

Modem Testing – 3 Days

Day1

1. Introduction to Modem Testing – 2 hour

- ❖ What is a Modem?
- ❖ Types of Modems (Dial-up, DSL, Cable, Cellular)
- ❖ Importance of Modem Testing
- ❖ Modem Standards and Protocols Overview

2. Test Setup and Tools – 2 hour

- ❖ Required Hardware (Test PCs, SIMs, Signal Generators, Antennas)
- ❖ Required Software (AT Command Terminal, Wireshark)
- ❖ Modem Firmware and Drivers
- ❖ Environment Setup (Network Simulator, Lab Equipment)

3. Basic Functional Tests – 2 hour

- ❖ Power ON/OFF Behavior
- ❖ SIM Detection
- ❖ Network Registration (2G/3G/4G/5G)
- ❖ Signal Strength (RSSI, RSRP, RSRQ)
- ❖ Flight Mode and Recovery

4. AT Command Testing – 2 hour

- ❖ Introduction to AT Commands
- ❖ Common AT Commands (AT, ATI, AT+CSQ, AT+CREG, AT+CGDCONT)
- ❖ Testing Network Information Retrieval
- ❖ SMS Functionality via AT Commands
- ❖ Data Call Establishment via AT

Day2

5. Data Communication Testing – 2 hour

- ❖ PDP Context Activation
- ❖ IP Address Assignment
- ❖ Ping and Throughput Testing
- ❖ Upload/Download Speed Test (FTP, HTTP, iPerf)
- ❖ DNS Resolution Test

6. Protocol-Level Testing – 2 hour

- ❖ TCP/UDP Session Establishment
- ❖ Packet Captures and Analysis (Wireshark)
- ❖ IP Stack Behavior (IPv4/IPv6)
- ❖ Packet Loss, Jitter, and Latency

7. Voice and SMS Testing (If Supported) – 2 hour

- ❖ Circuit-Switched Voice Call Test
- ❖ VoLTE Call Test
- ❖ MO/MT SMS Testing

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- ❖ Long SMS and Multipart Message Testing

8. Roaming and Handover Testing – 1 hour

- ❖ Manual and Automatic Network Selection
- ❖ Roaming Registration
- ❖ Handover Scenarios (Intra-RAT, Inter-RAT, Idle, Connected Mode)

9. Stability and Stress Testing – 1 hour

- ❖ Long Duration Data Session
- ❖ Repeated Power Cycles
- ❖ Network Drop and Recovery
- ❖ Thermal and Voltage Variation Test

Day3

10. Security and Authentication Testing – 2 hour

- ❖ SIM/USIM Authentication
- ❖ Secure PDP Context Setup
- ❖ TLS/SSL Data Transfer
- ❖ Firewall and NAT Traversal

11. Firmware and Upgrade Testing – 2 hour

- ❖ Firmware Download Methods (USB, OTA)
- ❖ Firmware Upgrade Verification
- ❖ Version Compatibility Testing
- ❖ Rollback and Recovery Scenarios

12. Regulatory and Compliance Testing – 1 hour

- ❖ SAR (Specific Absorption Rate) Testing
- ❖ EMC/EMI Compliance
- ❖ PTCRB/GCF Certification Basics

13. Logging and Debugging – 2 hour

- ❖ Enabling Logs (QXDM, AT Logs, Wireshark)
- ❖ Interpreting Logs for Root Cause
- ❖ Typical Log Capture Formats
- ❖ Reporting Issues with Evidence

Hardware to used

- 1) Raspberry pi 5 board

https://robu.in/product/raspberry-pi-5-model-8gb/?gad_source=1&gad_campaignid=19974686076&gbraid=0AAAAADvLFWcbd275juiX7YIpSW7mHwKKn&gclid=Cj0KCQjwMHEBhC-ARIsABua5iSZNzqksE7Yqb20ES25QSct_q_TmXx7tSyLZjWB-RksxcuUkWS5_MAaAiFFEALw_wcB

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2) Modem HAT

<https://robu.in/product/waveshare-cat-1-gnss-hat-for-raspberry-pi-based-on-sim7670g-module-global-multi-band-lte-4g-cat-1-support-gnss-positioning-3x-usb-2-0-extended-ports/>