

MELTAC Platform Category2 Additional V&V Final Report

Non Proprietary Version

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1. Outline

This is a Final Report of software V&V activity about Safety System Digital Platform MELTAC NplusS. This Software V&V activity was performed in accordance with MELTAC NplusS Category 2 Additional V&V SVVP (JEXU-1021-0007). This additional independent V&V activity was conducted for MELTAC NplusS Category 2 software, because it was previously determined that the original development of this software did not follow all requirements applicable to US Nuclear Safety Systems, but this software was not included in the original US Conformance Program (UCP).

2. Reference

Reference documents are shown in Table 2-1. For documents generated through V&V activity such as Task Report and Review Report, see "4.7 Document List".

Table 2-1 Reference

Document Number	Title
JEXU-1021-0001	Safety System Platform MELTAC NplusS 2 nd UCP Project Plan
JEXU-1021-0007	Safety System Platform MELTAC NplusS Category 2 Additional V&V SVVP(Software V&V Plan)

3. Evaluation

Evaluation details of V&V activities are described in this chapter.

3.1. Evaluation Criteria and Evaluation Results

Evaluation criteria and evaluation results of V&V activities are shown in Table 3-1. See “3.2 Evaluation of V&V Activity” for more details.

Table 3-1 Evaluation Criteria and Evaluation Summaries

	Evaluation Criteria		Evaluation Summary	Result	Reference
	Was V&V performed according to SVVP for all required objects?	V&V organization	V&V was performed in proper organization according to SVVP. (Qualification Certificate shows V&V Team members have enough skills. In addition, V&V team is independent of software design organization, including personnel, management and budget.)	Good	-
		Scope of V&V	V&V was performed for all V&V objects of the Module List attached to SVVP.	Good	-
		V&V report	All required documents were prepared as report documents. See Chapter 4.	Good	Table 4-2 to Table 4-18
2	Is there any problem (NG items) in the results of V&V activities? (For results of V&V reviews and tests.)		All V&V results are “Good”.	Good	Table 3-2
3	Is there any anomaly report still pending?		There is no pending.	Good	Table 4-2 to Table 4-18

V&V activities were performed according to SVVP as shown in Table 3-1 and were completed without pending item. In addition, V&V findings were corrected completely.

Therefore, all the activities planned in SVVP have completed. And all V&V results have turned out to be acceptable after evaluation.

3.2. Evaluation of V&V Activity

This section shows validity of V&V results.

Evaluation was performed for all V&V results including corrective actions to Anomaly Report and conclusions of Review Report.

For individual V&V object documents and source codes, they are described in Chapter 4. This section describes only a summary of V&V results and evaluations.

Table 3-2 V&V result and evaluation for each phase (1/12)

Table 3-2 V&V result and evaluation for each phase (2/12)

Table 3-2 V&V result and evaluation for each phase (3/12)

Table 3-2 V&V result and evaluation for each phase (4/12)

Table 3-2 V&V result and evaluation for each phase (5/12)

Table 3-2 V&V result and evaluation for each phase (6/12)

Table 3-2 V&V result and evaluation for each phase (7/12)

Table 3-2 V&V result and evaluation for each phase (8/12)

Table 3-2 V&V result and evaluation for each phase (9/12)

Table 3-2 V&V result and evaluation for each phase (10/12)

Table 3-2 V&V result and evaluation for each phase (11/12)

Table 3-2 V&V result and evaluation for each phase (12/12)

4. Appendix

4.1. V&V Implementation States and Results

This chapter describes the process of V&V activities. Also V&V results for every document and source code, and Document List are shown here.

Structure of this chapter is shown in Table 4-1.

Table 4-1 Structure of Chapter 4

Section	V&V Category		
	Category	Sub category	Detailed category
4.2	System Specification V&V		
4.3.1	Software Specification V&V	MELTAC Basic S/W	
4.3.2.1		Peripheral Module F/W	System Management Module F/W
4.3.2.2			Intelligent I/O Module F/W
4.3.2.3			W-net I/F Module F/W
4.4.1	Program Specification V&V	MELTAC Basic S/W	
4.4.2.1		Peripheral Module F/W	System Management Module F/W
4.4.2.2			Intelligent I/O Module F/W
4.4.2.3			W-net I/F Module F/W
4.5.1	Source Code V&V	MELTAC Basic S/W	
4.5.2.1		Peripheral Module F/W	System Management Module F/W
4.5.2.2			Intelligent I/O Module F/W
4.5.2.3			W-net I/F Module F/W
4.6.1	Unit Test Specification/ Report V&V	MELTAC Basic S/W	
4.6.2.1		Peripheral Module F/W	System Management Module F/W
4.6.2.2			Intelligent I/O Module F/W
4.6.2.3			W-net I/F Module F/W
4.7	Document List		

4.2. System Specification V&V

Table 4-2 Result of System Specification V&V

4.3. Software Specification V&V

4.3.1. MELTAC Basic S/W

Table 4-3 Result of Software Specification V&V (MELTAC Basic S/W)

4.3.2. Peripheral Module F/W**4.3.2.1. System Management Module F/W**

Table 4-4 Result of Software Specification V&V (System Management Module F/W)

4.3.2.2. Intelligent I/O Module F/W

Table 4-5 Result of Software Specification V&V (Intelligent I/O Module F/W)

4.3.2.3. W-net I/F Module F/W

Table 4-6 Result of Software Specification V&V (W-net I/F Module F/W)

4.4. Program Specification V&V

4.4.1. MELTAC Basic S/W

Table 4-7 Result of Program Specification V&V (MELTAC Basic S/W) (1/6)

Table 4-7 Result of Program Specification V&V (MELTAC Basic S/W) (2/6)

Table 4-7 Result of Program Specification V&V (MELTAC Basic S/W) (3/6)

Table 4-7 Result of Program Specification V&V (MELTAC Basic S/W) (4/6)

Table 4-7 Result of Program Specification V&V (MELTAC Basic S/W) (5/6)

Table 4-7 Result of Program Specification V&V (MELTAC Basic S/W) (6/6)

4.4.2. Peripheral Module F/W**4.4.2.1. System Management Module F/W**

Table 4-8 Result of Program Specification V&V (System Management Module F/W)

4.4.2.2. Intelligent I/O Module F/W

Table 4-9 Result of Program Specification V&V (Intelligent I/O Module F/W)

4.4.2.3. W-net I/F Module

Table 4-10 Result of Program Specification V&V (W-net I/F Module F/W)

4.5. Source Code V&V

4.5.1. MELTAC Basic S/W

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (1/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (2/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (3/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (4/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (5/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (6/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (7/8)

Table 4-11 Result of Source Code V&V (MELTAC Basic S/W) (8/8)

4.5.2. Peripheral Module F/W**4.5.2.1. System Management Module F/W**

Table 4-12 Result of Source Code V&V (System Management Module F/W) (1/2)

Table 4-12 Result of Source Code V&V (System Management Module F/W) (2/2)

4.5.2.2. Intelligent I/O Module F/W

Table 4-13 Result of Source Code V&V (Intelligent I/O Module F/W) (1/5)

Table 4-13 Result of Source Code V&V (Intelligent I/O Module F/W) (2/5)

Table 4-13 Result of Source Code V&V (Intelligent I/O Module F/W) (3/5)

Table 4-13 Result of Source Code V&V (Intelligent I/O Module F/W) (4/5)

Table 4-13 Result of Source Code V&V (Intelligent I/O Module F/W) (5/5)

4.5.2.3. W-net I/F Module

Table 4-14 Result of Source Code V&V (W-net I/F Module F/W) (1/3)

Table 4-14 Result of Source Code V&V (W-net I/F Module F/W) (2/3)

Table 4-14 Result of Source Code V&V (W-net I/F Module F/W) (3/3)

4.6. Unit Test Specification/ Report V&V**4.6.1. MELTAC Basic S/W**

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (1/7)

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (2/7)

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (3/7)

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (4/7)

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (5/7)

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (6/7)

Table 4-15 Result of Unit Test Specification/ Report V&V (MELTAC Basic S/W) (7/7)

4.6.2. Peripheral Module F/W**4.6.2.1. System Management Module F/W**

Table 4-16 Result of Unit Test Specification/ Report V&V (System Management Module F/W)

4.6.2.2. Intelligent I/O Module F/W

Table 4-17 Result of Unit Test Specification/ Report V&V (Intelligent I/O Module F/W)

4.6.2.3. W-net I/F Module F/W

Table 4-18 Result of Unit Test Specification/ Report V&V (W-net I/F Module F/W)

4.7. Document List

Table 4-19 Output Documents of the V&V Activities (1/6)

Table 4-19 Output Documents of the V&V Activities (2/6)

Table 4-19 Output Documents of the V&V Activities (3/6)

Table 4-19 Output Documents of the V&V Activities (4/6)

Table 4-19 Output Documents of the V&V Activities (5/6)

Table 4-19 Output Documents of the V&V Activities (6/6)