

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
REV01**

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**FACTORY ACCEPTANCE TEST & ATP DOCUMENT  
OF  
TB TACAN UNIT**



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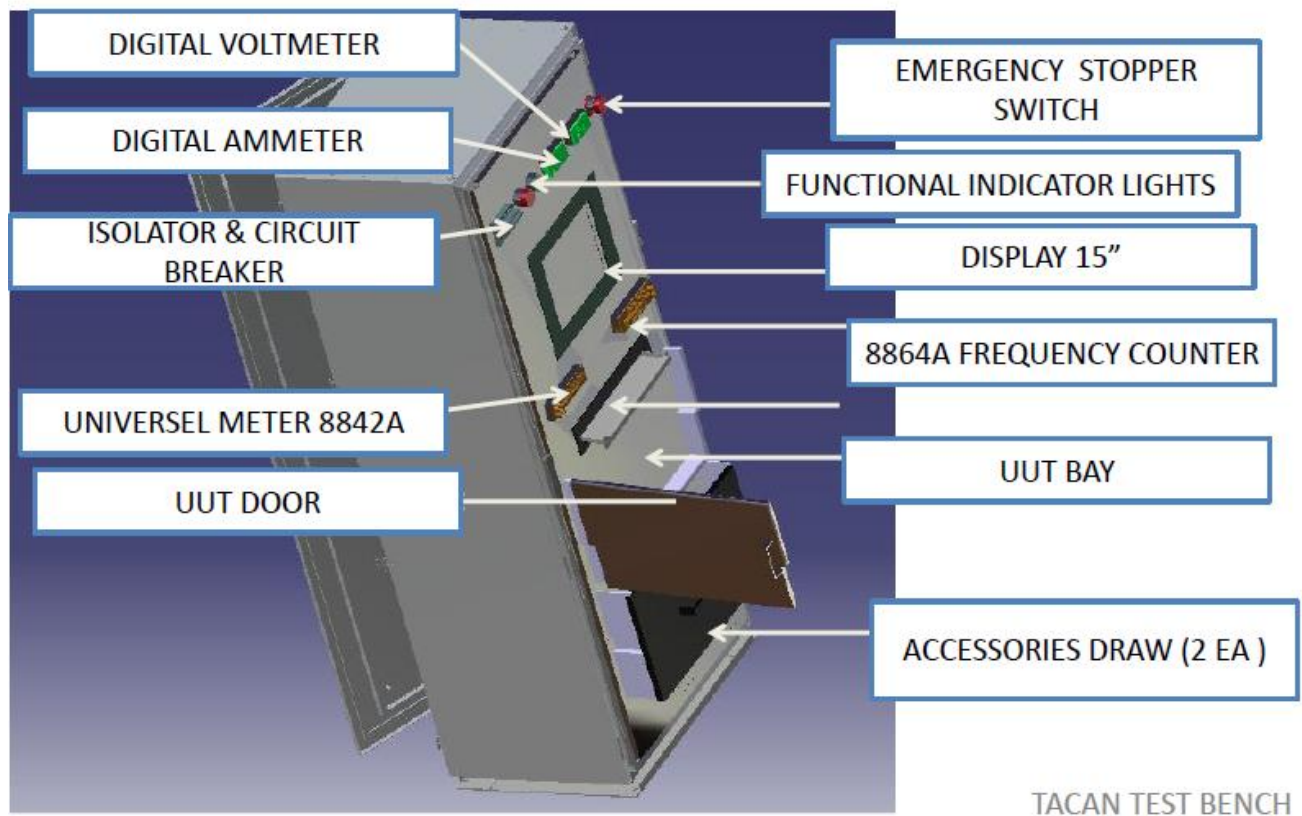
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**TACAN GA DRAWING:**

**ISOMATRIC VIEW**



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**Composition of FAT & PDI Team**

**Below are the team involved in FAT & PDI of TACAN test bench.**

<b><u>Name</u></b>	<b><u>Designation</u></b>	<b><u>Signature</u></b>

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**PRE-APPROVAL PAGE (FAT PROTOCOL)**

Signing of this approval page of Protocol with the qualification approach described in this document. If any modification in the System, qualification approach becomes necessary and an addendum shall be prepared and approved.

**Name and Designation of Authorized Person**

**Signature**

**DATE**

**Prepared by :**

**Reviewed By :**

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**1.0.0 GENERAL**

**1.1.0 Objective**

The TACAN 'I' Level Test bed is designed to check the following modules (Moog Fernau TACAN 2010)

S.No	OEM P/N	NOMENCLATURE
1.	79-FAU28A	Local Status Indicator
2.	284-FAU12A	System Interface
3.	80-FAU34A	Monitor
4.	274-FAU14A	Antenna Interface
5.	284-FAU11A	Keyer Interface
6.	28-FAU34A	High Power Amplifier
7.	30-FAU6A	Transponder
8.	28-FAU33B	Low Power Amplifier
9.	3-FAU14B	Receiver
10.	151-FAU8A	Transfer Unit
11.	14-FAU47A	Mains Power Supply
12.	1-FAU444C	Antenna Monitor And Control Unit
13.	196-FAU13A	Distribution Unit
14.		Modem
15.	FAS816B	Fan Unit
16.	236-FAU7A	Directional Coupler
17.	FAS800	Pulse Filter
18.	160-FAU1C	Detector
19.	425-FAU1A	RF Splitter Assy
20.		Hybrid/Isolator
21.	FAS240	Combiner
22.	125-003	Circuit Breakers
23.	15-FAU30A	HPA Backplane
24.	15-FAU26A	TXP/Mon Backplane
25.	79-FAU31B	Remote Status Panel

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The Modules (Unit Under Test/UUT) can be broadly classified into following

- (1) Intelligent Module
- (2) Slave/Component Module

#### **1.1.1 INTELLIGENT MODULE**

The TACAN is the Latest Generation design incorporating new features. Instead of employing a Central Controller, they have distributed node controllers.

Each Module is designed for a specific purpose (usually Analog Function). These modules have a Digital Node Microcontroller ( $\mu\text{c}$ ) which provides an intelligent link with the Main Controller. This offers lot of flexibility in the system Architecture, Reduced wiring, Ease in Installation and Calibration are the other advantages of this type of systems.

##### List of Intelligent Modules

- (1) Transponder
- (2) Low Power Amplifier
- (3) High Power Amplifier
- (4) System Interface
- (5) Antenna Interface
- (6) Distribution Unit
- (7) Keyer Interface
- (8) Transfer Unit
- (9) Local Status Indicator
- (10) Monitor
- (11) Receiver
- (12) Antenna Monitor and Control Unit

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**1.1.2 SLAVE/COMPONENT MODULE**

These Modules either have only one component (e.g. Circulator, splitter etc.) or slave device like Fan, Breakers etc.

List of Slave/Component Module

- (1) Mains Power Supply
- (2) Modem
- (3) Fan Unit
- (4) Directional Coupler
- (5) Pulse Filter
- (6) Detector
- (7) RF Splitter Assy
- (8) Hybrid/Isolator
- (9) Combiner
- (10) Circuit Breakers
- (11) HPA Backplane
- (12) TXP/MON Backplane
- (13) Remote Status Panel



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### 1.2.0 Scope

A factory acceptance test – User to visit the OEM's facility to test out the TB\_TACAN equipment and make sure it works as expected and to meet the Requirement as mentioned in Approval Documents. This will significantly reduce the time and expense of resolving those issues and helps to ensure that new processing lines are up and ready to go on time.

- Testing according to approved test protocols.
- To identify any issues before the equipment is shipped to the user's facility.
- This protocol will verify the TB equipment and relevant datasheets at the Factory
- Reporting of finding and deficiencies
- FAT Checklist from user to manufacturer

### 1.3.0 Contact Details

Firm Name	NEOMETRIX ENGINEERING PVT LTD
Address	#26, 4 <sup>TH</sup> STREET, LAKSHMI NAGAR, VELACHERY, CHENNAI-42
Contact person	AAMIR ALAM/SARFUDDIN
Phone no.	044-45538454
Fax no.	044-45538454
Email	<a href="mailto:aamir@neometrixgroup.com">aamir@neometrixgroup.com</a>

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### **Safety Instructions**

Electricity is widely recognized as a serious workplace hazard, exposing employees to electrical shock, electrocution, burns, fires, and explosions. Employees have been killed or injured in fires and explosions caused by electricity.

Additional considerations in relation to the electrical hazards of arc flash and arc blast, is that extremely high energy arcs can damage equipment, causing fragmented metal to fly in all directions. In atmospheres that contain explosive gases or vapors, or combustible dusts, even low-energy arcs can cause violent explosions. In these cases the electric arc may be the ignition source for a much bigger explosion and fire.

Due to the potential electrical hazards associated with the use of electrical test instruments, only qualified persons are permitted to perform tasks such as testing, troubleshooting, and voltage measuring when working within the Limited Approach Boundary of exposed energized electrical conductors or circuit parts operating at 50 volts or more, or where any other electrical hazard may exist.

Improper use of electrical test instruments can result in shock or electrocution, as well as creating an arc flash incident. This paper addresses these issues, along with the requirements for selecting and utilizing the test instruments to verify the presence of voltage.

### **Safety and warning**

The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with nonhazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product.

Refer to the user documentation for complete product specifications. If the product is used in a manner not specified, the protection provided by the product warranty may be impaired. The types of product users are: Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

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Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Most measurement, control, and data I/O signals are Measurement Category I and must not be directly connected to mains voltage or to voltage sources with high transient over-voltages. Measurement Category II connections require protection for high transient over-voltages often associated with local AC mains connections.

Assume all measurement, control, and data I/O connections are for connection to Category I sources unless otherwise marked or described in the user documentation. Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures.

The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30 V RMS, 42.4 V peak, or 60 VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use. When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator. For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any

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capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers. Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground.

Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured. The instrument and accessories must be used in accordance with its specifications and operating instructions, or the safety of the equipment may be impaired.



**WARNING**

**READ "SAFETY INFORMATION" BEFORE USING, INSTALLING OR  
MAINTENANCE THE INSTRUMENT.**

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**Protection for Electrostatic Discharge Sensitive (ESDS) devices:**

(A) Work area:

1. It is essential to handle ESDS devices at static-safe workstations. This will prevent yield loss (through catastrophic damage) or, worse, potential reliability failures in the field (through latent damage).
2. Where it is impractical or impossible to use antistatic wrist-straps or remove items that are composed of isolative materials at a static-safe workstation, use an air ionizer designed to neutralize electrostatic charges or apply topical antistats to control generation and accumulation of static charges.
3. When an air ionizer is utilized, it is vital that maintenance procedures and schedules are adhered to in order to ensure that ions generated by the ionizer are sufficiently balanced.
4. Avoid bringing sources of static electricity within 1 meter of a static-safe work bench.
5. Where it is necessary to use air-guns, use special models that do not generate static charges in the air stream

(B) Personnel:

1. Any accumulated charge on the body of the human operator should be discharged first before opening the protective container with ESDS devices inside. The discharge can be accomplished by putting a hand on a grounded surface or, ideally, by wearing a grounded antistatic wrist-strap.
2. The use of an antistatic smock for each worker is highly recommended.
3. Education and training on ESD preventive measures is invaluable.
4. A regular audit is also helpful in supporting an ESD program.



**WARNING**

**READ "SAFETY INFORMATION" BEFORE USING, INSTALLING OR  
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## 2.0.0 AUTOMATED TEST PROCEDURE AND REPORT TABLES

### 2.1.0 TEST PROCEDURES

#### 2.1.1 DETECTOR

**About :**



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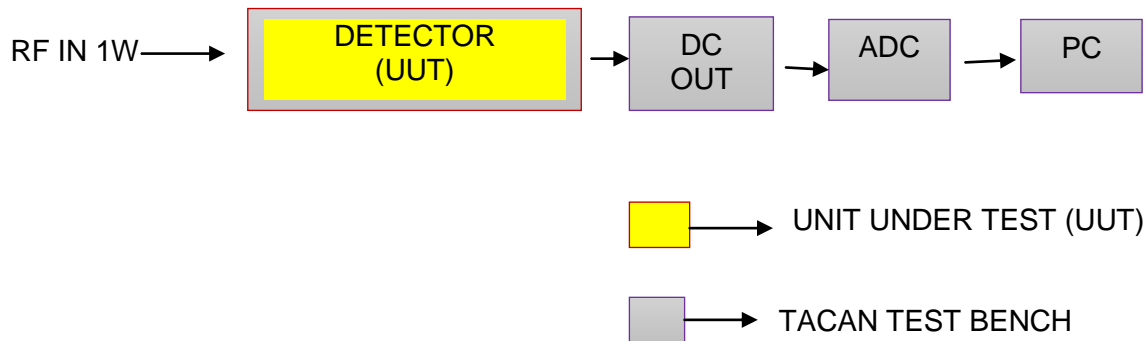
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**Connection:**

Connect the connector J1 connector to **RF IN** of the detector and J2 to the **DC OUT**

Of the detector. Switch ON power supply of the ATE, go to module test page and select the module to be test (Detector).

**Functional Block Diagram :**



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The Complete Engineering Solutions Company

**DETECTOR FUNCTIONAL TEST REPORT**

OPERATOR NAME.	1	MODULE CAT.	1
JON NO.	1	TEST DATE.	14/06/2021
SERIAL NO.	1	OEM PART NO.	160-FAU1C

F1 : 0.96GHz, F2 : 1.0GHz, F3 : 1.025GHz, L1 : -5.0dBm, L2 : 0.0dBm, L3 : 5.0dBm

INPUT	ACCEPTANCE RANGE(mV)	RF OUT VOLTAGE (Measured)	RESULT
F1L1	0092-0276	0133	PASS
F1L2	0188-0564	0312	PASS
F1L3	0355-1065	0539	PASS
F2L1	0103-0310	0154	PASS
F2L2	0206-0618	0324	PASS
F2L3	0386-1158	0587	PASS
F3L1	0102-0306	0166	PASS
F3L2	0204-0612	0340	PASS
F3L3	0386-1158	0623	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark



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### 2.1.2 TRANSFER UNIT:

#### About :

A **Directional coupler** is a device that samples a small amount of Microwave power for measurement purposes. The power measurements include incident power, reflected power, VSWR values, etc

#### Connection:

**Connect the connector J1 connector to** RF IN **of the detector and J2 to the** DC OUT

Of the detector. Switch ON power supply of the ATE, go to module test page and select the module to be test (Detector).

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**Test Report :**



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*The Complete Engineering Solutions Company*

**TRANSFER UNIT PANEL FUNCTIONAL TEST REPORT**

OPERATOR NAME:                       MODULE CAT:   
JOB NO.                                            TEST DATE:   
SERIAL NO.                     

**FUNCTIONAL TEST**

L1: -80 dBm, L2: -60dBm

SL.NO	PARAMETER	MEASURED O/P	RESULT
1	SELF	PASS/FAIL	PASS
2	CAN COMMUNICATION TEST	PASS/FAIL	PASS
3	RECEIVER RELAY 1 TEST	PASS/FAIL	PASS
4	RECEIVER RELAY 2 TEST	PASS/FAIL	PASS
5	TX FORWARD POWER TEST	PASS/FAIL	PASS
6	TX REVERSE POWER TEST	PASS/FAIL	PASS

**Test Witness Team:-**

Name	Designation	Signature	Remark

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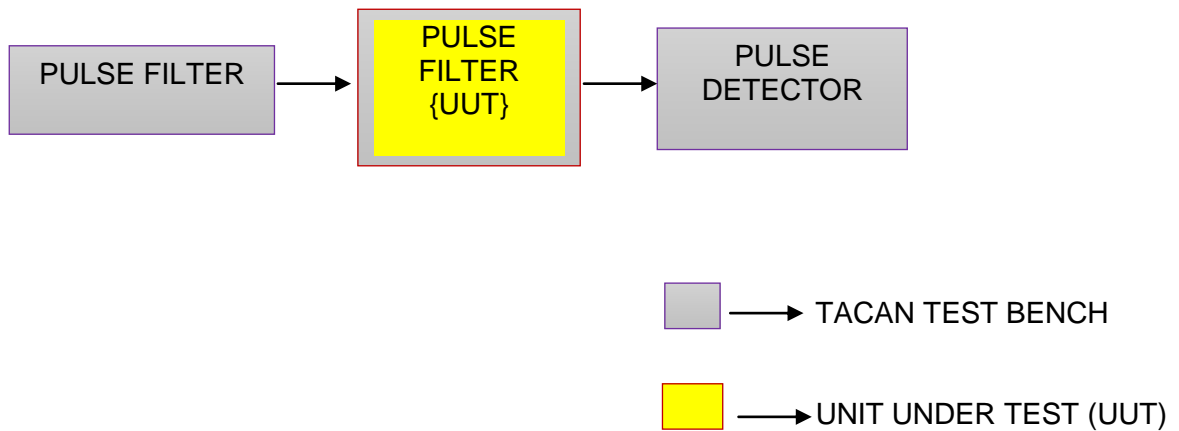
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**2.1.3 PULSE FILTER**



**ABOUT :**

**FUNCTIONAL BLOCK DIAGRAM:**



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**PULSE FILTER AMPLIFIER FUNCTIONAL TEST REPORT**

OPERATOR NAME.	Amir	MODULE CAT.	cat-a
JON NO.	01	TEST DATE.	22/04/2021
SERIAL NO.	1215	OEM PART NO.	FAS800

SLNO	PARAMETERS	ACCEPTANCE RANGE	OUTPUT POWER (mV)	RESULT
1	100MHz STOP FREQ		0000	PASS
2	200MHz STOP FREQ		0000	PASS
3	300MHz STOP FREQ		0000	PASS
4	960MHz PASS FREQ		0635	PASS
5	1000MHz PASS FREQ		0669	PASS
6	1096MHz PASS FREQ		0669	PASS
7	1900MHz STOP FREQ		0000	PASS
8	2000MHz STOP FREQ		0000	PASS
9	2200MHz STOP FREQ		0000	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

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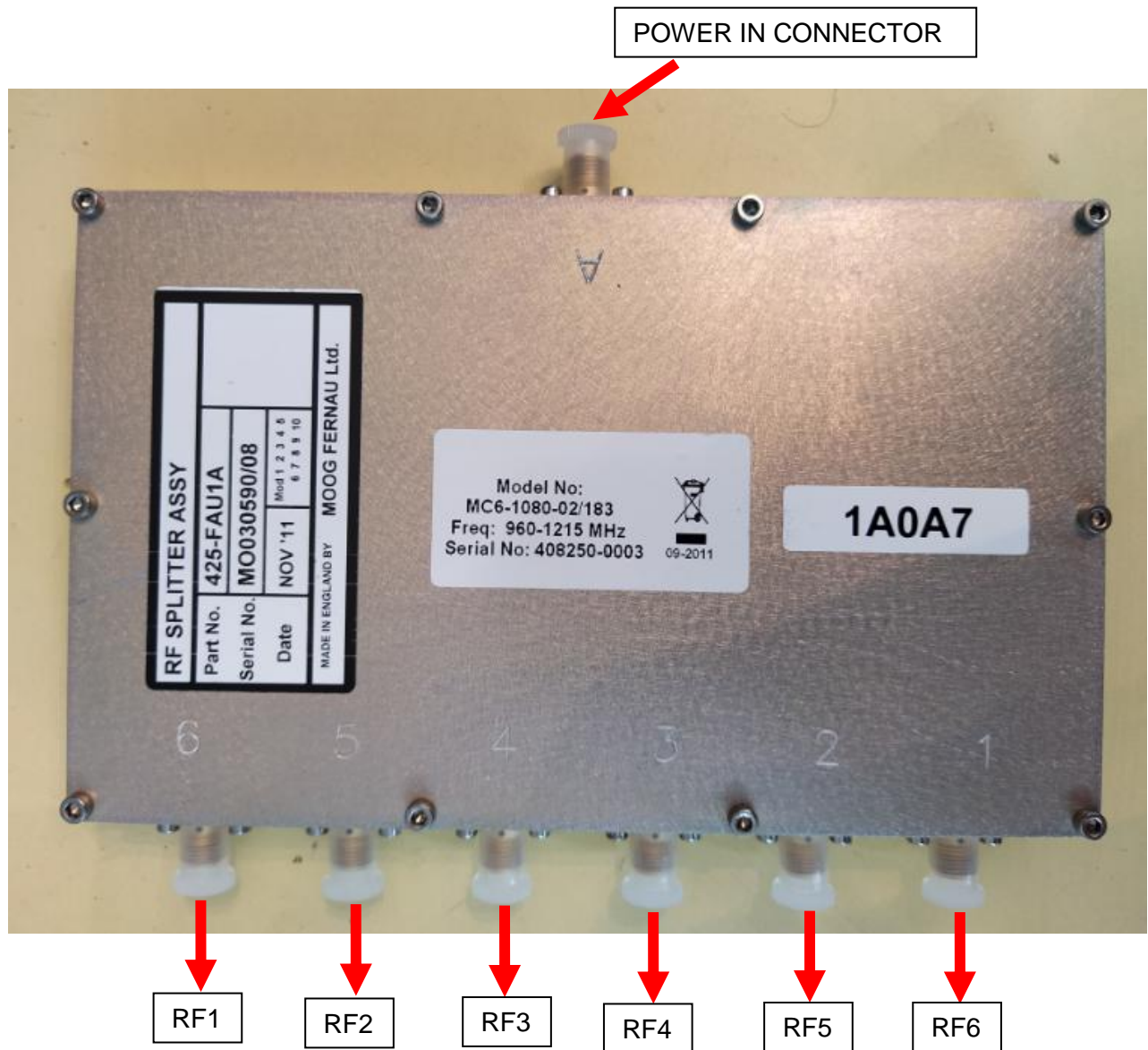
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**2.1.4 SPLITTER**

About :





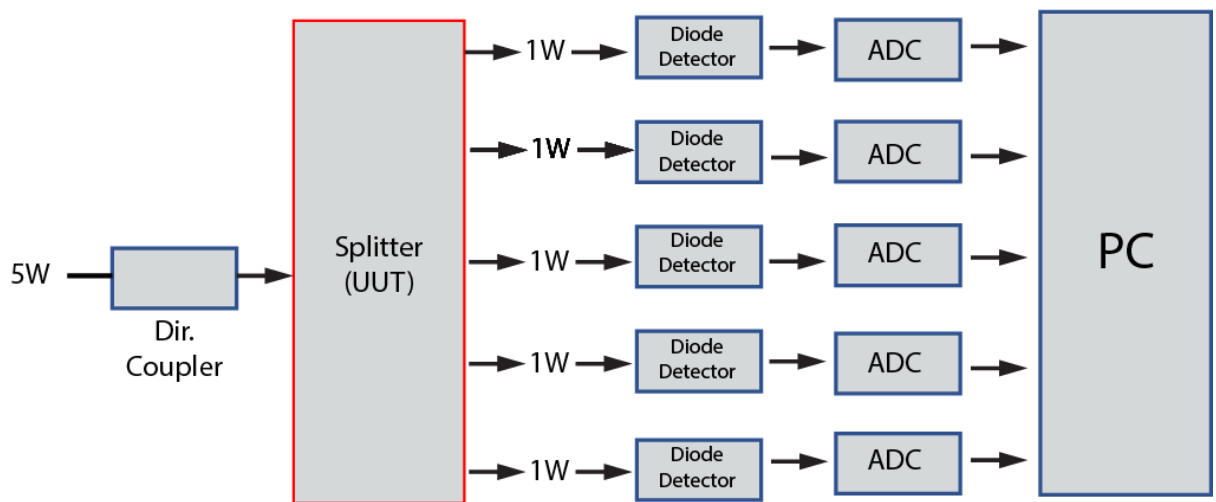
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**FUNCTIONAL BLOCK DIAGRAM:**



→ TACAN TEST BENCH

→ UNIT UNDER TEST (UUT)



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**SPLITTER FUNCTIONAL TEST REPORT**

OPERATOR NAME.	Amir	MODULE CAT.	CAT-A
JON NO.	spliter	TEST DATE.	22/04/2021
SERIAL NO.	s12	OEM PART NO.	425-FAU1A

**F1 : 0.96GHz      L1 : 126mV**

INPUT	ACCEPTANCE RANGE (dBm)	MEASURED VALUE (dBm)	RESULT
OUTPUT1	0028-0042	0039	PASS
OUTPUT2	0028-0043	0040	PASS
OUTPUT3	0032-0048	0044	PASS
OUTPUT4	0032-0048	0038	PASS
OUTPUT5	0024-0037	0033	PASS
OUTPUT6	0000-0000	0000	PASS

**F1 : 0.96GHz      L2 : 228mV**

INPUT	ACCEPTANCE RANGE (dBm)	MEASURED VALUE (dBm)	RESULT
OUTPUT1	0144-0216	0187	PASS
OUTPUT2	0144-0217	0188	PASS
OUTPUT3	0162-0243	0198	PASS
OUTPUT4	0165-0248	0179	PASS
OUTPUT5	0133-0217	0196	PASS
OUTPUT6	0000-0000	0000	PASS

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**F2 : 1.0GHz      L1 : 126mV**

<b>INPUT</b>	<b>ACCEPTANCE RANGE (dBm)</b>	<b>MEASURED VALUE (dBm)</b>	<b>RESULT</b>
OUTPUT1	0028-0043	0041	PASS
OUTPUT2	0030-0045	0041	PASS
OUTPUT3	0032-0048	0046	PASS

**Tested on TACAN TEST BENCH Model No: ..... Designed, developed and manufactured by  
M/s Neometrix Engineering Pvt Ltd, E-148, Sector-63, NOIDA, UP. India 201301**

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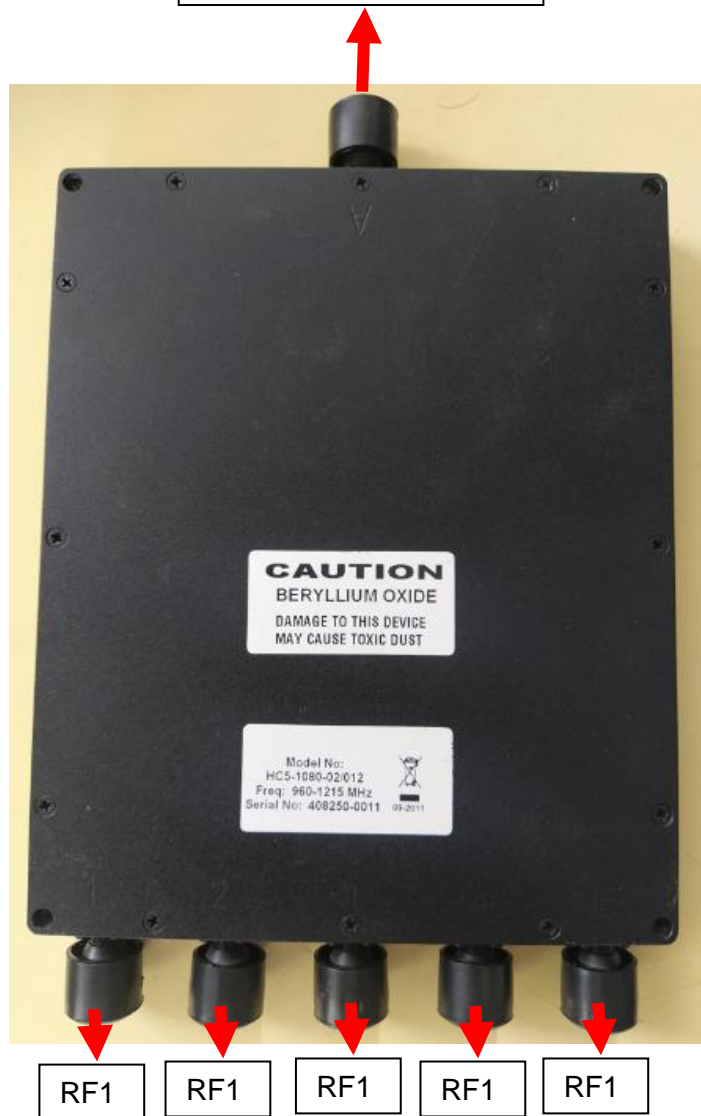
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**2.1.5 COMBINER**

**About:**

RF OUT CONNECTOR



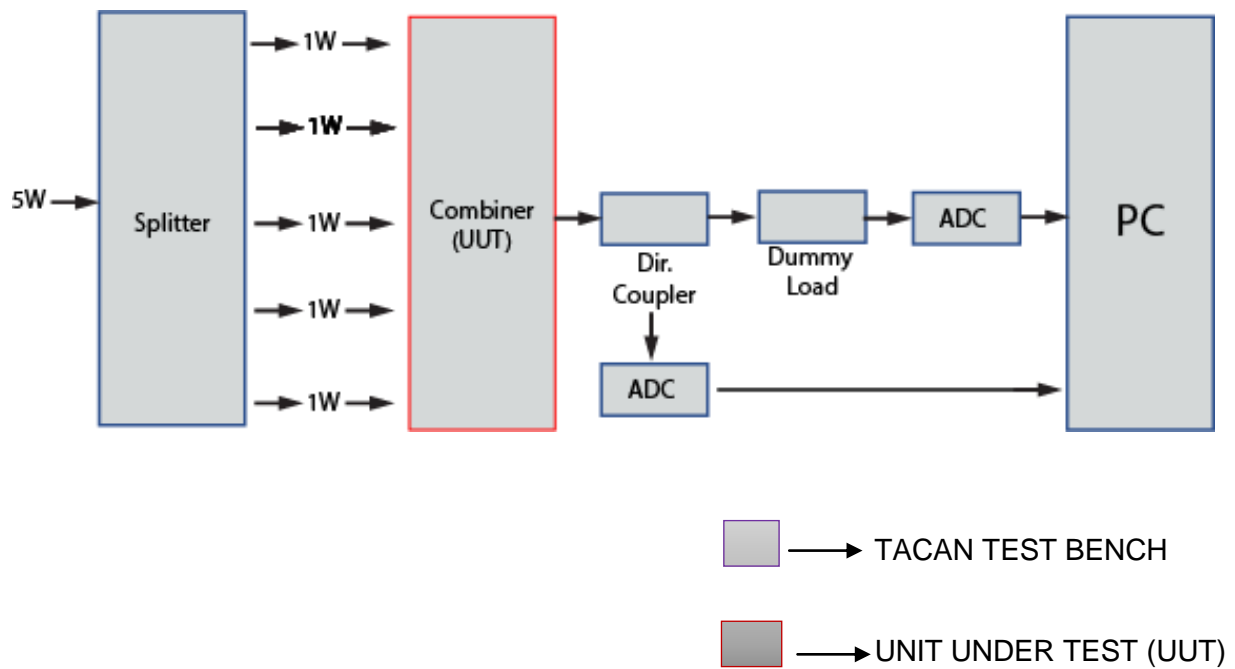
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**FUNCTIONAL BLOCK DIAGRAM:**



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**COMBINER FUNCTIONAL TEST REPORT**

OPERATOR NAME.	<input type="text" value="1"/>	MODULE CAT.	<input type="text" value="1"/>
JON NO.	<input type="text" value="1"/>	TEST DATE.	<input type="text" value="16/06/2021"/>
SERIAL NO.	<input type="text" value="1"/>	OEM PART NO.	<input type="text" value="FAS240"/>

F1 : 0.96GHz, F2 : 1.0GHz, F3 : 1.025GHz, L1 : -5.0dBm, L2 : 0.0dBm, L3 : 5.0dBm

INPUT1 (mW)	INPUT2 (mW)	INPUT3 (mW)	INPUT4 (mW)	INPUT5 (mW)	ACCEPTENC E RANGE	OUTPUT (mV)	RESULT
F1 L1	F1 L1	F1 L1	F1 L1	F1 L1	0013-0039	0019	PASS
F1 L2	F1 L2	F1 L2	F1 L2	F1 L2	0043-0130	0087	PASS
F1 L3	F1 L3	F1 L3	F1 L3	F1 L3	0090-0270	0156	PASS
F2 L1	F2 L1	F2 L1	F2 L1	F2 L1	0012-0036	0014	PASS
F2 L2	F2 L2	F2 L2	F2 L2	F2 L2	0038-0115	0043	PASS
F2 L3	F2 L3	F2 L3	F2 L3	F2 L3	0077-0232	0131	PASS
F3 L1	F3 L1	F3 L1	F3 L1	F3 L1	0004-0013	0004	PASS
F3 L2	F3 L2	F3 L2	F3 L2	F3 L2	0012-0036	0029	PASS
F3 L3	F3 L3	F3 L3	F3 L3	F3 L3	0053-0160	0083	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

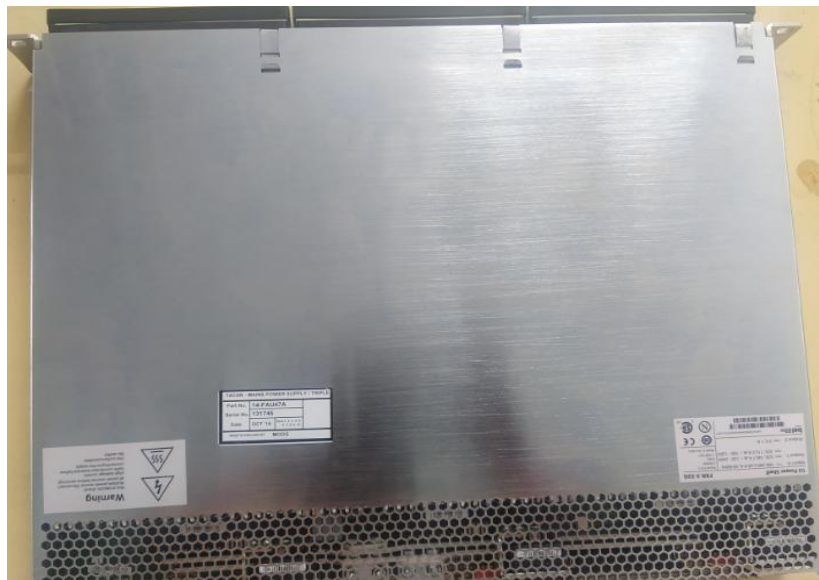
**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
REV00

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**2.1.6 MAIN POWER SUPPLY**

ABOUT:



LOAD CONNECTOR

CONNECT DB40  
CONNECTOR

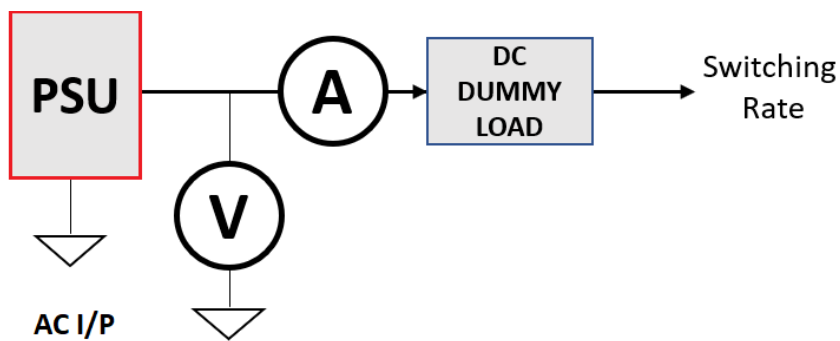
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
REV00

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**FUNCTIONAL BLOCK DIAGRAM:**



 → TACAN TEST BENCH

 → UNIT UNDER TEST (UUT)

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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The Complete Engineering Solutions Company

**MAIN POWER SUPPLY FUNCTIONAL TEST REPORT**

OPERATOR NAME. <input type="text" value="Amir"/>	MODULE CAT. <input type="text" value="CAT-A"/>
JON NO. <input type="text" value="12"/>	TEST DATE. <input type="text" value="30/04/2021"/>
SERIAL NO. <input type="text" value="12"/>	OEM PART NO. <input type="text" value="274-FAU14A"/>

**PSU 1**

S.NO	LOAD	MEASURED VOLTAGE (VDC)	MEASURED CURRENT(A)	ACCEPTANCE RANGE (A)	RESULT
1	25%	28.050	014.66	012.00-018.00	PASS
2	50%	28.050	022.00	018.00-027.00	PASS
3	75%	28.050	029.33	024.00-036.00	PASS
4	100%	28.050	036.66	030.00-045.00	PASS

**PSU 2**

S.NO	LOAD	MEASURED VOLTAGE (VDC)	MEASURED CURRENT(A)	ACCEPTANCE RANGE (A)	RESULT
1	25%	28.050	014.66	012.00-018.00	PASS
2	50%	28.050	022.00	018.00-027.00	PASS
3	75%	28.050	029.33	024.00-036.00	PASS
4	100%	28.050	036.66	030.00-045.00	PASS



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

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REV00**

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**PSU 3**

S.NO	LOAD	MEASURED VOLTAGE (VDC)	MEASURED CURRENT(A)	ACCEPTANCE RANGE (A)	RESULT
1	25%	28.050		012.00-018.00	PASS
2	50%	28.050		018.00-027.00	PASS
3	75%	28.050		024.00-036.00	PASS
4	100%	28.050		030.00-045.00	PASS

**Tested on TACAN TEST BENCH Model No: ..... Designed, developed and manufactured by  
M/s Neometrix Engineering Pvt Ltd, E-148, Sector-63, NOIDA, UP. India 201301**

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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**2.1.7 FAN MODULE**

FAN module is used in TACAN system to maintain the temperature of the panel uniform by forced air circulation



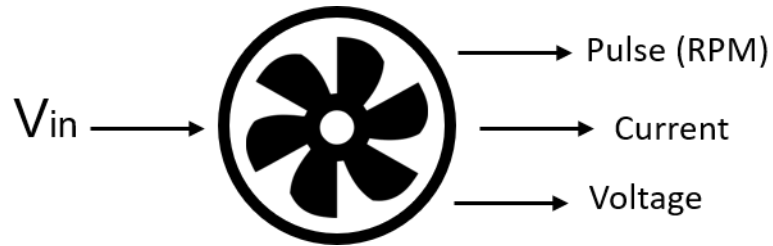
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**FUNCTIONAL BLOCK DIAGRAM:**



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
REV00

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**FAN UNIT FUNCTIONAL TEST REPORT**

OPERATOR NAME.	<input type="text" value="amir"/>	MODULE CAT.	<input type="text" value="cat1"/>
JON NO.	<input type="text" value="fan"/>	TEST DATE.	<input type="text" value="21/04/2021"/>
SERIAL NO.	<input type="text" value="f1"/>	OEM PART NO.	<input type="text" value="FAS816B"/>
VOLTAGE	<input type="text" value="+11.999"/>	CURRENT	<input type="text" value="+2.709"/>

SLNO	RPM	ACCEPTENCE RANGE (RPM)	STATUS
1	1660	1600 - 2100	PASS
2	1679	1600 - 2100	PASS
3	0	1600 - 2100	FAIL
4	0	1600 - 2100	FAIL
5	0	1600 - 2100	FAIL
6	0	1600 - 2100	FAIL

**Test Witness Team :-**

Name	Designation	Signature	Remark

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

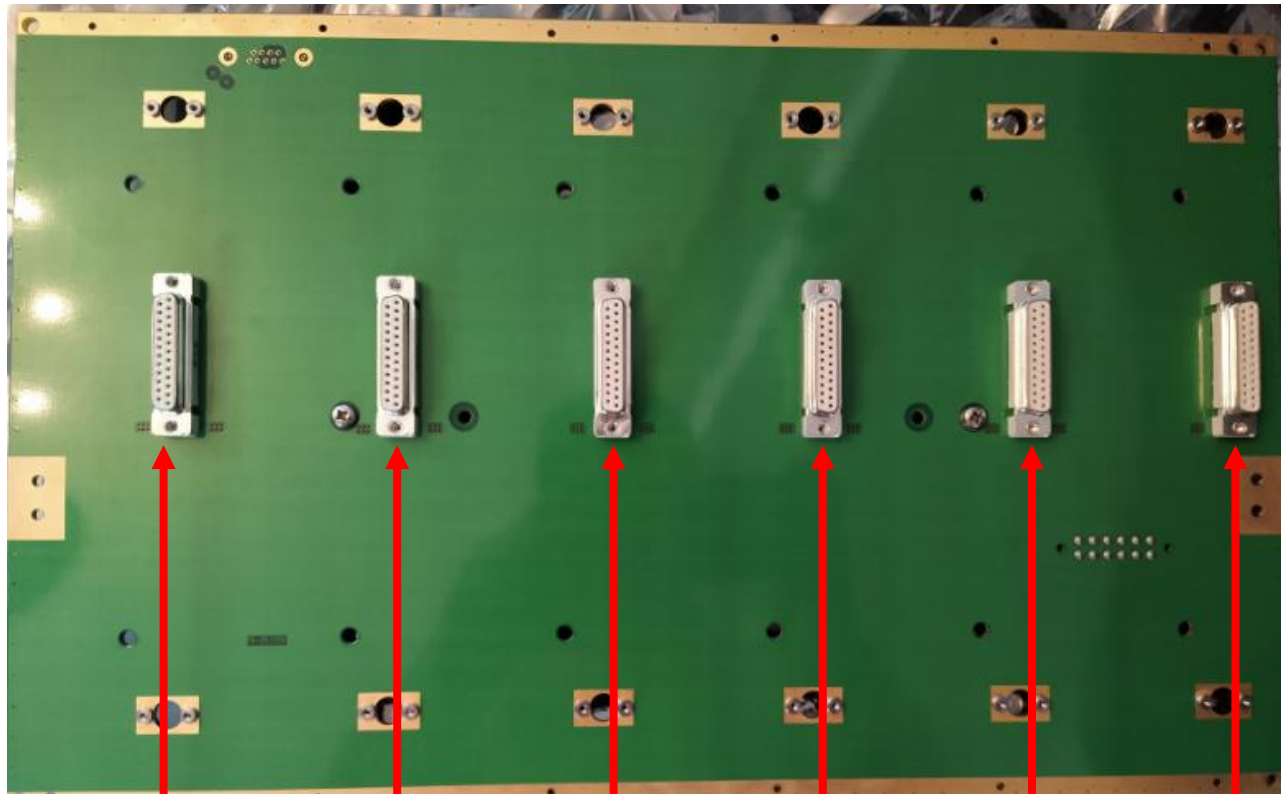
**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
REV00

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**2.1.8 HPA BACK PLANE**

ABOUT:



DB25-1

DB25-1

DB25-1

DB25-1

DB25-1

DB25-1

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

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**HPA BACKPLANE FUNCTIONAL TEST REPORT**

OPERATOR NAME.	amir	MODULE CAT.	tacan
JON NO.	hpa12	TEST DATE.	20/04/2021
SERIAL NO.	hpa123	OEM PART NO.	15-FAU30A

SLNO	PARAMETERS	ACCEPTENCE RANGE	RESULT
1	HPA CONNECTOR-1 TEST	CONNECTOR 1 CONTINUITY TEST	PASS
2	HPA CONNECTOR-2 TEST	CONNECTOR 2 CONTINUITY TEST	PASS
3	HPA CONNECTOR-3 TEST	CONNECTOR 3 CONTINUITY TEST	PASS
4	HPA CONNECTOR-4 TEST	CONNECTOR 4 CONTINUITY TEST	PASS
5	HPA CONNECTOR-5 TEST	CONNECTOR 5 CONTINUITY TEST	PASS
6	HPA CONNECTOR-6 TEST	CONNECTOR 6 CONTINUITY TEST	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

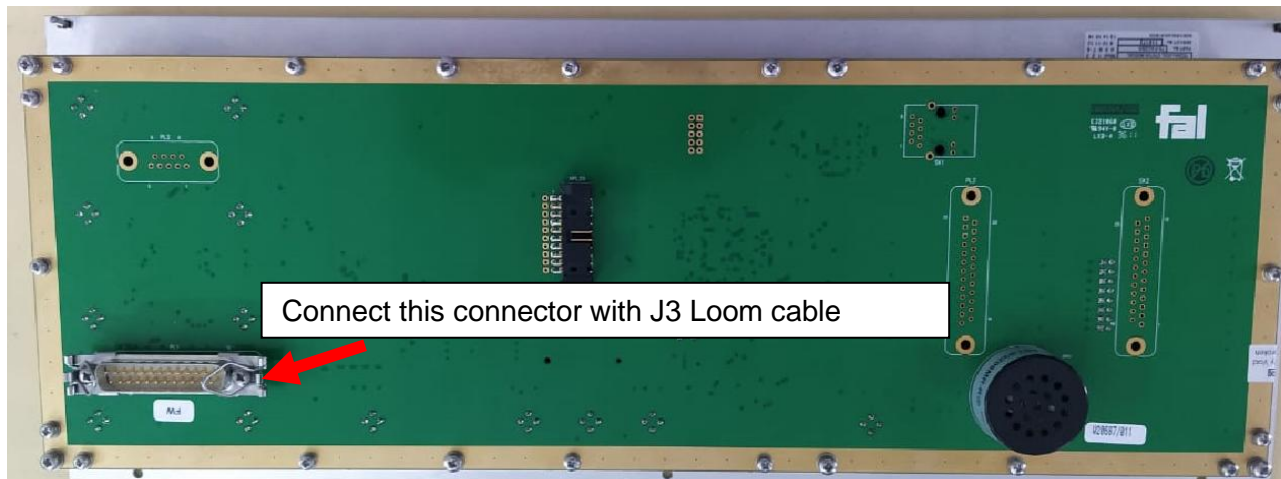
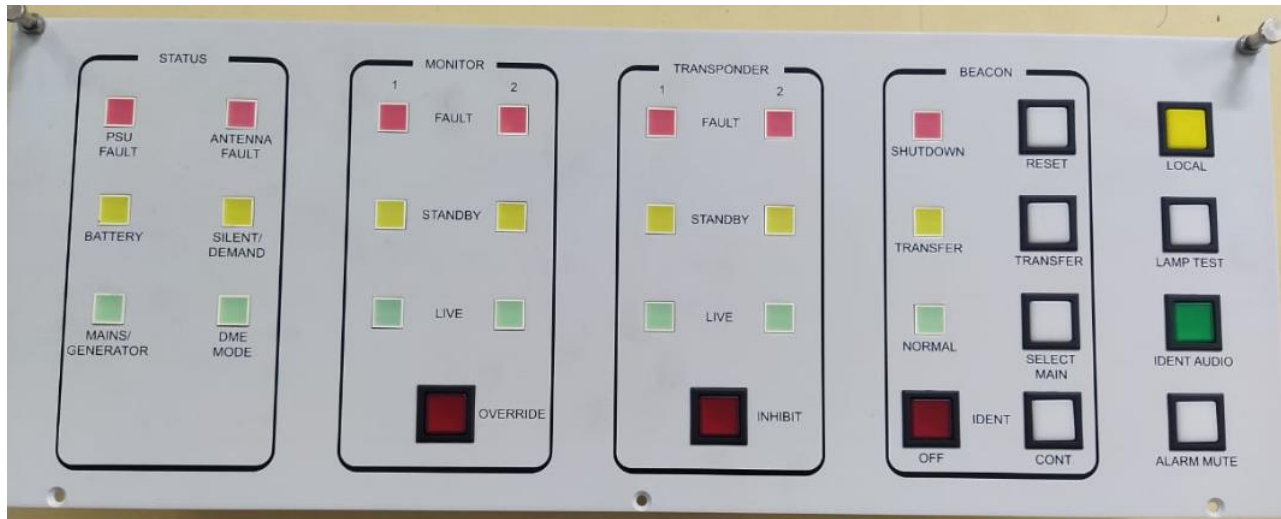
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
REV00**

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**2.1.9 LOCAL STATUS INDICATOR:**



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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**Connection with ATE:** As shown in above photograph, connect the multi-pin male connector of local status indicator with J3 connector of the ATE provided. Tight the connector carefully and check for any loose connection.

**About LSI:** This is an intelligent module , this shows the status of TACAN unit status locally. This is identical of remote status panel without the Ethernet interface (additional component). This has CAN bus interface and a serial port which is connected to a modem.



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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The Complete Engineering Solutions Company

**LOCAL STATUS INDICATOR FUNCTION TEST REPORT**

OPERATOR NAME.	amir	MODULE CAT.	tacan
JON NO.	Isi	TEST DATE.	21/04/2021
SERIAL NO.	Isi1	OEM PART NO.	79-FAU28A
VOLTAGE	+27.998	CURRENT	+0.081

SLNO	PARAMETERS	ACCEPTENCE RANGE	RESULT
1	LOCAL TEST	CHECK LOCAL COMMAND STATUS	PASS
2	OVERRIDE TEST	CHECK OVERRIDE COMMAND STATUS	PASS
3	INHIBIT TEST	CHECK INHIBIT COMMAND STATUS	PASS
4	IDENT OFF TEST	CHECK IDENT COMMAND STATUS	PASS
5	LAMP TEST	CHECK LAMP HEALTH STATUS	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

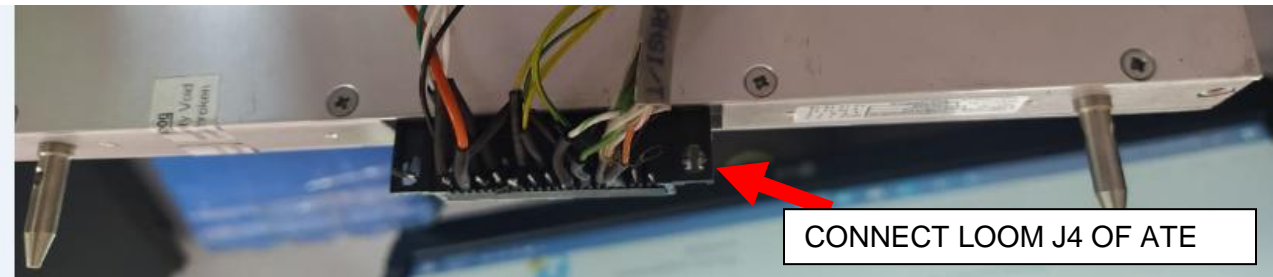
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
REV00

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**2.1.10 SYSTEM INTERFACE**



**About:**

This is an intelligent module, this forms the crucial interface of the TACAN system. It has CAN,USB,SERIAL & ETHERNET INTERFACE.

This module is responsible for initializing the system at start up.

**Connection:**

Connect the multi-pin connector of the module with ATE as shown in the fig above. Check the connection is proper and no any lose cables in the connector.

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

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The Complete Engineering Solutions Company

**SYSTEM INTERFACE FUNCTIONAL TEST REPORT**

OPERATOR NAME.	Amir	MODULE CAT.	CAT-a
JON NO.	s12	TEST DATE.	27/04/2021
SERIAL NO.	123	OEM PART NO.	274-FAU14A
VOLTAGE	+27.997	CURRENT	+0.100

SLNO	PARAMETERS	STANDARD VALUE	ACCEPTENCE RANGE	RESULT
1	INTERNAL BITE TEST FOR CAN BUS COMMUNICATION	CAN BUS TX AND RX CHECK WITH CONTROLLER	INTERNAL BITE TEST	PASS
2	INTERNAL BITE TEST FOR SERIAL COMMUNICATION	SERIAL TX AND RX CHECK WITH CONTROLLER	INTERNAL TX/RX BITE TEST	PASS
3	SYSTEM INITIALIZATION TEST	CHECK ALL COMMUNICATION TX/RX SIGNAL	INTERNAL BITE TEST	PASS
4	REAL TIME CLOCK TEST	CHECK REAL TIME	INTERNAL BITE TEST	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

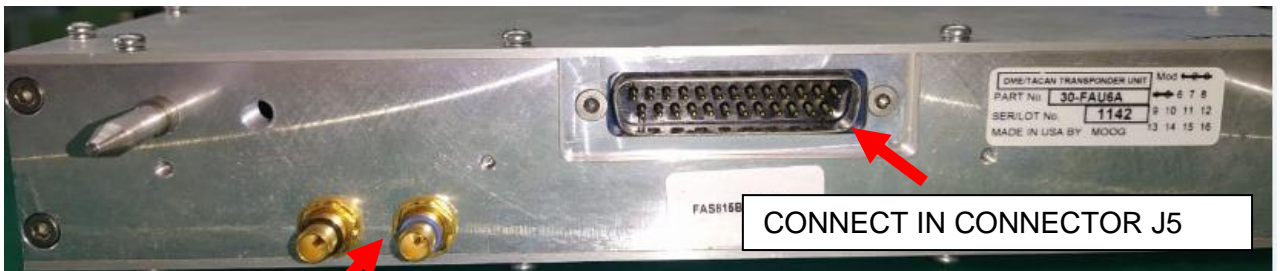
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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**2.1.11 TRANSPONDER :**



GET AUTOMATICALLY CONNECTED IN FIXTURE

**About:** The main purpose of the transponder is RF pulse pair generation. It can synthesize all the requirements allotted for TACAN generation. This generates the fundamental beacon TX signal this is identical to the monitor module and a transponder can be converted to monitors by interchanging the jumper settings.

The transponder also controls the low power amplifier by MOD A and MOD A/B signals.

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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**Connection:** Suitable fixture with connector slot is provided in the TACAN test bench. Connect the connector J5 as shown in the above picture. The remaining two RF IN and RF OUT will automatically get connected to the system. This is designed to avoid the wrong connectivity of the RF IN/ RF OUT.

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
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**Test Report**



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**TRANSPONDER UNIT PANEL FUNCTIONAL TEST REPORT**

OPERATOR NAME:  MODULE CAT:   
JOB NO.:  TEST DATE:   
SERIAL NO.:

**FUNCTIONAL TEST**

SL NO	COMMAND FOR BEACON FREQUENCY	MEASURED BEACON FREQUENCY(MHz)	RESULT
1	962MHz	962MHz	PASS
2	973 MHz	973 MHz	PASS
3	985 MHz	985 MHz	PASS
4	997 MHz	997 MHz	PASS
5	1009 MHz	1009 MHz	PASS
6	1021 MHz	1021 MHz	PASS

**Test Witness Team:-**

Name	Designation	Signature	Remark

Tested on TACAN TEST BENCH Model No: ..... Designed, developed and manufactured by M/s  
Neometrix Engineering Pvt Ltd, E-148, Sector-63, NOIDA, UP. India 201301



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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**About** : The receiver demodulate the RF pulse pair received from the aircraft. The front end of the receiver is auto tuned four cavity band pass filter. This is set by the transponder (+/- 63MHz, TX frequency). This is followed by LNA image reject mixer, RF analysis and video decoder. This receives the fault signals when the demodulator video is not within limits/parameters.

**Test Report:**



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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The Complete Engineering Solutions Company

**RECEIVER UNIT PANEL FUNCTIONAL TEST REPORT**

OPERATOR NAME

MODULE CAT

JOB NO.

TEST DATE:

SERIAL NO.

**FUNCTIONAL TEST**

L1: -80 dBm, L2: -60dBm

SL NO	PARAMETER	MEASURED O/P	RESULT
1	I2C COMMUNICATION TEST	PASS/FAIL	PASS
2	962MHz	LOG VEDIO DETECTED	PASS
3	970MHz	LOG VEDIO DETECTED	PASS
4	1100Mhz	LOG VEDIO DETECTED	PASS
5	1120MHz	LOG VEDIO DETECTED	PASS
6	1130Mhz	LOG VEDIO DETECTED	PASS

Test Witness Team:-

Name	Designation	Signature	Remark

Tested on TACAN TEST BENCH Model No: ..... Designed, developed and manufactured by M/s  
Neometrix Engineering Pvt Ltd, E-148, Sector-63, NOIDA, UP, India 201301

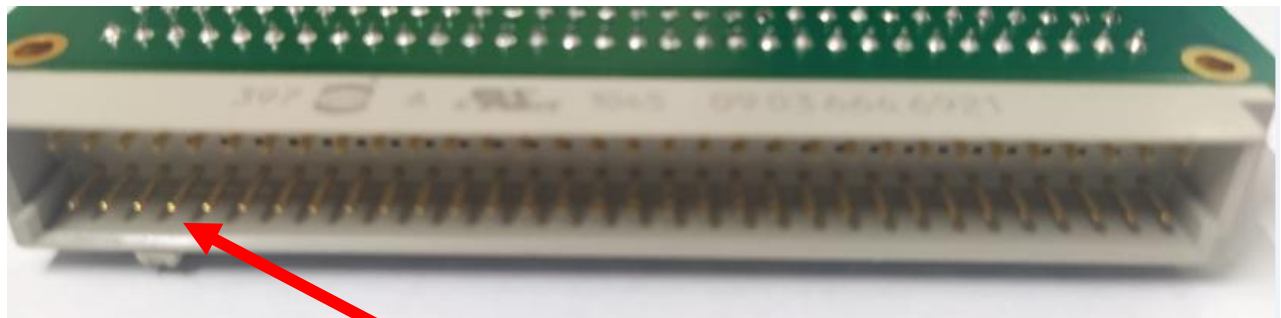
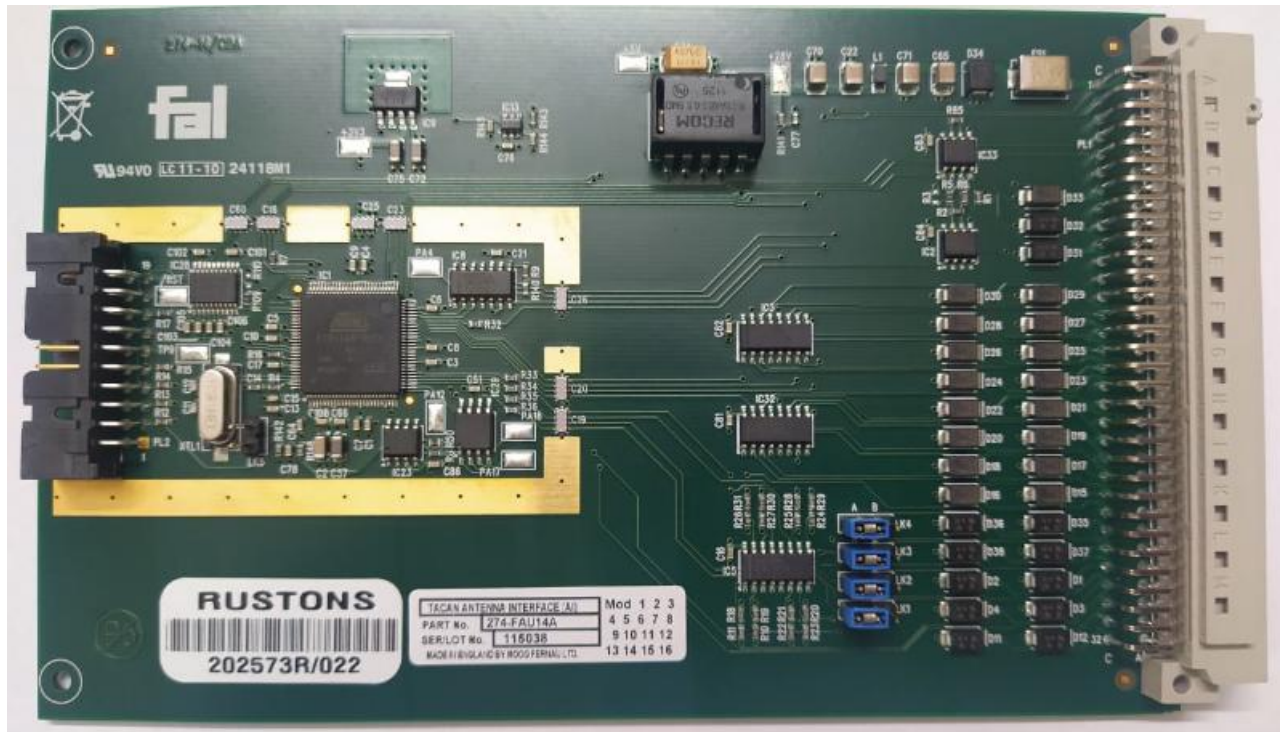
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**2.1.13 ANTENNA INTERFACE UNIT:**



Connect Loom J6 to this side in TACAN test bench

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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**About** : ANTENA interface unit forms the interface between MCU, interconnect antenna and if needed to a 3<sup>rd</sup> party antenna system.  
It also acts a an interface between parallel, serial and CAN BUS communication.

**Connection** : Connect the antenna interface unit with TACAN test bench with loom J6 as shown in the above picture.

Test Report :

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

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The Complete Engineering Solutions Company

**ANTENNA INTERFACE UNIT FUNCTIONAL TEST REPORT**

OPERATOR NAME.	<input type="text" value="amir"/>	MODULE CAT.	<input type="text" value="1"/>
JON NO.	<input type="text" value="12"/>	TEST DATE.	<input type="text" value="26/04/2021"/>
SERIAL NO.	<input type="text" value="12"/>	OEM PART NO.	<input type="text" value="274-FAU14A"/>
VOLTAGE	<input type="text" value="+27.997"/>	CURRENT	<input type="text" value="+0.030"/>

SLNO	PARAMETERS	ACCEPTENCE RANGE	RESULT
1	CAN BUS COMMUNICATION TEST	INTERNAL BITE FOR CAN BUS	PASS
2	SERIAL RS 485 COMMUNICATION TEST	INTERNAL BITE TEST FOR SERIAL 485	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**2.1.14 TACAN TRANSFER UNIT**

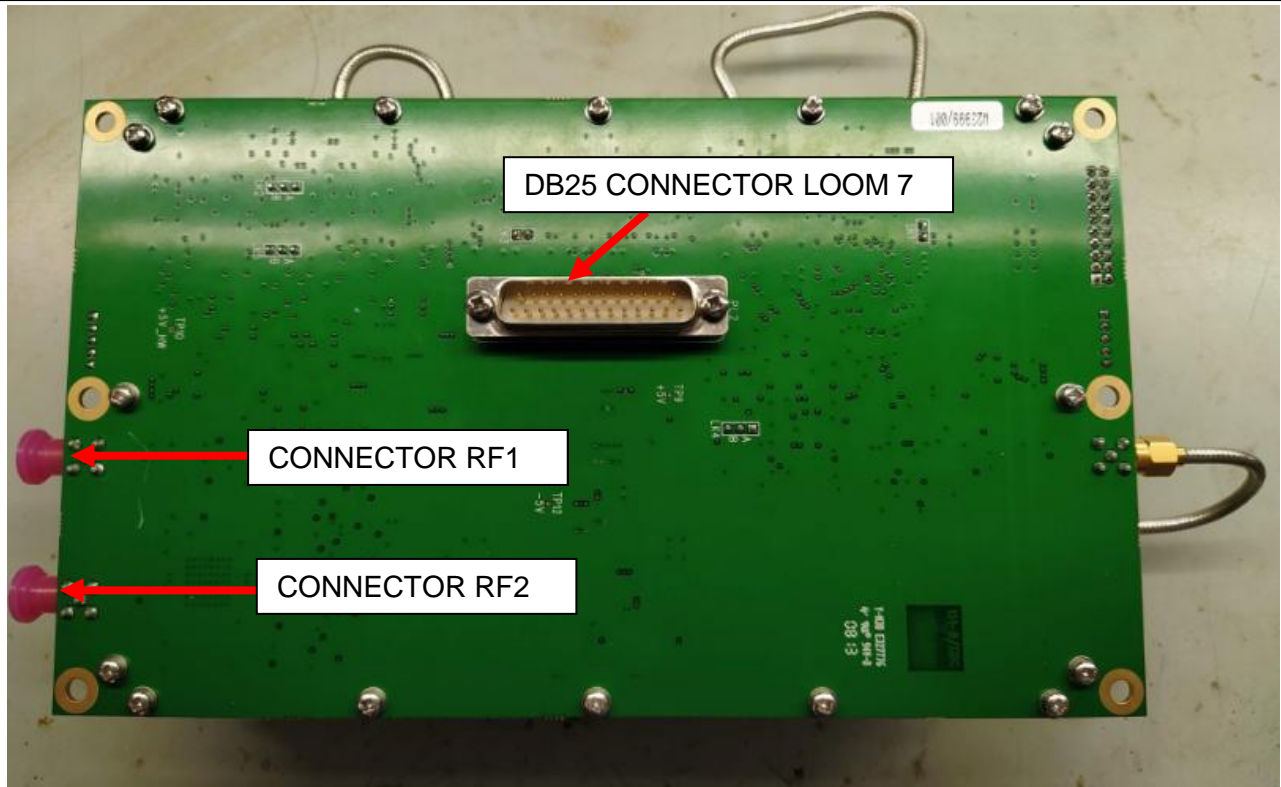


**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
REV00**

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**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

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Testing Table:



**NEOMETRIX**  
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**TRANSFER UNIT PANEL FUNCTIONAL TEST REPORT**

OPERATOR NAME

MODULE CAT.

JOB NO.

TEST DATE:

SERIAL NO.

**FUNCTIONAL TEST**

L1: -80 dBm, L2: -60dBm

SL.NO	PARAMETER	MEASURED O/P	RESULT
1	SELF	PASS/FAIL	PASS
2	CAN COMMUNICATION TEST	PASS/FAIL	PASS
3	RECEIVER RELAY 1 TEST	PASS/FAIL	PASS
4	RECEIVER RELAY 2 TEST	PASS/FAIL	PASS
5	TX FORWARD POWER TEST	PASS/FAIL	PASS
6	TX REVERSE POWER TEST	PASS/FAIL	PASS

Test Witness Team:-

Name	Designation	Signature	Remark

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**2.1.15 CIRCUIT BREAKERS**





**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**TEST REPORT :**



**NEOMETRIX**  
The Complete Engineering Solutions Company

**CIRCUIT BREAKERS FUNCTIONAL TEST REPORT**

OPERATOR NAME.	<input type="text" value="Amir"/>	MODULE CAT.	<input type="text" value="cat-a"/>
JON NO.	<input type="text" value="c12"/>	TEST DATE.	<input type="text" value="22/04/2021"/>
SERIAL NO.	<input type="text" value="123"/>	OEM PART NO.	<input type="text" value="125-003"/>
VOLTAGE	<input type="text" value="+12.999"/>	CURRENT	<input type="text" value="+15.880"/>

SL.NO	SUPPLY PEAK CURRENT	ACCEPTENCE RANGE PEAK CURRENT	MEASURED PEAK CURRENT	RESULT
1	12.00 Amps	11.98 – 12.02	+11.993	PASS
2	14.00 Amps	13.98 – 14.02	+13.992	PASS
3	16.00 Amps	15.98 – 16.02	+15.992	PASS
4	18.00 Amps	17.98 – 18.02	+15.942	FAIL
5	20.00 Amps	19.98 – 20.02	+15.880	FAIL

**Test Witness Team :-**

Name	Designation	Signature	Remark

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**2.1.16 HPA(HIGH POWER AMPLIFIER)**



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
REV00**

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**TEST REPORT:**



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**HIGH POWER AMPLIFIER UNIT PANEL FUNCTIONAL TEST  
REPORT**

OPERATOR NAME  MODULE CAT   
JOB NO.  TEST DATE:   
SERIAL NO.

**FUNCTIONAL TEST**

SL.NO	PARAMETERS	STANDARD VALUE	RESULT
1	F1L1	960Mhz	PASS
2	F2L2	1.0Ghz	PASS
3	F3L3	1.025Ghz	PASS
4	F4L4	1.050Ghz	PASS
5	F5L5	1.100Ghz	PASS
6	F6L6	1.150Ghz	PASS

**Test Witness Team:-**

Name	Designation	Signature	Remark

Tested on TACAN TEST BENCH Model No: ..... Designed, developed and manufactured by M/s  
Neometrix Engineering Pvt Ltd, E-148, Sector-63, NOIDA, UP. India 201301

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
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**2.1.17 LPA(Low Power Amplifier)**



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**TEST REPORTS :**



**NEOMETRIX**  
The Complete Engineering Solutions Company

**LOW POWER AMPLIFIER UNIT PANEL FUNCTIONAL TEST  
REPORT**

OPERATOR NAME:       MODULE CAT:   
JOB NO.       TEST DATE:   
SERIAL NO.

**FUNCTIONAL TEST**

SL.NO	PARAMETERS	STANDARD VALUE	RESULT
1	F1L1	960Mhz	PASS
2	F2L2	1.0Ghz	PASS
3	F3L3	1.025Ghz	PASS
4	F4L4	1.050Ghz	PASS
5	F5L5	1.100Ghz	PASS
6	F6L6	1.150Ghz	PASS

Test Witness Team:-

Name	Designation	Signature	Remark

Tested on TACAN TEST BENCH Model No: ..... Designed, developed and manufactured by M/s  
Neometrix Engineering Pvt Ltd, E-148, Sector-63, NOIDA, UP. India 201301

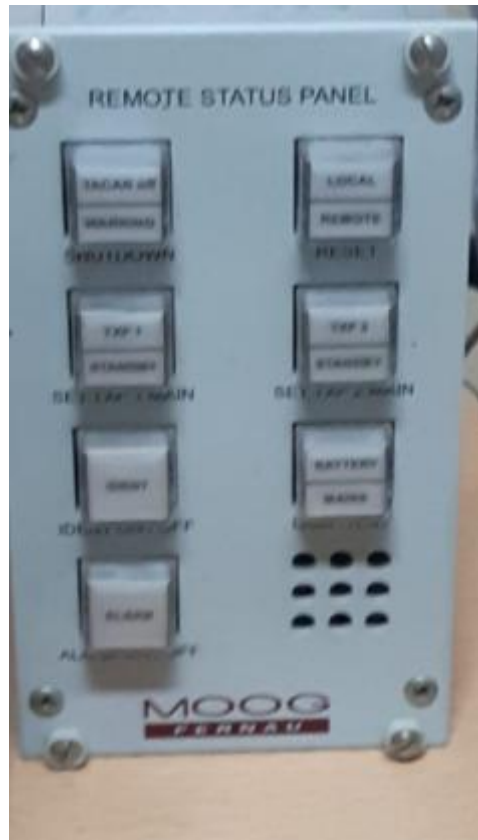
**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name** : TB\_TACAN

**Document No.** : T-PED-ATP-A2046-  
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**2.1.18 REMOTE STATUS INDICATOR**



**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

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**TEST REPORT:**



**NEOMETRIX**  
*The Complete Engineering Solutions Company*

**REMOTE STATUS PANEL FUNCTIONAL TEST REPORT**

OPERATOR NAME.	1	MODULE CAT.	1
JON NO.	1	TEST DATE.	27/04/2021
SERIAL NO.	1	OEM PART NO.	274-FAU14A
VOLTAGE	+11.997	CURRENT	+0.091

SLNO	PARAMETERS	ACCEPTENCE RANGE	RESULT
1	INTERNAL BITE TEST FOR SERIAL COMMUNICATION	SERIAL TX AND RX CHECK WITH CONTROLLER	PASS
2	SHUTDOWN TEST	SHUTDOWN COMMAND READ	PASS
3	RESET TEST	RESET COMMAND READ	PASS
4	SET TXP1 MAIN TEST	TXP1 MAIN COMMAND READ	PASS
5	SET TXP2 MAIN TEST	TXP2 MAIN COMMAND READ	PASS
6	IDENT ON/OFF TEST	IDENT COMMAND READ	PASS
7	ALARM ON/OFF TEST	ALARM COMMAND READ	PASS
8	LAMP TEST	ALL LAMP GLOW	PASS

**Test Witness Team :-**

Name	Designation	Signature	Remark

**FACTORY ACCEPTANCE TEST OF  
TB TACAN UNIT**

**System Name : TB\_TACAN**

**Document No. : T-PED-ATP-A2046-  
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**3.0.0 EXECUTION**

**3.1.0 General**

Testing of equipment and relevant documentation at the manufacturer's factory against the requirements of an approved test protocol. The successfully executed protocol conform that the TB-TACAN is satisfactorily ready to ship for Delivery

**3.2.0 Factory Details**

Firm Name	NEOMETRIX
Locality Type	R&D Lab / Factory
Address	#26, 4 <sup>TH</sup> STREET, LAKSHMI NAGAR, VELACHERY, CHENNAI-42
Point of Contact Person	AAMIR ALAM
Phone no.	044-45538454
Fax no.	044-45538454
Email	<a href="mailto:CONTACT@NEOMETRIXGROUP.COM">CONTACT@NEOMETRIXGROUP.COM</a>

**3.3.0 IDENTIFICATION OF EXECUTOR**

All executors involved in this protocol execution are to sign within the prescribed format given below:

Name	Designation	Signature	Initial	Date



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**4.0.0 FACTORY ACCEPTANCE TEST CHECKLIST**

Test Number	Test Name	Status		Tested By / DATE
		Pass	Fail	
1	Understanding of Actual Requirement			
2	Standard Work Procedures			
4	As-Built Drawing			
5	Calibration Certificates (Wherever required)			
6	Equipment's and Material's Datasheet			
7	Standard Operating Procedure (SOP)			
8	Installation, Maintenance and User's Manual			
9	BOM List			
10	Visual Inspection of Mounting and Screw Check			
11	Verifications of Tag and Label			
12	Safety Interlock Check			
13	Heat dissipation and Ventilation of TB Panel Check			
14	Startup Process			
15	Control System function			
16	Equipment Interface			
17	Shutdown Process			
18	Troubleshooting Procedure (ATP)			

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**5.0.0 FAT DISCREPANCY REPORT**

**DISCREPANCY AND CORRECTIVE ACTION REPORT FORM**

Discrepancy Number	
Document Ref. No.	
Chapter ref. No.	

**DISCREPANCY**

Describe the Discrepancy	Discrepancy Level		
	Minor	Major	Critical
Reported by			DATE

**CORRECTIVE ACTION**

Describe corrective action taken	
Reported to	DATE

**DISPOSITION ACTION**

Acceptable?	Yes	No
Discussion		
Approved by:	DATE	

**COMPLETION**

Completed by	DATE
Approved by:	DATE

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**6.0.0 CONCLUSION AND COMMENTS**

Test Data Sheets and discrepancy report shall be reviewed by validation team to prepare summary report. The summary of Test Report shall be used to draw conclusion for approval of Qualification Package.

**CONCLUSION**


**COMMENTS**


Prepared by	Checked by	Approved by
_____	_____	_____

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**7.0.0 TERMINOLOGIES**

**A. Alarm**

A device or function that signals the existence of an abnormal condition by means of an audible or visible discrete change, or both, intended to attract attention.

**B. Control System**

A system in which deliberate guidance or manipulation is used to achieve a prescribed value of a variable.

**C. Interlock**

An arrangement of signals, which perform a logical function in a control system.

**D. UUT**

Unit Under Test

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**8.0.0 SUPPORTING DOCUMENTATION**

<b>Sr. No.</b>	<b>Description of Attachment</b>	<b>Reference</b>	<b>Remark</b>	<b>Checked By / DATE</b>

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**9.0.0 FAT DOCUMENTS**

<b>Sr. No.</b>	<b>CERTIFICATE Of Attachment</b>	<b>Reference</b>	<b>Remark</b>	<b>Checked By / Date</b>
1	Calibration Report of -----			
2	Calibration Report of -----			
3	Calibration Report of -----			
4	Calibration Report of -----			
5	Calibration Report of -----			
6	Calibration Report of -----			
7	Calibration Report of -----			
8	Calibration Report of -----			
9	Calibration Report of -----			
10	Calibration Report of -----			
11	Warranty Certificate of -----			
12	Warranty Certificate of -----			
13	Warranty Certificate of -----			
14	Warranty Certificate of -----			
15	Warranty Certificate of -----			
16	Warranty Certificate of -----			
17	Warranty Certificate of -----			
18	Warranty Certificate of -----			
19	Warranty Certificate of -----			
20	Warranty Certificate of -----			

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