PSNN-2014-1202

Safety-Related

Project Document No.	Rev.	-	3

Commercial Dedication Instruction

Customer Name	N/A (As per each Job Order)
Project Name	N/A (As per each Job Order)
Item Name	N/A (As per each Job Order)
Item Number	N/A (As per each Job Order)
Job Number	N/A (As per each Job Order)

Product Name	Sub rack including middle plane for OPRM Unit
Model Number	HNU1200

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1. Product Identification

a. Part Number: See following Table 1.

b. Model Number: HNU1200

c. Drawing Number: 5P-00000150-001 Rev.1

d. Manufacturer's Name: [redacted]a,c

Sub supplier: [redacted]a,c

e. Manufacturer's Model Number: See following Table 1.

f. Manufacturer's Catalog Number: N/A

g. Name plate data: N/A

h. Applicable Material/Part Specification Number: N/A

i. Identification of Parent Component: See Section 2.3.

j. Software Version: N/A

k. Firmware Version: N/A

Table 1 Part Number List

Part Number: (Procurement/Purchase Specification Number/ Part Number)	Manufacturer's Model Number	Description
5P-00000150-001	[redacted]a,c	-

2. Product Description

2.1 Definitions

a. General Name of Product: Sub-Rack including middle plane for the OPRM Unit (hereinafter referred to as "OPRM Unit Chassis")

b. Product Name of Manufacturer: OPRM Unit Chassis

c. Description of Terms:

- AGRD module: AGRD module mounted on the OPRM unit generates amplitude based trip and growth rate based trip (safety function), using neutron flux oscillation received from the CELL module in the OPRM unit.
- CELL module: CELL module mounted on the OPRM unit calculates neutron flux oscillation (safety function), using LPRM levels received from the RCV module in the OPRM unit.
- DAT/ST module: DAT/ST module mounted on the OPRM unit indicates status of the OPRM unit and multiplexes the signals (safety function) received from each module in the OPRM unit.
- DIO module: DIO module is used to receive discrete signal from the relay unit, and also transmit discrete signal to the relay unit.
- LVPS: LVPS module, a low voltage power supply used in a unit to supply direct-current (DC) power to modules in the unit. Each unit has two LVPS modules that are redundant power supplies.
- NMS: Neutron Monitoring System, NMS consists of three safety-related subsystems: Startup Range Neutron Monitor (SRNM), Local Power Range Monitor (LPRM), and Average Power Range Monitor (APRM) which includes Oscillation Power Range Monitor (OPRM). The LPRM, OPRM, and APRM are collectively called the Power Range Neutron Monitor (PRNM).

- NMS Panel: NMS panel is used to mount the SRNM unit, the LPRM units, the APRM unit, the OPRM unit, and electrical parts.
- OPRM: Oscillation Power Range Monitor, a safety-related subsystem of the Neutron Monitoring System (NMS). The OPRM is a functional sub-system of the APRM.
- OPRM unit: A parent component of the OPRM Unit Chassis.
- PBD module: PBD module mounted on the OPRM unit generates period based trip (safety function) using neutron flux oscillation received from the CELL module in the OPRM unit.
- PRNM: Power Range Neutron Monitor, the parent system of the LPRM unit, the APRM unit and the OPRM unit. For Advanced Boiling Water Reactor (ABWR) application, four divisions of the PRNM are installed to plant. Each of those four PRNM divisions contains four LPRM units, an APRM unit and an OPRM unit.
- RCV module: RCV module is used to receive optical signals from units in the PRNM.
- TRN module: TRN module is used to transmit optical signals to external systems.

d. Abbreviation

ABWR	Advanced Boiling Water Reactor
AQ	Augmented Quality
CC	Critical Characteristics
CCD	Critical Characteristics for Design
CCA	Critical Characteristics for Acceptance
CDI	Commercial Dedication Instruction
CFI	Counterfeit and Fraudulent Item
CG	Commercial Grade
CPU	Central Processing Unit
C of C	Certificate of Conformance
DC	Direct Current
EMC	Electromagnetic Compatibility
EQ	Equipment Qualification
FPGA	Field Programmable Gate Array
FMEA	Failure Mode and Effect Analysis
NICSD	Nuclear Instrumentation and Control Systems Department
NICS-QA	Quality Assurance Group for Nuclear Instrumentation & Control Systems
NICS-QC	Quality Control Group for Nuclear Instrumentation & Control Systems
NISD	Nuclear Instrumentation Systems Development & Designing Group
NSR	Non-Safety-Related
QA	Quality Assurance
QC	Quality Control
SR	Safety-Related

2.2 Function of Product

An OPRM Unit Chassis is used to mount modules in the OPRM Unit, which is the parent component specified in Section 2.3. The OPRM Unit Chassis includes a middle plane which consists of a front middle plane and a rear middle plane. The front middle plane is a printed circuit board with connectors for connecting with front modules. The rear middle plane is a printed circuit board with connectors for connecting with the rear modules. The middle plane, which has no active device, logic device, Central Processing Unit (CPU) or Field Programmable Gate Array (FPGA) device, performs DC power distribution and connects the signals between the modules.

2.3 Function of Parent Component

Table 2 Function of Parent Component

Part No.	Model No.	Parent Component	Function of Parent Component (Safety Function)	Functional Classification of Parent Component
P001	HNU1200	OPRM unit	Neutron flux oscillation (Normalized Oscillation Signal) Growth Rate-Based Trip Amplitude-Based Maximum Trip Period-Based Trip OPRM Inoperative Providing the data signals, bypass state, trip state, annunciator, and operation state to the Engineered Safety Features Logic & Control System (ELCS) Flat Display (FD).	Safety Related

3. Safety Related Function

The OPRM Unit Chassis is required to perform before, during, and after abnormal environmental conditions (i.e., seismic, environmental and Electromagnetic Compatibility (EMC) conditions). The OPRM Unit Chassis shall perform the safety related functions described in Table 3 below. The environmental and EMC qualifications of the OPRM Unit Chassis are not performed as a standalone item. The verification of environmental and EMC qualifications will take place at a higher level as part of system equipment qualification effort (Refer to Section 6.2.1).

Table 3 Safety Related Function

Part No.	Model No.	Safety Related Function	Functional Classification
P001	HNU1200	<OPRM application> The OPRM Unit Chassis is used to mount one CELL module, one AGRD module, one PBD module, one DAT/ST module, two RCV modules, two TRN modules, one DIO module, and two LVPS modules. Each of those module stated above has the safety related function used for the safety related function of the parent component. A function of the OPRM unit chassis is to connect signal communication between the modules. This function is safety related function of the OPRM unit chassis.	Safety Related (Having a safety function)

The OPRM Unit Chassis is required to operate during and after the defined design basis events.

- ■ Seismic Sensitive Part/Assembly
- □ Not Seismic Sensitive
- □ Application Does Not Require Seismic Adequacy

The OPRM Unit Chassis is attached to a parent system, and the seismic integrity of the OPRM Unit Chassis is verified by qualification testing (Refer to Section 6.2.1).

3.1 Functional Classification

The functional mode and functional classification were evaluated and identified as follows.

a. Functional Mode : □ Active Functional Mode

■ Passive Functional Mode

b. Functional Classification : ■ Safety-Related (SR)
□ Non-Safety-Related (NSR)
□ Augmented Quality (AQ)

4. Critical Characteristics for Design

Table 4-1 shows the Critical Characteristics for Design (CCD) and technical evaluations. Table 4-2 shows the result of Failure Mode and Effect Analysis (FMEA). This evaluation is performed based on technical requirements for the OPRM Unit Chassis.

Nuclear Instrumentation Systems Development & Designing Group (NISD) evaluated the following manufacture's design:

Manufacturer's Model Number :{ }a,c (Commercial use)
Manufacturer's Delivery Specification :{ }a,c Rev.0 (Reference (2))

This chassis was developed under the ISO-9001 Quality Assurance (QA) process but not verified under the Nuclear Instrumentation and Control Systems Department (NICSD) Appendix-B QA program. For dedication of this chassis, NICSD requires{ }a,c to apply additional QA and documentation requirements specified in Purchase Specification (Reference (1)).

Table 4-1 CCD and Technical Evaluation

Part No.	No	CCD	Manufacturer's specification	Technical Evaluation
P001	1	Physical Characteristics -Dimension Section 1.1 of appendix for purchase specification*1 (177H × 482.6W × 440.8D mm) Dimensional variation is specified in the delivery specification*2. -Mass Section 1.1 of appendix for purchase specification*1 (9.3±0.9kg)	Dimension is specified in drawing No. {}a,c of delivery specification*2 (177.0±0.5H × 482.6±0.8W × 440.8 ±0.8D mm) Mass is specified in final inspection procedure*3. (9.3±0.9kg)	Manufacturer's item meets the purchaser requirement. This characteristic contributes to mounting requirement that is needed to perform to safety function of parent component. This characteristic related to item compatibility, form or fit is important when considering replacement and Counterfeit and Fraudulent Item (CFI) issues.
	2	Physical Characteristics -General configuration and shape Chassis configuration and shape is described in Section 2 of appendix for purchase specification*1.	Chassis configuration is described in drawing No.{ }a,c { }a,c of delivery specification*2	This characteristic contributes to mounting requirement that is needed to perform to safety function of parent component. This characteristic related to item compatibility, form or fit is important when considering replacement and CFI issues. These characteristics contribute to EQ and EMC capability.
	3	Performance Characteristics -Signal transmission between modules via middle plane Performance characteristic of signal transmission between modules via middle plane is decided by middle plane pin assignment. Middle plane pin assignment is described in Sections 6.1 and 6.2 of appendix for purchase specification*1.	Middle plane pin assignment is specified in delivery specification*2.	Supplier controls the middle plane design. This characteristic contributes to transmission requirement that is safety function of parent component.

*1 Purchase Specification: 5P-00000150-001 Rev.1 (Reference (1))
*2 Delivery Specification:{ }a,c Rev.0 (Reference (2))
*3 Final Inspection Procedure{ }a,c, 2012.03.01 (Reference (17))

Table 4-2 Failure Mode and Effect Analysis

No	Function	Failure Mode	Failure Mechanism	Effect on System	Method of Detection	Effect on Plant Operation	Remarks
1	Signal transmission between modules	Transmission Error	Contact failure on printed circuit board Contact failure between middle planes	The OPRM unit panel LED may indicate improper item. The OPRM unit may generate improper signal.	This failure error will be detected with a surveillance test during periodic inspection.	One division spurious trip signal	-
2	Module compatibility	Module mounting on unit chassis	Inappropriate unit chassis assembling	The OPRM unit cannot operate.	This failure can be detected when module mounting.	Can not monitor the neutron flux oscillation.	-
3	Unit compatibility	Unit mounting on NMS panel	Inappropriate unit chassis assembling	The OPRM unit cannot operate. This failure can be detected when unit mounting.	This failure can be detected when module mounting.	Can not monitor the neutron flux oscillation.	-
4	Grounding	Disconnection of Grounding wire error	Breaking of grounding wire Contact failure on earth terminal)	The OPRM unit panel LED may indicate improper item. The OPRM unit may generate improper signal. This failure may affect the EMC capability.	This failure error will be detected with a surveillance test during periodic inspection.	One division spurious trip signal	-

5. Critical Characteristics for Acceptance, Verification Methods and Responsibilities

The physical characteristics and performance characteristics are able to be measured as Critical Characteristics for Acceptances (CCAs) by the supplier testing. NICSD intends to receive a Certificate of Conformance (C of C) and the supplier's final inspection record during the receiving inspection. The NICSD also performs a review of supplier document, witness of supplier's final inspection, and special test to supplement the verification of the physical characteristics and performance characteristics. The following supplier's process to control Critical Characteristics (CC) shall be verified as CCAs, as a minimum, through Commercial Grade (CG) survey of{ }a,c evaluation of{ }a,c and receiving inspection.

- Design Control (Document Control)
- Inspection and Test Control
- Measuring and Test Equipment Control

To supplement verification of the general configuration and shape, supplier's control capability regarding "Configuration Control and Traceability of Hardware" shall be verified through CG Survey of{ }a,c evaluation of{ }a,c and receiving inspection.

Table 5-1 CCA and Verification Method

Item No	Critical Characteristics for Acceptance	Verification Method for Qualification	Responsibility	Verification Method for Production	Responsibility
1	Physical Characteristics -Dimension -Mass -General Configuration and Shape	-	-	Receiving Inspection (Receiving C of C and supplier's final inspection record, Section 6.1.1)	NICS-QC
				Review of Supplier Documents (Section 6.1.2)	NICSD Verifier
				Witness of Supplier's Final Inspection (Section 6.1.3)	NICS-QC
2	Performance Characteristics -Signal transmission between modules via middle plane	-	-	Receiving Inspection (Receiving C of C and supplier's final inspection record,, Section 6.1.1)	NICS-QC
				Review of Supplier Documents (Section 6.1.2)	NICSD Verifier
				Witness of Supplier's Final Inspection (Section 6.1.3)	NICS-QC
				Special Test (Section 6.1.4)	NICS-QC
3	Design Control (Document Control)	CG Survey of [ ]a,c Evaluation of [ ]a,c [ ]a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC
4	Inspection and Test Control	CG Survey of [ ]a,c Evaluation of [ ]a,c [ ]a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC
5	Measuring and Test Equipment Control	CG Survey of [ ]a,c Evaluation of [ ]a,c [ ]a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC
6	Configuration Control and Traceability of Hardware	CG Survey of [ ]a,c Evaluation of [ ]a,c [ ]a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC

NICSD Nuclear Instrumentation and Control Systems Department

NICS-QA Quality Assurance Group for Nuclear Instrumentation & Control Systems

NICS-QC Quality Control Group for Nuclear Instrumentation & Control Systems

6. Verification Instruction

6.1 Recurring Activities

6.1.1 Receiving Inspection

Receiving inspectors or Quality Control (QC) inspectors from NICS-QC shall implement the receiving inspection in accordance with the "Receiving Inspection Procedure (Section 9-(1))" and the "Receiving Inspection Specification (Section 9-(2))."

6.1.2. Review of Supplier Documents

The NICSD verifiers or independent reviewers perform review of the supplier documents. Results of the

review are recorded in the "Design Verification Report (Reference (11))." This activity is conducted at the first qualification and when a major design change which needs documents review occurs after the first qualification. The acceptance criteria are as follow:

- The design and test documents shall satisfy requirements from procurement documents, and shall be complete, correct, consistent, and accurate.

6.1.3 Witness of Supplier's Final Inspection

The QC inspector of NICSD performs the witness of the Supplier's Final Inspection. This witness verifies and ensures the validity of supplier's final inspection record and the inspection work by [Schroff]^{a,c} The acceptance criteria for verification of this CCA are as follows:

Table 6-1 Acceptance Criteria

Part No.	CCA No.	CCA	Acceptance Criteria
P001	1-1	Physical Characteristics Dimension	The dimension requirements in Section 1.1 of Appendix for Purchase Specification (Reference (1)) shall be satisfied. Width 482.6±0.8mm Height 177.0±0.5 mm Depth 440.8±0.8mm
	1-2	Physical Characteristics Mass	The mass requirements in Section 1.1 of Appendix to Purchase Specification (Reference (1)) shall be satisfied. – The mass shall be 9.3kg±0.9.
	1-3	Physical Characteristics -General Configuration and Shape	- There shall be no abnormalities at the guide rail installation position. - There shall be no abnormalities upon insertion of modules. - There shall be no damages on the external appearance that deviate from the standards listed in Section 5.1 of Appendix to Purchase Specification.
	2-1	Performance Characteristics -Signal transmission between modules via middle plane	- There shall be no abnormalities on the MP connector pins.

This activity is performed in accordance with the above criteria using the form "Source Verification Check Sheet and Record for Commercial Grade Dedication (Reference (13))." The result is reported in the form "Source Verification Report (Reference (14))."

6.1.4 Special Test

The QC inspector of NICSD performs a special test to verify "Signal transmission between modules via middle plane" supplementing the witness of the Supplier's Final Inspection where a visual inspection of middle plane connector are performed. The acceptance criteria for verification of this CCA are as follows:

Table 6-2 Acceptance Criteria

Part No.	CCA No.	CCA	Acceptance Criteria
P001	2-1	Performance Characteristics	- There is no conduction between power supply (+5V) line of the front middle plane (MP) and power supply (GND) line of the front MP.

		-Signal transmission between modules via middle plane	- There is conduction between power supply (+5V) line of the front MP and power supply (+5V) line of the front MP. - There is conduction between power supply (GND) line of the front MP and power supply (GND) line of the front MP. - There is conduction between power supply (+5V) line of the front MP and power supply (+5V) line of the rear MP. - There is conduction between power supply (GND) line of the front MP and power supply (GND) line of the rear MP. - There is no conduction between power supply (+5V) line of the rear MP and power supply (GND) line of the rear MP. - There is conduction between power supply (+5V) line of the rear MP and power supply (+5V) line of the rear MP. - There is conduction between power supply (GND) line of the rear MP and power supply (GND) line of the rear MP.

This activity is performed in accordance with the System Test Specification (Reference (18)) with above criteria. The result is recorded in a test record in accordance with NQ-3015 (Reference (19)).

The Test Personnel of NICSD also performs a System Validation Testing to demonstrate that the unit, which is combination of unit chassis and modules, performs its intended safety functions. The responsible design engineers from NISD shall identify a test report in Section 7 of this Commercial Dedication Instruction (CDI) after system validation testing, which shows successful compliance with system validation test requirements.

6.2 Periodic Activities

6.2.1 Environmental Conditions Qualification

Equipment qualification testing and EMC qualification testing are performed in a type test using test specimen. Successful completion and continued application of qualification testing verifies that the item is capable of performing its intended safety function. Any time a design change is made to the item or item is used in another application, impact on all previous qualification programs shall be evaluated to determine if re-qualification is required.

The responsible design engineers from NISD shall identify a test report in Section 7 of this Commercial Dedication Instruction (CDI) after qualification test, which shows successful compliance with qualification test requirements. If any changes are made to a configuration as the result of qualification test, the responsible design engineers shall identify a baseline after change in the CDI. The responsible design engineers evaluates any changes to an item that are made after baseline establishment, determines the need for an additional qualification test, and documents the evaluation result in the CDI. In order to continuously purchase items with same configuration, the "Configuration Control and Traceability of Hardware" of supplier shall be verified through CG Surveys as described in Section 6.2.2.

6.2.2 Vendor Evaluation

NICSD shall perform CG Survey of$\{\ \}^{a,c}$and evaluation of$\{\ \}^{a,c}$.

(1) CG Survey of$\{\ \}^{a,c}$

NICSD performs CG Survey periodically. This activity is performed in accordance with the following criteria using the form "CG Survey Checklist (Reference (7))." The result is reported in the form "Commercial Grade Survey Report (Reference (9))."

Process	No.	[a,c] Acceptance Criteria (Process Details to be Surveyed)
Order Entry	1.1	[a,c] shall have a process for the review and acceptance of Toshiba purchase order including: ・[a,c] shall establish and implement the control to assure that when multiple manufacturing facilities are used, the purchase order requirements are being completely and correctly transmitted. ・[a,c] shall establish and implement the control to notify Toshiba of any changes to CGI/CGS from previous purchase order. ・[a,c] shall establish and implement the control to ensure that design changes are documented by a formal change procedure and that notification is provided to Toshiba of any changes that could affect the product (such as change of configuration, operation, performance, or manufacturing process)
Design Control	2.1	[a,c] shall establish and implement the control to assure that applicable design requirements and purchase order requirements are correctly translated into instructions, procedures or drawings. (Document Control) ・[a,c] shall establish and implement the controls to assure that the product complies with the manufacturers published product description. ・[a,c] shall establish and implement the controls to assure that the published product description part numbers are traceable to design documents.
	2.2	The measures to control the issuance of documents including the changes shall be established and implemented. (Document Control) [a,c] shall establish and implement the controls to assure that design changes are evaluated in a manner commensurate with the original design.
	2.3	Design and test documentation and records shall be collected, stored, and maintained in accordance with documented procedures.
	2.4	[a,c] shall establish and implement the design control process and verification methods.
	2.5	[a,c] shall establish and implement failure management in their development process. [a,c] shall evaluate failure modes and behavior of component under abnormal and faulted conditions to reflect the countermeasures to a design.
Procurement Control	3.1	[a,c] shall establish and implement the measures to assure applicable requirement are included in procurement document to sub-tier supplier.
	3.2	[a,c] shall establish and implement the control using procurement documents to ensure that [a,c] procures the parts in accordance with parts list approved by Toshiba, assembles chassis using those parts and supplies those chassis to Toshiba. Procurement documents, including changes, include provisions for the following, as applicable: ・Scope of work ・Technical requirements ・Documentation requirements ・Quality requirements ・Requirements for prevention and detection of counterfeit material and items ・Special process control requirements (soldering, coating, in-circuit testing etc.) including procedure and personnel qualification.
	3.3	[a,c] shall implement the control to assure that purchased items and services comply with procurement documents (receiving inspection, source inspection, validation testing)
	3.4	[a,c] establish and implement the control to ensure that Bill of Material (BOM) items approved by Toshiba are properly documented in the [a,c] purchase orders and that part substitutions by [a,c] are not allowed without Toshiba approval.
	3.5	[a,c] shall have a process to assure that changes to procurement documents are treated in the same manner as the original document

Process	No.	[a,c] Acceptance Criteria (Process Details to be Surveyed)
	3.6	[ ]shall implement inspection/testing processes (such as those used during receipt/in-process/final inspection or testing) for identifying suspect (including counterfeit/fraudulent) material, items or components that may not be those ordered.
Material Identification and Control	4.1	[ ]shall provide traceability to applicable chemical/physical analysis, certifications, test reports or other documents.
	4.2	[ ]shall establish and implement the controls to maintain lot/material identification throughout manufacturing operations including followings. ・Definition of "lot" or "batch". ・Unique coding systems or practices used by the supplier to identify lots.
	4.3	[ ]shall establish and implement the control to assure items are adequately identified and maintained.
	4.4	[ ]shall establish and implement the control to prevent the use of incorrect or defective item.
	4.5	[ ]shall establish and implement the measures to control limited shelf life item. ・Shelf life durations is established ・Storage/environmental controls is established
Manufacturing and Processes	5.1	[ ]shall establish and implement the control to assure that Instructions/Procedures/Drawings and their correct revision are specified on work instructions and are available where the activity is being performed. [ ]shall establish and implement the control using manufacturing data for printed circuit boards (PCBs) to ensure that [ ]manufactures the PCBs for chassis specified by Toshiba.
	5.2	Personnel performing soldering, crimping, cable routing, assembly, coating, inspection and testing shall be trained and qualified as required, with documented records.
	5.3	[ ]shall establish and implement the methods for identification of finished parts and assemblies as specified in Toshiba procurement document including packing and preparation of C of C and deliverables.
	5.4	[ ]shall establish and implement the methods for handling parts and assemblies to avoid damage due to electrostatic discharge.
	5.5	Crimping, cable routing, and assembly shall be performed in accordance with correct revision of Instructions/Procedures/Drawings
Inspection and Test Control	6.1	[ ]shall establish and implement the controls to assure that activities affecting quality are inspected and tested for conformance to instructions, procedures, drawings and Toshiba procurement documents.
	6.2	[ ]shall establish and implement the controls that include appropriate inspection/test planning, acceptance criteria and documentation of results.
	6.3	[ ]shall have a process to identify, document and segregate nonconforming items. [ ]shall implement problem reporting as required in Toshiba procurement document.
	6.4	[ ]shall establish and implement the control for the review, acceptance, rejection, repair or rework of nonconforming items.
	6.5	The supplier personnel performing inspection and testing shall be trained and qualified.
Measuring and Test Equipment Control:	7.1	[ ]shall establish and implement the controls that M&TE is properly controlled and calibrated. The M&TE used during manufacturing and testing shall be identified in relevant records and test documents. [ ]shall establish and implement calibration system including; ・Calibration of M & TE and standards using standards traceable to nationally recognized standards shall be adequately controlled at periodic intervals. ・Adequacy of standards to assure accuracy, stability, range and resolution required for their intended use. ・Labeling/Identification of M&TE to prevent misuse

Process	No.	Acceptance Criteria (Process Details to be Surveyed)
		・Adequate calibration records, including as found/as left information is available ・Evaluation of nonconforming M&TE ・Environmental conditions are controlled during calibration

(2) Survey of [redacted]a,c

NICSD performs survey periodically. This activity is performed in accordance with the following criteria using the form "Survey/Audit Checklist (Reference (6))." The result is reported in the form "Survey/Audit Report (Reference (8))."

Process	No.	[redacted]a,c Acceptance Criteria (Process Details to be Surveyed) [redacted]a,c
Order Entry	1.1	[redacted]a,c shall have a process for the review and acceptance of [redacted]a,c purchase order including: ・[redacted]a,c shall establish and implement the control to assure that when multiple manufacturing facilities are used, the purchase order requirements are being completely and correctly transmitted. ・[redacted]a,c shall establish and implement the control to notify [redacted]a,c of any changes to CGI/CGS from previous purchase order. ・[redacted]a,c shall establish and implement the control to ensure that design changes are documented by a formal change procedure and that notification is provided to [redacted]a,c of any changes that could affect the product (such as change of configuration, operation, performance, or manufacturing process)
Design Control	2.1	[redacted]a,c shall establish and implement the control to assure that applicable design requirements and purchase order requirements are correctly translated into instructions, procedures or drawings. (Document Control) ・[redacted]a,c shall establish and implement the controls to assure that the product complies with the manufacturers published product description. ・[redacted]a,c shall establish and implement the controls to assure that the published product description part numbers are traceable to design documents.
	2.2	The measures to control the issuance of documents including the changes shall be established and implemented. (Document Control) [redacted]a,c shall establish and implement the controls to assure that design changes are evaluated in a manner commensurate with the original design.
	2.3	Design and test documentation and records shall be collected, stored, and maintained in accordance with documented procedures.
	2.4	[redacted]a,c shall establish and implement the design control process and verification methods.
	2.5	[redacted]a,c shall establish and implement failure management in their development process. [redacted]a,c shall evaluate failure modes and behavior of component under abnormal and faulted conditions to reflect the countermeasures to a design.
Procurement Control	3.1	[redacted]a,c shall establish and implement the measures to assure applicable requirement are included in procurement document to sub-tier supplier.
	3.2	[redacted]a,c shall establish and implement the control using procurement documents to ensure that [redacted]a,c procures the parts specified by [redacted]a,c or in accordance with parts list approved by [redacted]a,c assembles printed circuit boards (PCBs) using those parts and supplies those PCBs to [redacted]a,c. Procurement documents, including changes, include provisions for the following, as applicable: ・Scope of work ・Technical requirements ・Documentation requirements ・Quality requirements

Process	No.	Acceptance Criteria (Process Details to be Surveyed)
		・ Requirements for prevention and detection of counterfeit material and items ・ Special process control requirements (soldering, coating, in-circuit testing etc.) including procedure and personnel qualification.
	3.3	[a,c] shall implement the control to assure that purchased items and services comply with procurement documents (receiving inspection, source inspection, validation testing)
	3.4	[a,c] establish and implement the control to ensure that Bill of Material (BOM) items specified or approved by [a,c] are properly documented in the [a,c] purchase orders and that part substitutions by [a,c] are not allowed without [a,c] approval.
	3.5	[a,c] shall have a process to assure that changes to procurement documents are treated in the same manner as the original document
	3.6	[a,c] shall implement inspection/testing processes (such as those used during receipt/in-process/final inspection or testing) for identifying suspect (including counterfeit/fraudulent) material, items or components that may not be those ordered.
Material Identification and Control	4.1	[a,c] shall provide traceability to applicable chemical/physical analysis, certifications, test reports or other documents.
	4.2	[a,c] shall establish and implement the controls to maintain lot/material identification throughout manufacturing operations including followings. ・ Definition of "lot" or "batch". ・ Unique coding systems or practices used by the supplier to identify lots.
	4.3	[a,c] shall establish and implement the control to assure items are adequately identified and maintained.
	4.4	[a,c] shall establish and implement the control to prevent the use of incorrect or defective item.
	4.5	[a,c] shall establish and implement the measures to control limited shelf life item. ・ Shelf life durations is established ・ Storage/environmental controls is established
Manufacturing and Processes	5.1	[a,c] shall establish and implement the control to assure that Instructions/Procedures/Drawings and their correct revision are specified on work instructions and are available where the activity is being performed. [a,c] shall establish and implement the control using manufacturing data for printed circuit boards (PCBs) to ensure that [a,c] manufactures the PCBs for chassis specified by [a,c]
	5.2	Personnel performing soldering, crimping, cable routing, assembly, coating, inspection and testing shall be trained and qualified as required, with documented records.
	5.3	[a,c] shall establish and implement the methods for identification of finished parts and assemblies as specified in [a,c] procurement document including packing and preparation of C of C and deliverables.
	5.4	[a,c] shall establish and implement the methods for handling parts and assemblies to avoid damage due to electrostatic discharge.
	5.5	Crimping, cable routing, and assembly shall be performed in accordance with correct revision of Instructions/Procedures/Drawings
Inspection and Test Control	6.1	[a,c] shall establish and implement the controls to assure that activities affecting quality are inspected and tested for conformance to instructions, procedures, drawings and [a,c] procurement documents.
	6.2	[a,c] shall establish and implement the controls that include appropriate inspection/test planning, acceptance criteria and documentation of results.
	6.3	[a,c] shall have a process to identify, document and segregate nonconforming items. [a,c] shall implement problem reporting as required in [a,c] procurement document.
	6.4	[a,c] shall establish and implement the control for the review, acceptance, rejection, repair or rework of nonconforming items.

Process	No.	Acceptance Criteria (Process Details to be Surveyed)
	6.5	The supplier personnel performing inspection and testing shall be trained and qualified.
Measuring and Test Equipment Control:	7.1	{ }[a,c] shall establish and implement the controls that M&TE is properly controlled and calibrated. The M&TE used during manufacturing and testing shall be identified in relevant records and test documents. { }[a,c] shall establish and implement calibration system including; ・Calibration of M & TE and standards using standards traceable to nationally recognized standards shall be adequately controlled at periodic intervals. ・Adequacy of standards to assure accuracy, stability, range and resolution required for their intended use. ・Labeling/Identification of M&TE to prevent misuse ・Adequate calibration records, including as found/as left information is available ・Evaluation of nonconforming M&TE ・Environmental conditions are controlled during calibration

7. Acceptance Documentation

(1) Receiving Inspection Check List/Report (Attachment to NQ-3024 (Reference (4)))

(2) Certificate of Conformance (Attachment to Reference (1))

(3) Final Inspection Record by supplier (Same format as Reference (17)))

(4) Design Verification Report (Attachment to Reference (11))

(5) Test record for special test (As per NQ-3015 (Reference (19))

(6) Nuclear Instrumentation & Control Systems Department
Environmental Qualification Report for Safety-Related Oscillation Power Range Monitor (OPRM)
FC51-7513-1000 Rev.0 (5B8K0077 Rev.0)

(7) Nuclear Instrumentation & Control Systems Department
Dynamic Qualification Report for Safety-Related Oscillation Power Range Monitor (OPRM)
FC51-7513-1003 Rev.0 (5B8K0094 Rev.0)

(8) Nuclear Instrumentation & Control Systems Department
EMC Qualification Report for Safety-Related Oscillation Power Range Monitor (OPRM)
FC51-7513-1001 Rev.0 (5B8K0078 Rev.0)

(9) Software Validation Test Report
FC51-7513-1002 Rev.1 (5B8K0093 Rev.1)

8. References

(1) PURCHASE SPECIFICATON (5P-00000150-001 Rev.1)

(2) Delivery Specification of Sub-Rack including middle plane for OPRM Unit ({ }[a,c] Rev.0)

(3) OPRM Unit Detailed Design Specification for Power Range Neutron Monitor (5B8K0041 Rev.2)

(4) Receiving Inspection Procedure, NQ-3024

(5) Standard Receiving Inspection Specification for sub-rack including middle plane (5T8K0002 Rev.0)

(6) Survey/Audit Checklist (Exhibit-2-1 of NQ-3005 (Reference (10)))

(7) CG Survey Checklist (Exhibit-2-2 of NQ-3005 (Reference (10)))

(8) Survey/Audit Report (Exhibit-5-1 of NQ-3005 (Reference (10)))

(9) Commercial Grade Survey Report (Exhibit-5-2 of NQ-3005 (Reference (10)))

(10) Toshiba Nuclear Instrumentation & Control Systems Department NQ-3005 "Procedure for Evaluation of Suppliers"

(11) Design Verification Report (Exhibit-1, -2 and -4 of AS-200A002 (Reference (12)))

(12) Toshiba Nuclear Energy Systems and Service Division AS-200A002 "Design Verification Procedure"

(13) Source Verification Check Sheet and Record for Commercial Grade Dedication (Exhibit-3 of AS-200A111 (Reference (15))

(14) Source Verification Report (Exhibit-1 of AS-300A005 (Reference (16))

(15) Toshiba Nuclear Energy Systems and Service Division AS-200A111 "Acceptance Procedure for Commercial Grade Items"

(16) Toshiba Nuclear Energy Systems and Service Division AS-300A005 "Preparation Procedure for Source Verification"

(17) [ ]a,c Final Inspection Procedure ([ ]a,c, 2012.03.01)

(18) Nuclear Instrumentation & Control Systems Department System Test Specification for Safety-Related Oscillation Power Range Monitor (OPRM) (FC51-7012-1002 Rev.0)

(19) Toshiba Nuclear Instrumentation & Control Systems Department NQ-3015 "Test Control Procedure"

9. Inspection and Test Procedure

(1) Receiving Inspection Procedure (Reference (4))

(2) Standard Receiving Inspection Specification for sub-rack including middle plane (Reference (5))

(3) Nuclear Instrumentation & Control Systems Department System Test Specification for Safety-Related Oscillation Power Range Monitor (OPRM) (Reference (18))

10. Supplements

N/A

変更記号 REV. MARK 変更発行日 REV. ISSUED	ページ PAGE	変更箇所・変更内容 CHANGED PLACE AND CONTENTS	承認 APPROVED BY	調査 REVIEWED BY	担当 PREPARED BY	保管 REGISTERED
変更記録 REVISIONS						
0 Mar. 09, 2012		Initial Issue				
1 Mar. 27, 2012	3	Former c. Drawing Number: 5P-00000150-001 Rev.0 Revised c. Drawing Number: 5P-00000150-001 Rev.1				
	6	Former Manufacturer's Delivery Specification : [a,c] Rev.0 (Reference (2)) Revised Manufacturer's Delivery Specification : [a,c] Rev.0 (Reference (2))				
	6	Former Section 1.1 of appendix for purchase specification*1 (12kg or less) Revised Section 1.1 of appendix for purchase specification*1 (9.3±0.9kg)				
	6	Former Mass is not specified. Revised Mass is specified in final inspection procedure*3. (9.3±0.9kg)				
	6	Former Supplier is now revising the delivery specification to include design specifications of the mass. Revised -				
	6	Former None Revised Middle plane pin assignment is specified in delivery specification*2.	K. Wakita Mar. 27, 2012	T. Tarumi Mar. 27, 2012	H. Ito Mar. 26, 2012	K. Tamura Mar. 27, 2012
	6	Former Supplier controls the middle plane design, and is now revising the delivery specification to include design specifications of the middle plane. Revised Supplier controls the middle plane design.				
	6	Former *1 Purchase Specification: 5P-00000150-001 Rev.0 (Reference (1)) *2 Delivery Specification: [a,c] Rev.0 (Reference (2)) Revised *1 Purchase Specification: 5P-00000150-001 Rev.1 (Reference (1)) *2 Delivery Specification: [a,c] Rev.0 (Reference (2)) *3 Final Inspection Procedure [a,c], 2012.03.01 (Reference (17))				
	9	Former – The mass shall be 12 kg or less, and - An actual measurement value shall be within the error range of ± 10% against the specified value. (*1) Revised – The mass shall be 9.3kg ± 0.9.				

変更記号 REV. MARK 変更発行日 REV. ISSUED	ページ PAGE	変更箇所・変更内容 CHANGED PLACE AND CONTENTS	承認 APPROVED BY	調査 REVIEWED BY	担当 PREPARED BY	保管 REGISTERED
(Continued)	9	Former *1: NICSD has requested the Supplier to perform a final inspection for the mass in accordance with these acceptance criteria. If, however, the Supplier is not able to perform the final inspection for the mass, this CCA (i.e., the mass) is to be verified through testing by NICSD. Revised -				
1	14	Former (1) PURCHASE SPECIFICATON (5P-00000150-001 Rev.0) (2) Delivery Specification of Sub-Rack including middle plane for OPRM Unit ([a,c] Rev.0) Revised (1) PURCHASE SPECIFICATON (5P-00000150-001 Rev.1) (2) Delivery Specification of Sub-Rack including middle plane for OPRM Unit ([a,c] Rev.0)				
	14	Former (5) Standard Receiving Inspection Specification for Chassis from [a,c] (TBD) Revised (5)Standard Receiving Inspection Specification for sub-rack including middle plane (5T8K0002 Rev.0)				
	15	Former - Revised (17) [a,c] Final Inspection Procedure ([a,c] 2012.03.01)				
	15	Former (2)Standard Receiving Inspection Specification (Reference (5)) Revised (2)Standard Receiving Inspection Specification for sub-rack including middle plane (Reference (5)) Those changes in Revision 1 do not affect NICSD dedication activities.				
2 Aug.22, 2012	-	For detailed changed contents and impact evaluation, refer to DECN-9B8K0051-02 Rev.0.	K. Wakita Aug.22, 2012	T. Tarumi Aug.21, 2012	T. Furusawa Aug.20, 2012	K. Tamura Aug. 22, 2012
3 Jan.16.2014	-	For detailed changed contents and impact evaluation, refer to DECN-9B8K0051-03 Rev.0.	K. Wakita Jan.16.2014	T. Tarumi Jan.16.2014	T. Furusawa Jan.16, 2014	M. Ito Jan.16.2014