

SITE COMPLETION CHECKLIST (SCC) REMOTE TERMINAL UNIT (INSTALLATION)			 TENAGA NASIONAL		
Doc No.	SCC - RTU (INS)	Rev. No.	1	Date	5 June 2020

CONTRACT TITLE :

**PEMBEKALAN, PEMASANGAN DAN PENGUJIAN FASILITI DISTRIBUTION AUTOMATION SECARA BERSEPADU
(INTEGRATED INTER-CHANGEABLE DA), DISTRIBUTION NETWORK DIVISION, TNB – MAINHEAD D: SELATAN (N.
SEMBILAN, MELAKA & JOHOR)**

CONTRACT NO. :	TNB771/2024			
CONTRACTOR :	EMPIRE RHEA			
DATE :	04-02-2026			
SUBSTATION NAME :	TNB HQ			
FUNCTIONAL LOCATION :	MMLK/PCE/J00203			
SUBZONE :	MLK			
STATE :	MELAKA			
RTU BRAND :	ABB			
RTU SERIAL NUMBER :	RTU 1231			
RTU TYPE : Tick "✓" whichever applicable	VCB	☒	M-RMU	☐

SITE COMPLETION CHECKLIST (SCC) REMOTE TERMINAL UNIT (INSTALLATION)	 TENAGA NASIONAL
--	---

Doc No.	SCC - RTU (INS)	Rev. No.	1	Date	5 June 2020
A1. SCC RTU (DURING INSTALLATION)					
CONTRACT NO. :		TNB771/2024			
FUNCTIONAL LOCATION :		MMLK/PCE/J00203			
SUBSTATION NAME :		TNB HQ			

Check boxes as follows: (✓) OK NI : Need Improvement (Pls. give comments at 'Remark' column)

No.	Description	OK	NI	REMARKS
1.	Visual Checks on RTU Cabinet			
i.	RTU cabinet is properly mounted & aligned at the wall / designated area.	✓		
ii.	QR code / label is available inside RTU Cabinet. Scan QR code and check contact (must be as per requirement in SOW). [* If available for this contract]	✓		
iii.	All wirings to the terminal blocks are terminated tightly and terminal blocks are in good condition.	✓		
iv.	All cables shall be properly glanded at the cable entry points using proper glanding and sealing (to ensure no space/gap between the cable entry points/glands and the panel).	✓		
2.	Visual and Physical Checks on Cablings and Terminations			
i.	All non-armoured cables shall be installed in rigid high impact PVC conduits, neatly secured in position and adequately supported where necessary in an approved manner.	✓		
ii.	For armoured cables, cable supports, elbows, cleats, trays shall be used. All materials must be of galvanised type (of at least 1.2 mm in thickness).	✓		
iii.	The size of the PVC conduit shall be 25 mm in diameter and the colour of the conduit and fittings shall be orange. The conduits shall be fixed by means of saddles secured rigidly at intervals not exceeding 750 mm.	✓		
iv.	Cable supports/brackets/elbows shall be installed at intervals not greater than 1500 mm for vertical runs and not greater than 1000 mm for horizontal runs. The brackets shall be derusted, finished in a primer and coated with standard orange enamel. The brackets/elbows shall not be painted.	✓		
3.	Visual Checks on Installations			
a.	RTU equipment			
i.	All cablings and internal wirings for RTU modules and accessories are laid properly & neatly secured.	✓		
ii.	All spares and unused points/modules/cards are wired internally, configured and ready for terminations from Plant (complete with its terminal blocks/connectors/wires and all other necessary accessories).	✓		
iii.	All cables for I/O signal, AC, DC & Ground are laid & terminated according to RTU Technical Specification.	✓		
iv.	Anti static wrist strap need to be installed on ESD bonding points.	✓		

Observations:

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:

	Ts. AHMAD AZRUL AMIN BIN MAT NOR Head of Zone Project Delivery (Southern) Distribution Automation Distribution Network Division, TNB
Name: HASFARRUDDIN	Name: AHMAD AZRUL AMIN
Date: 04-06-2020	Date:

SITE COMPLETION CHECKLIST (SCC) REMOTE TERMINAL UNIT SITE ACCEPTANCE TEST (SAT)			 TENAGA NASIONAL		
Doc No.	SCC - RTU (SAT)	Rev. No.	1	Date	5 June 2020

CONTRACT TITLE :

**PEMBEKALAN, PEMASANGAN DAN PENGUJIAN FASILITI DISTRIBUTION AUTOMATION SECARA BERSEPADU
 (INTEGRATED INTER-CHANGEABLE DA), DISTRIBUTION NETWORK DIVISION, TNB – MAINHEAD D: SELATAN (N.
 SEMBILAN, MELAKA & JOHOR)**

CONTRACT NO. :	TNB771/2024			
CONTRACTOR :	EMPIRE RHEA			
DATE :	04-02-2026			
SUBSTATION NAME :	TNB HQ			
FUNCTIONAL LOCATION :	MMLK/PCE/J00203			
SUBZONE :	MLK			
STATE :	MELAKA			
RTU BRAND :	ABB			
RTU SERIAL NUMBER :	RTU 1231			
RTU TYPE : Tick "✓" whichever applicable	VCB	☒	M-RMU	☐

**SITE COMPLETION CHECKLIST (SCC)
REMOTE TERMINAL UNIT
SITE ACCEPTANCE TEST (SAT)**



Doc No.	SCC - RTU (SAT)	Rev. No.	1	Date	5 June 2020
A1. SCC RTU (DURING INSTALLATION)					
CONTRACT NO. :	TNB771/2024				
FUNCTIONAL LOCATION :	MMLK/PCE/J00203				
SUBSTATION NAME :	TNB HQ				

Check boxes as follows: (✓) OK NI : Need Improvement (Pls. give comments at 'Remark' column)

No.	Description	OK	NI	REMARKS
1.	Visual Checks on RTU Cabinet			
i.	Nameplate/Sticker with information on Serial Number, Site Acceptance Test (SAT) date & Warranty period is available in cabinet.	✓		
ii.	SAT date must be written clearly & in the correct text position on the Nameplate/Sticker.	✓		
2.	Site Drawings & Tests			
i.	Hardcopy of Approved Drawings Documents are available & placed inside RCB / RTU panel. [Note: Any changes to the drawings shall be updated in softcopy and passed to TNB as As-built drawings].	✓		
ii.	Hardcopy of Mastersheet & Wiring List (Working Copies) Any changes shall be updated/written in the Mastersheet & Wiring List & verified signed and stamped by TNB supervisor / representative	✓		
iii.	Check & verify all necessary tests are performed as required & have passed.	✓		
iv.	Approved Engineering Drawing at least Tab 2 (RTU CONFIGURATION DRAWING) , Tab 3 (RTU CUBICLE INTERNAL WIRING DRAWING) and Tab 5 (RTU CONFIGURATION DRAWING) .	✓		

Test Observations:

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:



Name: HASFARRUDDIN
Date: 04-06-2020

Ts. AHMAD AZRUL AMIN BIN MAT NOR
Head of Zone Project Delivery (Southern)
Distribution Automation
Distribution Network Division, TNB

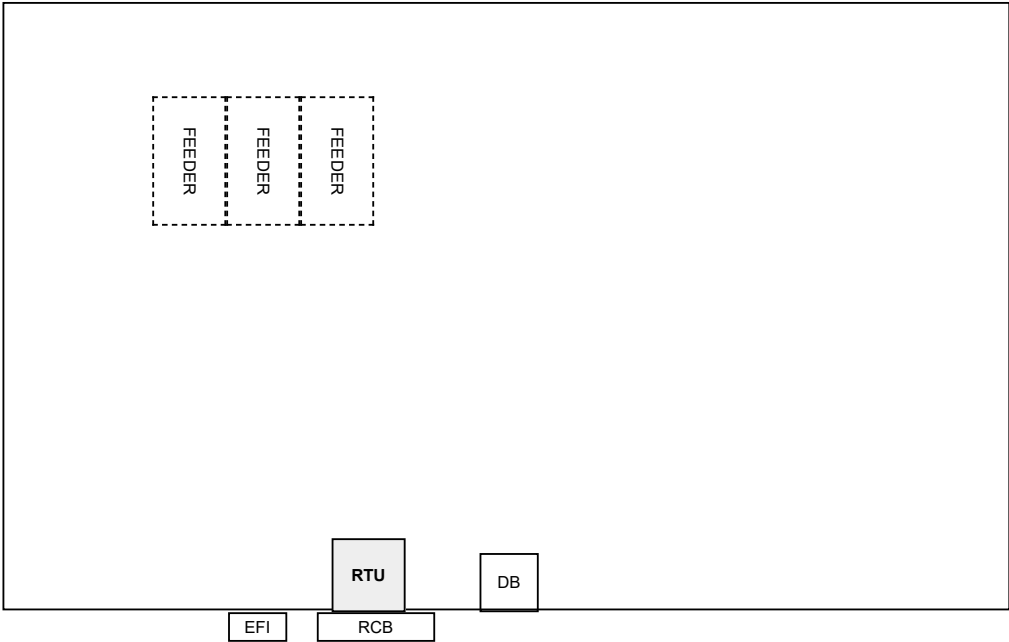
Name: AHMAD AZRUL AMIN
Date:

SITE COMPLETION CHECKLIST (SCC) REMOTE TERMINAL UNIT SITE ACCEPTANCE TEST (SAT)			 TENAGA NASIONAL		
Doc No.	SCC - RTU (SAT)	Rev. No.	1	Date	5 June 2020
CONTRACT NO. :		TNB771/2024			
FUNCTIONAL LOCATION :		MMLK/PCE/J00203			
SUBSTATION NAME :		TNB HQ			

Note: Please sketch the building layout and the location of:

- a. RCB panel
- b. Battery Charger
- c. EFIs location
- d. Switchgear Panel
- e. RTU Panel

SITE DRAWING:



Remote Terminal Unit (RTU) Site Acceptance Test Procedures			 TENAGA NASIONAL		
Doc No.	SAT TP-RTU	Rev. No.	1	Date	5 June 2020

CONTRACT TITLE :

**PEMBEKALAN, PEMASANGAN DAN PENGUJIAN FASILITI DISTRIBUTION AUTOMATION SECARA BERSEPADU
(INTEGRATED INTER-CHANGEABLE DA), DISTRIBUTION NETWORK DIVISION, TNB – MAINHEAD D: SELATAN (N.
SEMBILAN, MELAKA & JOHOR)**

CONTRACT NO. :	TNB771/2024				
CONTRACTOR :	EMPIRE RHEA				
DATE :	04-02-2026				
SUBSTATION NAME :	TNB HQ				
FUNCTIONAL LOCATION :	MMLK/PCE/J00203				
SUBZONE :	MLK				
STATE :	MELAKA				
RTU BRAND :	ABB				
RTU SERIAL NUMBER :	RTU 1231				
RTU TYPE : Tick "✓" whichever applicable	VCB	✓	M-RMU		

Remote Terminal Unit (RTU) Site Acceptance Test Procedures			 TENAGA NASIONAL		
Doc No.	SAT TP-RTU	Rev. No.	1	Date	5 June 2020

TABLE OF CONTENT

A1.	RTU SYSTEM'S Functional CHECK RTU System's Functional Check	Test Ref. FC.1
A2.	RTU SYSTEM'S DIGITAL OUTPUT Point Test – Digital Output	Test Ref. DO.1
A3.	RTU SYSTEM'S DIGITAL INPUT Point Test – Digital Input	Test Ref. DI.1
A4.	RTU SYSTEM'S ANALOG INPUT Point Test – Analog Input	Test Ref. AI.1
A5.	RTU ALARM DETECTION – GENERAL ALARM RTU General Alarm	Test Ref. GE.1

Remote Terminal Unit (RTU)
Site Acceptance Test Procedures



Doc No.

SAT TP-RTU

Rev. No.

1

Date

5 June 2020

A1. RTU SYSTEM'S FUNCTIONAL CHECK

Test Ref:

RTU System's Functional Check

FC.1

a) RTU Power Up and Health Check

No.	Inspection Item	Check (✓)	REMARKS
1	i. Switch on the RTU load MCB at battery charger. Measure the voltage across the input to the RTU DC MCB and ensure that the reading is within Nominal Voltage which is $\pm 10\%$ ii. Check the DC MCB rating	Done	DC Voltage = 30 Vdc DC MCB Rating = 6 Amp
2	i. Switch on the AC source to RTU cabinet. Measure the voltage across the AC input MCB and ensure that the reading is within $240\text{ V} \pm 10\%$ ii. Check the AC MCB rating.	Done	DC Voltage = 240 Vac DC MCB Rating = 16 Amp

b) RTU Control Enable/Disable

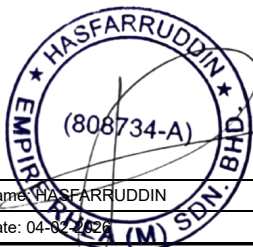
No.	Inspection Item	Check (✓)	REMARKS
1	At the CES switch marked 'CES', set the switch to the ON and OFF state and execute a control command using Protocol Analyser. (Note : ON – can control, OFF – cannot control)	Done	

Test Observations:

Test Result: PASS ☒ FAIL ☐

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:



Name: HASFARRUDDIN

Date: 04-06-2020

Ts. AHMAD AZRUL AMIN BIN MAT NOR
Head of Zone Project Delivery (Southern)
Distribution Automation
Distribution Network Division, TNB

Name: AHMAD AZRUL AMIN

Date:

**Remote Terminal Unit (RTU)
Site Acceptance Test Procedures**



Doc No.

SAT TP-RTU

Rev. No.

1

Date

5 June 2020

A2. RTU SYSTEM'S DIGITAL OUTPUT

Test Ref:

Point Test - Digital Output

DO.1

No.	Inspection Item	Check (✓)	REMARKS
1	Isolate terminal block links at the marshalling panel. Establish communication between Protocol Analyser and RTU.	Done	
2	From Protocol Analyser, send control command to the Dummy Breaker and observe the result. Check the Digital Feedback.	Done	
3	From Protocol Analyser, send control command to the others RTU points and observe the result. Test all DO point and record in Master Sheet.	YES	

Test Observations:

Test Result: PASS ☒ FAIL ☐

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:



Name: HASFARRUDDIN

Date: 04-06-2020

Ts. AHMAD AZRUL AMIN BIN MAT NOR
Head of Zone Project Delivery (Southern)
Distribution Automation
Distribution Network Division, TNB

Name: AHMAD AZRUL AMIN

Date:

Remote Terminal Unit (RTU)
Site Acceptance Test Procedures



Doc No.

SAT TP-RTU

Rev. No.

1

Date

5 June 2020

A3. RTU SYSTEM'S DIGITAL INPUT

Test Ref:

Point Test - Digital Input

DI.1

No.	Inspection Item	Check (✓)	REMARKS
1	Isolate terminal block links at the marshalling panel. Establish communication between Protocol Analyser and RTU.	Done	
2	Initiate status from the selected point and observe status reported at Protocol Analyser.	YES	
	Test all DI points and record in Master Sheet.		

Test Observations:

Test Result: PASS ☒ FAIL ☐

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:


 Name: HASFARRUDDIN
 Date: 04-07-2020

Ts. AHMAD AZRUL AMIN BIN MAT NOR
 Head of Zone Project Delivery (Southern)
 Distribution Automation
 Distribution Network Division, TNB

Remote Terminal Unit (RTU)
Site Acceptance Test Procedures



Doc No.

SAT TP-RTU

Rev. No.

1

Date

5 June 2020

A4. RTU SYSTEM'S ANALOG INPUT

Test Ref:

Point Test - Analog Input

AI.1

No.	Inspection Item	Check (✓)	REMARKS
1	Isolate terminal block links at the marshalling panel. Establish communication between Protocol Analyser and RTU.	Done	
2	By using current injector/process meter, inject the current source to the first point of AI module. Vary the current source from 4mA, 12mA and 20mA and observe status reported at Protocol Analyser.	YES	
Test all AI points and record in Master Sheet.			

Test Observations:

Test Result: PASS ☒ FAIL ☐

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:


 Name: HASFARRUDDIN
 Date: 04-06-2020

Ts. AHMAD AZRUL AMIN BIN MAT NOR
 Head of Zone Project Delivery (Southern)
 Distribution Automation
 Distribution Network Division, TNB

Remote Terminal Unit (RTU)
Site Acceptance Test Procedures



Doc No.

SAT TP-RTU

Rev. No.

1

Date

5 June 2020

A5. RTU SYSTEM'S GENERAL ALARM

Test Ref:

RTU System's General Alarm

GE.1

Test Objective:

1. To verify the RTU should initiate an alarm due to detection of a malfunction on the IO module.

Test Procedure:

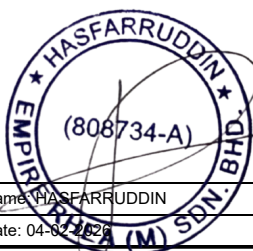
No.	Inspection Item	Check (✓)	REMARKS
1	Confirm that no alarms are active and the RTU is not in program mode.	Done	
2	Disconnect the 'Link' port at an IO module to initiate a general alarm.	Done	
3	Check 'RTU Fault Alarm' indicator is lit and at DI point configured for IO module alarm.	Done	

Test Observations:

Test Result: PASS ☒ FAIL ☐

Checks conducted by:
Contractor's Signature & Stamp:

Verified by:
TNB's Representative Signature & Stamp:



Name: HASFARRUDDIN

Date: 04-06-2020

Ts. AHMAD AZRUL AMIN BIN MAT NOR
Head of Zone Project Delivery (Southern)
Distribution Automation
Distribution Network Division, TNB

Name: AHMAD AZRUL AMIN

Date:

**SITE COMPLETION CHECKLIST (SCC)
REMOTE TERMINAL UNIT
(INSTALLATION)**



Doc No.	SCC - RTU (INS)	Rev. No.	1	Date	5 June 2020
----------------	------------------------	-----------------	----------	-------------	--------------------

A2. PICTURES (BEFORE & AFTER DURING PRE-CABLING & INSTALLATION)

CONTRACT NO. : TNB771/2024

FUNCTIONAL LOCATION : MMLK/PCE/J00203

SUBSTATION NAME : TNB HQ

BEFORE INSTALLATION



OVERALL PICTURE OF SUBSTATION OUTER WALL
(WITH SUBSTATION NAME)



DESIGNATED SPACE/WALL FOR RTU BEFORE

AFTER INSTALLATION



RTU AFTER INSTALLATION

SITE COMPLETION CHECKLIST (SCC) REMOTE TERMINAL UNIT SITE ACCEPTANCE TEST (SAT)			 TENAGA NASIONAL		
Doc No.	SCC - RTU (SAT)	Rev. No.	1	Date	5 June 2020
A2. PICTURES (BEFORE & AFTER DURING PRE-CABLING & INSTALLATION)					
CONTRACT NO. :		TNB771/2024			
FUNCTIONAL LOCATION :		MMLK/PCE/J00203			
SUBSTATION NAME :		TNB HQ			
					
OVERALL PICTURE OF SUBSTATION OUTER WALL (WITH SUBSTATION NAME)		RTU AFTER INSTALLATION (WITH INSIDE PICTURE)		RTU WARRANTY STICKER (COMPLETE WITH SAT DATE)	
OVERALL PICTURE OF MASTERSHEET INSIDE RTU PANEL		CABLES GLAND INSIDE RTU PANEL		CABLES GLAND INSIDE RTU PANEL SECOND PIC (IF ANY)	
INDIVIDUAL EARTHING CONNECTIONS COMPLETED FOR I/O CABLES TO RTU EARTH BAR		INDIVIDUAL EARTHING CONNECTIONS COMPLETED FOR I/O CABLES TO EARTH STUD AT RCB PANEL		INDIVIDUAL EARTHING CONNECTIONS COMPLETED FOR I/O CABLES TO EARTH STUD AT RCB PANEL SECOND PICTURE (IF ANY)	

**Remote Terminal Unit (RTU)
Site Acceptance Test Procedures**



Doc No.	SAT TP-RTU	Rev. No.	1	Date	5 June 2020
A2. PICTURES (BEFORE & AFTER DURING PRE-CABLING & INSTALLATION)					
CONTRACT NO. :		TNB771/2024			
FUNCTIONAL LOCATION :		MMLK/PCE/J00203			
SUBSTATION NAME :		TNB HQ			
INDIVIDUAL EARTHING CONNECTIONS COMPLETED FOR I/O CABLES TO EARTH STUD AT RCB PANEL THIRD PIC (IF ANY)		INSTALLATION INDIVIDUAL EARTHING FOR SPD TO RTU EARTH BAR		ANTI STATIC WRIST STRAP NEED TO BE INSTALLED ON ESD BONDING POINTS	

VERIFIED BY TNB

Ts. AHMAD AZRUL AMIN BIN MAT NOR
Head of Zone Project Delivery (Southern)
Distribution Automation
Distribution Network Division, TNB

TNB Personnel: AHMAD AZRUL AMIN
Verified at: 03-02-2026 11:08:04