropriate valid ADS-B Aircraft Identification and Category data is available. Verify that the ADS-B Aircraft Identification and Category Message is broadcast at intervals that are uniformly distributed over the range of 9.8 to 10.2 seconds as specified in §2.2.3.3.2.4.c.	<u>ED-102A chapter 2.4.3.3.2.4</u> Step 3: On the Ground (§2.2.3.3.2.4.c) Ensure that the equipment is set to the “On the Ground” condition and that the appropriate valid ADS-B Aircraft Identification and Category data is available. Verify that the ADS-B Aircraft Identification and Category Message is broadcast at intervals that are uniformly distributed over the range of 4.8 to 5.2 seconds as specified in §2.2.3.3.2.4.c.	There is no deviation to the requirements itself, but a correction of corresponding test procedure given in ED-102A.
2	2.4.3.2.3.1 “TYPE” Code Subfield in ADS-B Airborne Position Messages	<u>ED-102A chapter 2.4.3.2.3.1</u> Step 1 Verification of TYPE Codes 9 through 18, and 20 through 22 with GNSS/Baro Altitude [...] Verify that TYPE codes 9 and 10 cannot be set if the unit under test is not provided with either a GNSS Time Mark (see §2.2.5.1.6) or UTC data unless the Non-Coupled Case of position estimation (see §2.2.3.2.3.7.3 for Latitude, and §2.2.3.2.3.8.3 for Longitude) is implemented.	<u>ED-102A chapter 2.4.3.2.3.1</u> Step 1 Verification of TYPE Codes 9 through 18, and 20 through 22 with GNSS/Baro Altitude [...] Verify that TYPE codes 9 and 10 cannot be set if the unit under test is not provided with either a GNSS Time Mark (see §2.2.5.1.6) or UTC data unless the Non-Coupled Case of position estimation (see §2.2.3.2.3.7.3 for Latitude, and §2.2.3.2.3.8.3 for Longitude) is implemented.	There is no requirement inside ED-102A for such a dedicated functionality. By this, the marked part of test procedure is not adaptive for all implementation architectures. There is no deviation to any requirement, if marked part of test procedure will be not performed.

Item	ED-102A Original Requirement	Original Text in ED-102A	Industry	Justification
3	2.2.3.3.2.11 d The ADS-B Transmitting Subsystem shall not clear the Aircraft Identification Message (see §2.2.3.2.5).	<u>ED-102A chapter 2.4.3.2.5.2</u> Step 2: Emitter Category Data Not Available Set up the ADS-B Transmitting Subsystem as in Step 1 above. Discontinue the input of valid ADS-B Emitter Category data and verify that the ADS-B Emitter Category Subfield is set to ALL ZEROs (binary 000) in the Aircraft Identification and Category Message.	<u>ED-102A chapter 2.4.3.2.5.2</u> Step 2: Emitter Category Data Not Available Set up the ADS-B Transmitting Subsystem as in Step 1 above. Discontinue the input of valid ADS-B Emitter Category data and verify that the ADS-B Emitter Category Subfield has not changed.	There is no deviation to the requirements itself, but a correction of corresponding test procedure given in ED-102A.
4	2.2.3.2.5.3 "ID Character" Subfield in ADS-B Aircraft Identification and Category Message 2.2.5.1.11: Aircraft Identification (or Registration) Data	<u>ED-102A chapter 2.4.3.2.5.3</u> Step 1: Aircraft Identification Data Input - Part 1 Provide the ADS-B Transmitting Subsystem with appropriate ADS-B Emitter Category data via the appropriate interface. Set the input data for each of the eight characters to the character "5." Verify that each of the characters in the ADS-B Aircraft Identification and Category Message is transmitted properly in accordance with the encoding provided in §A.1.4.4.1 of Appendix A. For an input character of "5," the encoding for each character should be 110101 Binary. Step 2: Aircraft Identification Data Input - Part 2 Provide the ADS-B Transmitting Subsystem with appropriate ADS-B Emitter Category data via the appropriate interface. Set the input data for each of the eight characters to the character "J." Verify that each of the characters in the ADS-B Aircraft Identification and Category Message is transmitted properly in accordance with the encoding provided in §A.1.4.4.1 of Appendix A. For an input character of "J," the encoding for each character should be 001010 Binary.	<u>ED-102A chapter 2.4.3.2.5.3</u> Step 1: Aircraft Identification Data Input - Part 1 Provide the ADS-B Transmitting Subsystem with appropriate Aircraft Identification data via the appropriate interface. Set the input data for each of the eight characters to the character "5." Verify that each of the characters in the ADS-B Aircraft Identification and Category Message is transmitted properly in accordance with the encoding provided in §A.1.4.4.1 of Appendix A. For an input character of "5," the encoding for each character should be 110101 Binary. Step 2: Aircraft Identification Data Input - Part 2 Provide the ADS-B Transmitting Subsystem with appropriate Aircraft Identification data via the appropriate interface. Set the input data for each of the eight characters to the character "J." Verify that each of the characters in the ADS-B Aircraft Identification and Category Message is transmitted properly in accordance with the encoding provided in §A.1.4.4.1 of Appendix A. For an input character of "J," the encoding for each character should be 001010 Binary.	There is no deviation to the requirements itself, but a correction of corresponding test procedure given in ED-102A.

Item	ED-102A Original Requirement	Original Text in ED-102A	Industry	Justification
5	2.2.3.2.3.1 "TYPE" Code Subfield in ADS-B Airborne Position Messages (refer to Table 2-14)	<u>ED-102A chapter 2.4.3.2.4.1.4</u> Step 1: Verification of TYPE Code Based on Rc from the Navigational Data Source Set the ADS-B Transmitting Subsystem to the "On- Ground" status and enable transmission of Surface Position Messages. Provide valid horizontal position information with an Rc value less than 7.5 m. Verify that the TYPE Code ("ME" bits 1 – 5) in the next transmitted Surface Position Message is set to FIVE (binary 0 0101). Repeat this step with Rc values of less than 75m , less than 0.1 NM (182.5m) and greater than or equal to 0.1 NM (182.5m) and verify that TYPE Codes of 6, 7 and 8 respectively are reflected in each of the respectively next transmitted Surface Position Messages.	<u>ED-102A chapter 2.4.3.2.4.1.4</u> Step 1: Verification of TYPE Code Based on Rc from the Navigational Data Source Set the ADS-B Transmitting Subsystem to the "On- Ground" status and enable transmission of Surface Position Messages. Provide valid horizontal position information with an Rc value less than 7.5 m. Verify that the TYPE Code ("ME" bits 1 – 5) in the next transmitted Surface Position Message is set to FIVE (binary 0 0101). Repeat this step with Rc values of less than 25m , less than 0.1 NM (185.2m) and greater than or equal to 0.1 NM (185.2m) and verify that TYPE Codes of 6, 7 and 8 respectively are reflected in each of the respectively next transmitted Surface Position Messages.	There is no deviation to the requirement itself, but a correction of corresponding test procedure given in ED-102A.
6	2.2.11.3.2 Non-Transponder-Based Equipment: Non-transponder implemented ADS-B Transmitting Subsystems shall declare a device failure in the event that its own ICAO 24-bit Address is set to all "ZEROS" or all "ONES."	<u>ED-102A chapter 2.3.2.5.2</u> Step 2: Address set to ALL ZEROS Remove power from the Unit Under Test (UUT). Set the ICAO 24-Bit Address provided to the UUT to ALL ZEROS. Apply power to the UUT. Verify that the ADS-B transmission function properly enunciates the "Fail Warn" state within no more than 2.0 seconds .	<u>ED-102A chapter 2.3.2.5.2</u> Step 2: Address set to ALL ZEROS Remove power from the Unit Under Test (UUT). Set the ICAO 24-Bit Address provided to the UUT to ALL ZEROS. Apply power to the UUT. Verify that the ADS-B transmission function properly enunciates the "Fail Warn" state within no more than 10 seconds .	There is no time defined inside the requirement. The value is needed to be increased inside corresponding test procedure. By this, also provision of Mode S address from an external system will be enabled without risk to raise an equipment failure message caused by a long start-up time of it.