



Grid Vision T&D Sdn.Bhd.

Factory Acceptance Test Record DF1725IED RTU

Project Name	
Contract No.	

Approval				
	Name	Company	Date	Signature
Prepared by:	Muhammad Nor Farhan	Grid Vision T&D	17 th December 2024	
Reviewed by:	Lim Yee Chin	Grid Vision T&D	17 th December 2024	
Verified by:	Ir. Ts. Ramlah Binti Awang	Tenaga Nasional Berhad		

FORM REF	1725IED-FAT-TR		
FORM DESCRIPTION	RTU FAT RECORD	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	1 of 39
FAT – TEST RECORD REF:	TABLE OF CONTENT	RECORD SHEET NO.	1 of 1

Change Log

No.	Date	Rev No.	Remark
1	22/12/2022	00	<ul style="list-style-type: none"> Initial Release
2	24/2/2024	00	<ul style="list-style-type: none"> Revise parameter setting for AI, IEC101.
3	16/5/2024	01	<ul style="list-style-type: none"> Separate Test Procedure and Test Record
4	10/9/2024	01	<ul style="list-style-type: none"> Update firmware version and date for MCU-1-A and MCU-4-A. Change Force to 0 setting under AI Card Module.
5	17/12/2024	02	<ul style="list-style-type: none"> Add Ecolink LED in accessories list. Add another firmware check under Processor Functional Test. Update IEC104 Channel Redundancy Test Procedure. Combine Physical and Functional result in 1 page. Add checkbox and signature box in FAT flowchart. Add tester's competency verification. Update IOA for I/O Fail. Add COM-6-A Module. Add Appendix for I/O Test Setup.

FORM REF	1725IED-FAT-TR		
FORM DESCRIPTION	RTU FAT RECORD	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	2 of 39
FAT – TEST RECORD REF:	TABLE OF CONTENT	RECORD SHEET NO.	1 of 1

Table of Contents

Overall FAT Result.....	5
Factory Acceptance Test Summary	6
FAT Log.....	6
FAT Attendance.....	6
Pre-Requisites	
1.0 Approved Engineering Drawings	7
2.0 Bill of Quantity	7
3.0 SGP Certificate	8
4.0 RTU Panel IP Certificate	8
5.0 Test Equipment Record.....	8
6.0 Measuring Equipment Record	8
7.0 Software Record.....	9
8.0 Pre-FAT Record.....	9
9.0 Tester's Competency	9
Declaration	
1.0 Product Declaration	10
2.0 Test Setup.....	11
Accessories Declaration and Inspection	
1.0 Electronic Accessories	12
2.0 RTU Panel Accessories.....	13 - 15
Inspection – RTU Panel	
1.0 Panel Information.....	16
2.0 Physical and Quality Inspection.....	16
Inspection – Subrack	
1.0 Subrack Information	17
2.0 Physical and Quality Inspection.....	17
Inspection – Power Supply Module	
1.0 Physical and Quality Inspection	18
2.0 Functional Test – Power Supply	18

FORM REF	1725IED-FAT-TR		
FORM DESCRIPTION	RTU FAT RECORD	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	3 of 39
FAT – TEST RECORD REF:	TABLE OF CONTENT	RECORD SHEET NO.	1 of 1

Inspection – Processor

1.0 Physical and Quality Inspection	19
2.0 Functional Test - Processor	19
3.0 IEC101 Initialization	20
4.0 IEC104 Initialization	20
5.0 DNP3 Initialization	21

Inspection – COM-6-A

1.0 Physical and Quality Inspection	22
2.0 Functional Test – COM-6-A	22

Inspection – Digital Input Module

1.0 Physical and Quality Inspection	23
2.0 Functional Test – Digital Input Module	23

Inspection – Digital Output Module

1.0 Physical and Quality Inspection	24
2.0 Functional Test – Digital Output Module	24
3.0 Dummy Breaker and CES Functional Test.....	25
4.0 Buzzer Test	25

Inspection – Analog Input Module

1.0 Physical and Quality Inspection	26
2.0 Functional Test – Analog Input Module	26

Inspection – Analog Output Module

1.0 Physical and Quality Inspection	27
2.0 Functional Test – Analog Output Module	27

RTU Power Up 28

Parameter Setting

1.0 Processor Parameter Setting	
1.1 MCU-1-A.....	29
1.2 MCU-4-A.....	29
2.0 Digital Input Parameter Setting	
2.1 Under Card Module	30
2.2 Under Logical Module.....	30

FORM REF	1725IED-FAT-TR		
FORM DESCRIPTION	RTU FAT RECORD	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	4 of 39
FAT – TEST RECORD REF:	TABLE OF CONTENT	RECORD SHEET NO.	1 of 1

3.0 Digital Output Parameter Setting	
3.1 Under Card Module	31
3.2 Under Logical Module.....	31
4.0 Analog Input Parameter Setting	
4.1 Under Card Module	32
4.2 Under Logical Module.....	32
5.0 Analog Output Parameter Setting	
5.1 Under Card Module	33
5.2 Under Logical Module.....	33
6.0 IEC101 Parameter Setting.....	34
7.0 IEC104 Parameter Setting.....	35
8.0 DNP3 Parameter Setting	36
Virtual Alarm Test	37
Channel Redundancy Test	38
1.0 IEC101	38
2.0 IEC104	38
3.0 DNP3	38
Limit of Authority.....	39

FORM REF	1725IED-FAT-TR-TS		
FORM DESCRIPTION	RTU FAT RECORD - TEST SUMMARY	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	5 of 39
FAT – TEST RECORD REF:	OVERALL TEST RESULT	RECORD SHEET NO.	1 of 1

1.0 Overall Pre-FAT/FAT Result

RTU Serial No.	
-----------------------	--

PASS ☐

FAIL ☐

REMARKS:

Tested By:
(Signature/Official Stamp)

Witnessed By:
(Signature/Official Stamp)

Tester's
Name:
Date:

TNB QAI's
Name:
Date:

FORM REF	1725IED-FAT-TR-TS		
FORM DESCRIPTION	RTU FAT RECORD - TEST SUMMARY	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	6 of 39
FAT – TEST RECORD REF:	FAT TEST SUMMARY	RECORD SHEET NO.	1 of 1

2.0 Factory Acceptance Test Summary

No.	Form Description	No. of Record	Result
1	Pre-Requisites		Pass/Fail
2	Declaration		Pass/Fail
3	Accessories		Pass/Fail
4	Physical Inspection		Pass/Fail
5	Parameter Setting		Pass/Fail
6	Functional Test		Pass/Fail
7	Channel Redundancy Test		Pass/Fail

3.0 FAT Log

Day	Time		Test Activity
	Start	End	
1			
2			
3			

4.0 FAT Attendance

Date	Name	Company	Designation	Signature
		Grid Vision T&D	Tester	
		Grid Vision T&D	Tester	
		TNBR/TNBLabs	QAI	

FORM REF	1725IED-FAT-TR-PR		
FORM DESCRIPTION	RTU FAT RECORD – PRE-REQUISITES	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	7 of 39
FAT – TEST RECORD REF:	FAT PRE-REQUISITE	RECORD SHEET NO.	1 of 1

1.0 Approved Drawings

Drawing Title	Drawing No.	Revision	Approved Date	OK
Telecontrol Overview Drawing	GV TNBD 0614 B02 TOD			<input type="checkbox"/>
RTU Configuration Drawing	GV TNBD 0614 B01 RCF			<input type="checkbox"/>
RTU Cubicle Internal Wiring Drawing	GV TNBD 0614 V01 RIW			<input type="checkbox"/>
RTU Cubicle Drawing	GV TNBD 0614 U01 CDW			<input type="checkbox"/>
RTU Parameter List	GV TNBD 0614 T01 PM			<input type="checkbox"/>
RTU Cable Drawing	GV TNBD 0614 T11 RCS			<input type="checkbox"/>

2.0 Bill of Quantity

No.	Module Name	Part Number	Quantity	Firmware Version
1	RTU Subrack	1725IED_SUBRACK 19”		N/A
2	RTU Subrack	1725IED_SUBRACK 2/3 19”		N/A
3	RTU Subrack	1725IED_SUBRACK 1/2 19”		N/A
4	RTU Processor Board	1725IED_MCU-1-A		4.11.024 24 Aug 2024
5	RTU Processor Board	1725IED_MCU-4-A		4.02.008 24 Nov 2023
6	RTU Digital Input Module	1725IED_DI-32-24V		N/A
7	RTU Digital Input Module	1725IED_DI-16-24V-A		N/A
8	RTU Digital Input Module	1725IED_DI-16-110V		N/A
9	RTU Digital Output Module	1725IED_CO-8-A		N/A
10	RTU Digital Output Module	1725IED_CO-16-A		N/A
11	RTU Analog Input Module	1725IED_DCAI-8-A		N/A
12	110/220V Power Supply Board	1725IED_POWER-110/220V		N/A
13	24V Power Supply Board	1725IED_POWER-24V-A		N/A
14	Communication Module	1725IED_COM-6-A		N/A

FORM REF	1725IED-FAT-TR-PR		
FORM DESCRIPTION	RTU FAT RECORD – PRE-REQUISITES	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	8 of 39
FAT – TEST RECORD REF:	FAT PRE-REQUISITE	RECORD SHEET NO.	1 of 1

3.0 SGP Certificate

Item	Serial Number
DF1725IED RTU SGP Certificate	D2023–0510:0014

4.0 Panel IP Certificate

No.	RTU Panel Type	IP Rating	Certificate Number	Applicable
1	Floor Standing – Indoor	IP51	2017EEA0204	<input type="checkbox"/>
2	Floor Standing – Outdoor	IP54	2021EA1541	<input type="checkbox"/>
3	Wall Mounted – Indoor	IP51	2015EEA0091	<input type="checkbox"/>
4	Wall Mounted – Outdoor	IP54	2021EA1540	<input type="checkbox"/>

5.0 Test Equipment Record

No.	Item	Brand	Model	Serial Number
1	Laptop			
2				
3				

6.0 Measuring Equipment Record

No.	Item	Brand	Model	Serial Number	Calibration Date	Calibration Due Date
1	Process Meter	Fluke	787			
2	Measuring Tape					
3	Digimatic Caliper					
4						

FORM REF	1725IED-FAT-TR-PR		
FORM DESCRIPTION	RTU FAT RECORD – PRE-REQUISITES	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	9 of 39
FAT – TEST RECORD REF:	FAT PRE-REQUISITE	RECORD SHEET NO.	1 of 1

7.0 Software Record

No.	Item	Brand	Software Name	Version	OK
1	Diagnostic/Configuration Tool	Dong Fang	DFE Engineering Tool Software	3.02.009	<input type="checkbox"/>
2	IEC101/IEC104/DNP3.0 Master Simulator	ASE	ASE2000 Version 1	1.56	<input type="checkbox"/>

8.0 Pre-FAT Record

Pre-FAT Date	
Pre-FAT Result	Pass/Fail
Remarks/Notes	

9.0 Tester's Competency

No.	Tester's Name	Years of Experience
1		
2		

Tested By:
(Signature/Official Stamp)

Witnessed By:
(Signature/Official Stamp)

Tester's
Name:
Date:

TNB QAI's
Name:
Date:

FORM REF	1725IED-FAT-TR-D		
FORM DESCRIPTION	RTU FAT RECORD – DECLARATION	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	10 of 39
FAT – TEST RECORD REF:	PRODUCT DECLARATION	RECORD SHEET NO.	1 of 1

1.0 Product Declaration

Item	Description	Remarks
1	RTU Model	DF1725IED
2	Communication Protocol	IEC101 <input type="checkbox"/> Single <input type="checkbox"/> Redundancy IEC104 <input type="checkbox"/> Single <input type="checkbox"/> Redundancy DNP3 <input type="checkbox"/> Single <input type="checkbox"/> Redundancy
3	Type	<input type="checkbox"/> Centralized <input type="checkbox"/> Decentralized
4	Power Supply Input	<input type="checkbox"/> 110VDC <input type="checkbox"/> 30VDC <input type="checkbox"/> 24VDC Others:

Tested By:
(Signature/Official Stamp)

Witnessed By:
(Signature/Official Stamp)

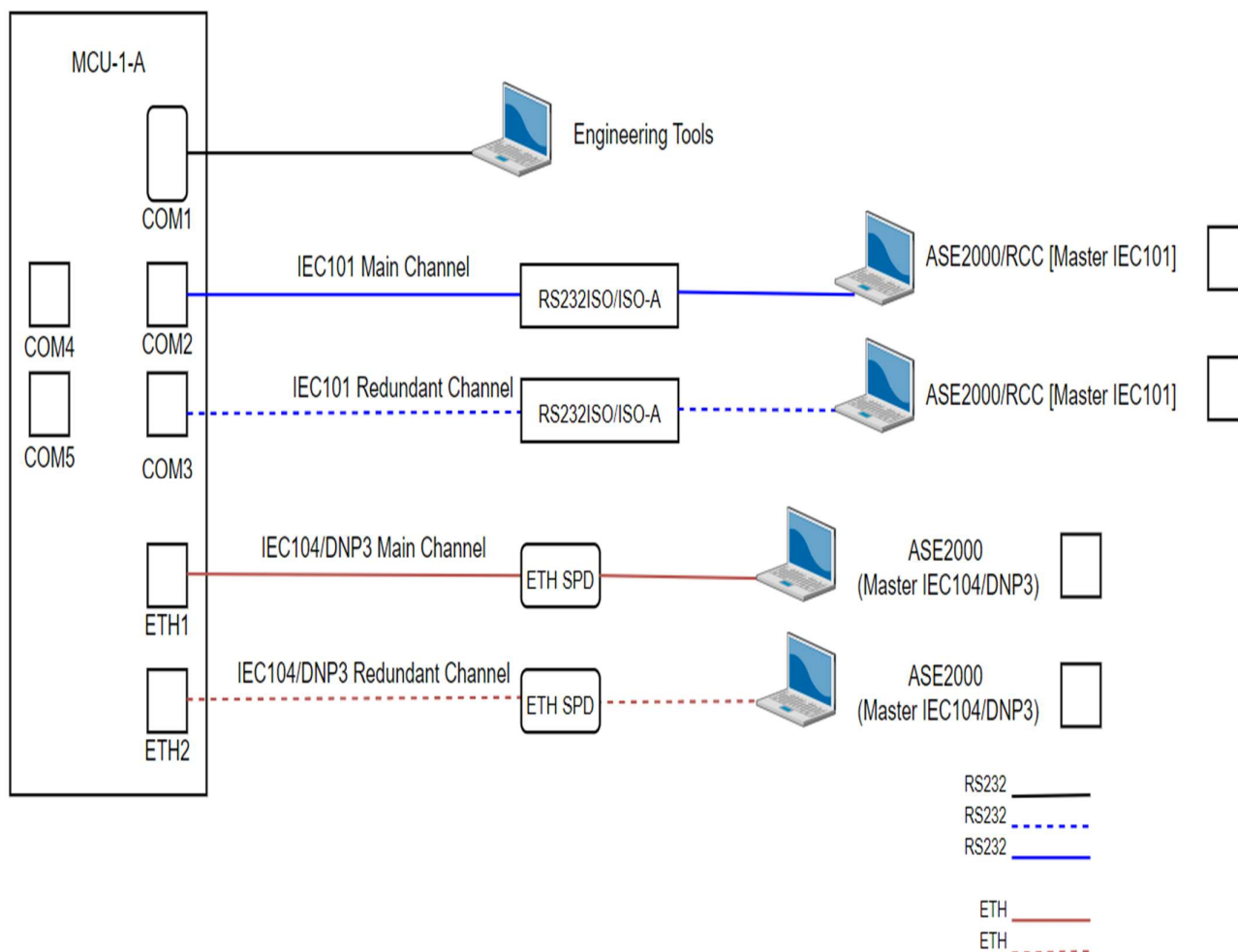
Tester's
Name:
Date:

TNB QAI's
Name:
Date:

FORM REF	1725IED-FAT-TR-D		
FORM DESCRIPTION	RTU FAT RECORD – DECLARATION	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	11 of 39
FAT – TEST RECORD REF:	FAT TEST SETUP	RECORD SHEET NO.	1 of 1

2.0 Test Setup

Notes: For I/O Test Setup, please refer Appendix: I/O Test Setup (i) to (iv).



Tested By:
(Signature/Official Stamp)

Witnessed By:
(Signature/Official Stamp)

Tester's
Name:
Date:

TNB QAI's
Name:
Date:

FORM REF	1725IED-FAT-TR-ACC		
FORM DESCRIPTION	RTU FAT RECORD – ACCESSORIES	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	12 of 39
FAT – TEST RECORD REF:	ELECTRONIC ACCESSORIES INSPECTION	RECORD SHEET NO.	1 of 1

1.0 Electronic Accessories

Item	Accessories	Brand	Model	Quantity	Datasheet	OK
1	Dummy Breaker					<input type="checkbox"/>
2	Fault Alarm Relay [K2]					<input type="checkbox"/>
3	Fault Alarm Relay [K3]					<input type="checkbox"/>
4	110VDC Power Supply Unit Surge Protector					<input type="checkbox"/>
5	30VDC Power Supply Unit Surge Protector					<input type="checkbox"/>
6	UTP Cable Surge Protector					<input type="checkbox"/>
7	Modem Splitter					<input type="checkbox"/>
8	Communication Surge Arrestor					<input type="checkbox"/>
9	Lease Line Modem					<input type="checkbox"/>
10	Communication Surge Protector					<input type="checkbox"/>
11	Fiber Modem					<input type="checkbox"/>
12	Router Switch					<input type="checkbox"/>

FORM REF	1725IED-FAT-TR-ACC		
FORM DESCRIPTION	RTU FAT RECORD – ACCESSORIES	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	13 of 39
FAT – TEST RECORD REF:	RTU PANEL ACCESSORIES INSPECTION	RECORD SHEET NO.	1 of 1

2.0 RTU Panel Accessories

Item	Accessories	Brand	Model	Quantity	Datasheet	OK
1	MCB DC					<input type="checkbox"/>
2	MCB DC (Converter)					<input type="checkbox"/>
3	MCB DI					<input type="checkbox"/>
4	MCB CES					<input type="checkbox"/>
5	MCB Modem					<input type="checkbox"/>
6	MCB AC (F6)					<input type="checkbox"/>
7	MCB AC (F6A)					<input type="checkbox"/>
8	MCB Auxiliary Contact					<input type="checkbox"/>
9	Control Enable Switch					<input type="checkbox"/>
10	DC/DC 110/24VDC Converter					<input type="checkbox"/>
11	Door Switch					<input type="checkbox"/>
12	Buzzer Switch					<input type="checkbox"/>
13	Panel Light					<input type="checkbox"/>
14	Switch Socket Outlet					<input type="checkbox"/>
15	Lamp Indicator DC Supply					<input type="checkbox"/>
16	Lamp Indicator RTU Fault					<input type="checkbox"/>
17	Lamp Indicator Dummy CB Open					<input type="checkbox"/>

FORM REF	1725IED-FAT-TR-ACC		
FORM DESCRIPTION	RTU FAT RECORD – ACCESSORIES	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	14 of 39
FAT – TEST RECORD REF:	RTU PANEL ACCESSORIES INSPECTION	RECORD SHEET NO.	1 of 1

Item	Accessories	Brand	Model	Quantity	Datasheet	OK
18	Lamp Indicator Dummy CB Close					<input type="checkbox"/>
19	Terminal Block (DC Wetting/DO System)					<input type="checkbox"/>
20	Terminal Block (I/O Plant)					<input type="checkbox"/>
21	Terminal Block (DC Plant/Input/Comm)					<input type="checkbox"/>
22	Terminal Block (AC Circuit)					<input type="checkbox"/>
23	Terminal Block (External Local Alarm – XE)					<input type="checkbox"/>
24	Earthing Bar					<input type="checkbox"/>
25	Buzzer					<input type="checkbox"/>

Tested By:
(Signature/Official Stamp)

Witnessed By:
(Signature/Official Stamp)

Tester's
Name:
Date:

TNB QAI's
Name:
Date:

FORM REF	1725IED-FAT-TR-PIPN		
FORM DESCRIPTION	RTU FAT RECORD – INSPECTION	FORM VERSION	02
PROJECT DETAILS	RTU SERIAL NO:	PRODUCT DETAILS	DF1725IED RTU
	CONTRACT NO:	TEST RECORD SHEET	16 of 39
FAT – TEST RECORD REF:	INSPECTION – RTU PANEL	RECORD SHEET NO.	1 of 1

1.0 Physical and Quality Inspection

No.	Inspection	Measurement (mm)	Manufacturer Tolerance	OK	NO
1	Panel Height		±5%	<input type="checkbox"/>	<input type="checkbox"/>
2	Panel Width		±5%	<input type="checkbox"/>	<input type="checkbox"/>
3	Panel Depth		±5%	<input type="checkbox"/>	<input type="checkbox"/>

No	Inspection	OK	NO
1	The panel is free from defect e.g. scratches, deformities, corrosion, broken.	<input type="checkbox"/>	<input type="checkbox"/>
2	The wirings are neat, tidy, proper, and accessible.	<input type="checkbox"/>	<input type="checkbox"/>
3	The wire marker and ferrules are available, proper, and correct.	<input type="checkbox"/>	<input type="checkbox"/>
4	The wire marker has source and destination stated.	<input type="checkbox"/>	<input type="checkbox"/>
5	The terminal block arrangement is proper and tidy.	<input type="checkbox"/>	<input type="checkbox"/>
6	All LED indicators are correct as per approved drawing.	<input type="checkbox"/>	<input type="checkbox"/>

Tested By:
(Signature/Official Stamp)

Witnessed By:
(Signature/Official Stamp)

Tester's
Name:
Date:

TNB QAI's
Name:
Date: