DNV·GL

PROJECT NAME

Verification report of the IEC 60870-5-104 protocol implementation in the Martem AS Telem-AGC

Martem AS

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Customer:	Martem AS, Laki 25, 12915, Tallinn, Estonia	The Netherlands
Contact person:	Aleksandr Koskin	
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Prepared by:	Verified by:	Approved by:
D.M. Sooran Test Engineer	E. Henríquez Suárez Head of Department	S.J.T. Mulder Business Leader Interoperability of smart power systems

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4 TEST RESULTS

This Chapter gives a summary of the test results. Numbers shown in the table refer to test numbers of individual test cases in IEC 60870-5-604. If applicable, an end note describing a defect is added in appendix A.

Defects are a certain cause for operational risks: these MUST be corrected before going into an operational situation! They imply the overall test outcome to be **failed.**

Remarks introduce additional observations about the test case results, like limitations in the implementation or implementation choices.

The PICS in Chapter 6 is the basis for the applicable test cases in Appendix A. The PICS gives an overview of the tested protocol implementation, but this isn't a guarantee that the complete function or ASDU, as enabled in the PICS, is tested and supported. Partial testing is possible and the completeness of the tests for the specific function or ASDU must be consulted in Appendix A.

Table 1 Summary of the test results

Test group ([IEC-604] tables)	Defects	Remarks	Verdict
T1. Configuration parameters		-	Passed
T2. Transport provider level		5.3.2.50, 5.3.2.90	Passed
T3. Data Unit Identifier			Passed
T4. ASDUs for Process information in monitor (normal) direction		-	Passed
T5. ASDUs for Process information in control (normal) direction		-	Passed
T6. ASDUs for system information in monitor direction			Passed
T7. ASDU for system information in control (normal) direction		5.3.7.1, 5.3.7.10	Passed
T8. ASDU for parameters in control (normal) direction		-	N.A.
T9. ASDU for file transfer in monitor and control direction		-	N.A.
T10. Data Unit Identifier		-	Passed
T11. Information object address		-	Passed
T12. Station initialisation		-	Passed
T13. Redundant connection tests		5.4.13.1	Passed
T14. Cyclic data transmission			N.A.
T15. Data acquisition through Read		-	N.A.
T16. Acquisition of events		-	Passed
T17. General interrogation			Passed
T18. Clock synchronisation		-	Passed
T19. Command transmission		5.4.19.1, 5.4.19.10, 5.4.19.20	Passed
T20. Transmission of integrated totals		-	Passed
T21. Parameter loading		-	N.A.
T22. Test procedure		-	Passed
T23. File Transfer		-	N.A.
T24. Additional tests		-	Passed
T25. Negative tests		5.4.25.1	Passed
TOTAL	**0**	**9**	**Passed**

* N.A. = Not Applicable

5 CONCLUSION AND RECOMMENDATIONS

The assignment was to give a well-founded answer to the question:

"Does the Martem AS IEC 60870-5-104 controlled station protocol implementation (IEC 104 Application software version 2.0.70-5696dfc-k4) for the Telem-AGC conform to the IEC 60870-5-104 Companion Standard in Standard Direction and the Martem AS Telem-AGC IEC 60870-5-104 Protocol Implementation Document for Telem-AGC, version 5?"

Based on the test results described in this report, DNV GL declares the tested Martem AS CS104 controlled station implementation for the Telem-AGC, **in conformance** with the IEC 60870-5-104 standard [IEC 5-104] and the [PICS] for the tested configuration.

5.1 Exceptions with the [PICS]

There are no exceptions. All functionality is implemented and tested.

5.2 Remarks and Recommendations following from the test

The following comments and recommendations apply:

- Quality bits supported are limited to IV, OV, NT
- For all types of commands the associated event (with COT=3) is received before ACT TERM message except for Regulating Step command (RS) which comes after ACT TERM
- Values in the integrated totals were simulated by a PC acting as slave of the RTU, they do not represent any real values. RTU send the values to the master as they were received, including quality bits. (no processing)
- RTU can be configured to receive at the same time both command with time tag and without, configuration is done per IOA. It is recommended to change this behaviour in future versions, so that only one type of command is accepted at the same time, being this parameter configurable.