GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

सत्यमेव जयते

Wireless Technician

QP Code: TEL/Q4105

Version: 1.0

NSQF Level: 4

Telecom Sector Skill Council || 3rd Floor, Plot No 126, Sector - 44 Gurgaon - 122003

Qualification Pack

Contents

TEL/Q4105: Wireless Technician

Brief Job Description

Wireless Technician is responsible for installation, configuration and testing of WiFi Backhaul Eqpt (5 GHz) and WiFi Access Points (2.4 GHz) for broadband access. He also establishes connectivity in the backhaul between WiFi nodes and Access Points at multiple sites and carries out basic trouble-shooting for identifying, localizing & rectifying cable, connectivity and equipment faults in coordination with Network Operation Centre (NOC).

Personal Attributes

This job requires the individual to have good communication skills with a clear diction; regional language proficiency; strong customer service focus; pleasant personality; should be self-motivated; should be able to apply practical judgment to successfully perform the assigned responsibilities and a team player with ability to work under pressure.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. TEL/N4122: WiFi Backhaul Equipment (5 GHz) &WiFi Access Points (2.4 GHz) wiring & Installation at different sites.

2. TEL/N4123: Configuration of Equipment and establishing broadband connectivity

3. TEL/N4124: Troubleshoot to localize and rectify faults

4. TEL/N4125: UPS Installation & Domestic Power Supply Checks

Qualification Pack (QP) Parameters

Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operation and Maintenance
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2004/NIL

Minimum Educational Qualification & Experience	12th Class
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	10/07/2016
Next Review Date	31/03/2022
NSQC Approval Date	22/08/2019
Version	1.0
Reference code on NQR	2019/TEL/TSSC/3535
NQR Version	1.0

TEL/N4122: WiFi Backhaul Equipment (5 GHz) &WiFi Access Points (2.4 GHz) wiring & Installation at different sites.

Description

This unit is about cable/system wiring & installation of WiFi Backhaul equipment (5 GHz) along with Antenna at different sites as well as WiFi Access Points (2.4 GHz) as per the surveyed plan. Cables include OFC, UTP/STP, Co-axial cable and Feeder Cable for connecting the WiFi Backhaul Eqpt (5 GHz) with Antenna on Mast / Tower.

Scope

This unit/task covers the following:

Elements and Performance Criteria

Prepare the wiring & equipment installation of WiFi Backhaul Equipment (5 GHz), Antenna and WiFi Access Points (2.4 GHz).

To be competent, the user/individual on the job must be able to:

PC1. arrange access to sites according to required procedure

PC2. organize tools, equipment and materials for a given work

PC3. match cable type including feeder cable and connectors to installation environment and different site requirements as per the plan

PC4. check cable length for continuity

PC5. verify cable route is free of electrical hazards and obstructions both outdoors and indoors

PC6. verify that the cable running length is free from obstruction for connecting theEqpt with antenna at different sites

PC7. select suitable location for equipment installation at different site wrtLocation ofMast / Tower & power point etc

Undertake wiring and Install system hardware cable route from PoP to WiFiEqpt sites, Access Points

To be competent, the user/individual on the job must be able to:

PC8. ensure structured wiring from PoP to different sites

PC9. ensure neat wiring and clipping at all points up to the Eqpt at each site

PC10. ensure proper cable termination and use of appropriate connectors

PC11. ensure proper feeder cable termination between Eqpt and Antenna

PC12. test the cable & joints for transmission loss and strength. Re-terminate if loss exceeds prescribed limits

PC13. install equipment following electrical safety principals andmanufacturers instructions

PC14. power-up the system ensuring proper earthing arrangement

Clean up worksite and complete documentation

To be competent, the user/individual on the job must be able to:

PC15. removal and proper dispose of installation waste

PC16. 'restore worksite to customer''s satisfaction'

PC17. update plans and records with details of installation and test results

PC18. complete all installation documents

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. risk and impact of not following defined procedures/work instructions issued as per guidelines

KU2. risk of working above the ground level on Mast / Towers

KU3. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures,fire and power failures

KU4. records to be maintained and implications of non-maintenance of the same

KU5. knowledge of obtaining cables and equipment from company and keeping them in safe conditions at sites

KU6. knowledge of payment options and procedures

KU7. first aid requirements in case of electrical shocks, cuts, fall and other common injuries

KU8. cabling types (OFC, UTP, STP, Twisted Pair etc.) and connectors (RJ-45, RJ- 11 etc.) as well as feeder cable and connectors

KU9. structured cabling norms (pertaining to laying the cables)

KU10. working knowledge of cable laying, feeder cable laying and connectorisation

KU11. knowledge of WiFiBackhaul Equipment (5.0 GHz), WiFi Access Points (2.4 GHz), all types of cable & connectors required in the system, Test & measuring instruments

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up appropriate technical forms, activity logs in required format of the company

GS2. maintain proper records as per given format

GS3. read and understand manuals, work orders, health and safety instructions, memos, reports etc

GS4. courteous to the customers

GS5. liasoning and coordination skills

GS6. communicate with supervior and peers

GS7. communicate in the local language (preferable)

GS8. plan the sites as per the schedule

GS9. organize all equipments and support from the team during the the setup

GS10. plan testing activities

GS11. time and work management

GS12. read and comprehend/understand equipment installation manual

GS13. perform fault clearance

GS14. select a suitable installation location adhering to cabling norms and signal coverage (for Wi-Fi backhaul equipment)

GS15. climb the mast / Tower as per the requirement for laying of feeder cable and termination at antenna point as well as Eqpt point

GS16. work systematically with required attention to detail and adherence to all safety requirements

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare the wiring & equipment installation of WiFi Backhaul Equipment (5 GHz), Antenna and WiFi Access Points (2.4 GHz).	**21**	**19**	**-**	**-**
PC1. arrange access to sites according to required procedure	3	3	-	-
PC2. organize tools, equipment and materials for a given work	3	3	-	-
PC3. match cable type including feeder cable and connectors to installation environment and different site requirements as per the plan	3	3	-	-
PC4. check cable length for continuity	3	3	-	-
PC5. verify cable route is free of electrical hazards and obstructions both outdoors and indoors	3	3	-	-
PC6. verify that the cable running length is free from obstruction for connecting theEqpt with antenna at different sites	3	2	-	-
PC7. select suitable location for equipment installation at different site wrtLocation ofMast / Tower & power point etc	3	2	-	-
Undertake wiring and Install system hardware cable route from PoP to WiFiEqpt sites, Access Points	**21**	**19**	**-**	**-**
PC8. ensure structured wiring from PoP to different sites	3	3	-	-
PC9. ensure neat wiring and clipping at all points up to the Eqpt at each site	3	3	-	-
PC10. ensure proper cable termination and use of appropriate connectors	3	2	-	-
PC11. ensure proper feeder cable termination between Eqpt and Antenna	3	2	-	-
PC12. test the cable & joints for transmission loss and strength. Re-terminate if loss exceeds prescribed limits	3	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. install equipment following electrical safety principals andmanufacturers instructions	3	3	-	-
PC14. power-up the system ensuring proper earthing arrangement	3	3	-	-
Clean up worksite and complete documentation	**12**	**8**	**-**	**-**
PC15. removal and proper dispose of installation waste	3	2	-	-
PC16. 'restore worksite to customer''s satisfaction'	3	2	-	-
PC17. update plans and records with details of installation and test results	3	2	-	-
PC18. complete all installation documents	3	2	-	-
NOS Total	**54**	**46**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4122
NOS Name	WiFi Backhaul Equipment (5 GHz) &WiFi Access Points (2.4 GHz) wiring & Installation at different sites.
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operation & Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	10/07/2016
Next Review Date	31/03/2022
NSQC Clearance Date	NA

TEL/N4123: Configuration of Equipment and establishing broadband connectivity

Description

This unit is about configuring of WiFiBackhaul Eqpt (5 GHz), WiFiAccess Points (2.4 GHz)and establishing broadband connectivity between two ends and service provider gateway and also between theWiFiBackhaul Equipment and Access Points

Scope

This unit/task covers the following:

- Configuration of WiFiBackhaul Eqpt (5 GHz), WiFiAccess Points (2.4 GHz) at different sites.
- Establishing connectivity with the service provider gateway.
- Establishing connectivity between WiFiBackhaul Eqpt and WiFiAccess points and end user devices.
- Record configuration setting and testing steps.

Elements and Performance Criteria

Configuration of WiFiBackhaul Equipment (5 GHz),WiFi Access Points (2.4 GHz) at different sites

To be competent, the user/individual on the job must be able to:

PC1. connect up Feeder Cable with Antenna at different sites and measure VSWR / Return loss

PC2. connect WiFiBackhaul Eqpt with feeder cable and check Antenna orientation to get surveyed receive levels

PC3. connect WiFiBackhaul Eqpt with WiFiAccess Points

PC4. connect up laptop/PC, and other appropriate device to the interface eqpt at WiFibackhaul Eqptand establish connectivity with WiFi Access Points

PC5. access setting using default login credentials

PC6. configure as per the base setting (IP, Gateway, Mask etc.)

Establishing connectivity with the service provider gateway

To be competent, the user/individual on the job must be able to:

PC7. ensure all cables/connectors are correctly plugged in

PC8. ping service provider gateway

PC9. analyze test results for connectivity and throughput parameters

Establishing connectivity between WiFi Backhaul Eqpt and WiFi Access Points and End user devices

To be competent, the user/individual on the job must be able to:

PC10. configure end user device to establish connectivity with the WiFi Access Point

PC11. ping WiFi access point from end user device and analyze response

Record configuration setting and testing steps

To be competent, the user/individual on the job must be able to:

PC12. record WiFi Backhaul Equipment (5 GHz) configuration settings & test results at all sites

PC13. record WiFi Access Equipment (2.4 GHz) configuration settings&test results at all sites

PC14. record end user device configuration setting

PC15. record pinging procedure and expected result parameters

PC16. brief customer on basic trouble-shooting steps/self-help

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. risk and impact of not following defined procedures/work instructions as per guidelines

KU2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures,fire and power failures

KU3. knowledge of sourcing equipment and base configuration details

KU4. first aid requirements in case of electrical shocks, cuts, fall and other common injuries

KU5. basic concepts of wireless technologies including WiFi conforming to 802.11 standards, Antennas, Feeder Cables, WiFi Access Points

KU6. network topologies, broadband network elements, Gateways,TCP/IP, IP address, subnet masks, Ethernet address, MAC address, IPv4, IPv6

KU7. basic commands like ping & IP configuration and acceptable round-trip time for IPpackets

KU8. configuration settings at WiFiEqpt&WiFiAccess Points

KU9. command line access and command prompts to execute basic commands

KU10. knowledge of customer premise equipment

KU11. features and operating requirements of test equipment

KU12. how to test the speed of connection and to demonstrate same to customer

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. record system configuration and testing procedure

GS2. read and comprehend technical data on networks, configurations and testing

GS3. read and comprehend organizational policies and procedures

GS4. courteous to the customers

GS5. liasoning and coordination skills

GS6. communicate with supervisor and peers

GS7. communicate in the local language (preferable)

GS8. interpret configuration screens for entering correct details

GS9. interpret ping results

GS10. interpret IP configuration and other basic command outputs

GS11. interpret in-built diagnostics results for remedial action

GS12. configure WiFi Backhaul equipment &WiFiAccess Points equipment

GS13. test configuration

GS14. level1 & 2 diagnostics

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Configuration of WiFiBackhaul Equipment (5 GHz),WiFi Access Points (2.4 GHz) at different sites	**18**	**20**	**-**	**-**
PC1. connect up Feeder Cable with Antenna at different sites and measure VSWR / Return loss	3	3	-	-
PC2. connect WiFiBackhaul Eqpt with feeder cable and check Antenna orientation to get surveyed receive levels	3	3	-	-
PC3. connect WiFiBackhaul Eqpt with WiFiAccess Points	3	3	-	-
PC4. connect up laptop/PC, and other appropriate device to the interface eqpt at WiFibackhaul Eqptand establish connectivity with WiFi Access Points	3	3	-	-
PC5. access setting using default login credentials	3	3	-	-
PC6. configure as per the base setting (IP, Gateway, Mask etc.)	3	5	-	-
Establishing connectivity with the service provider gateway	**9**	**11**	**-**	**-**
PC7. ensure all cables/connectors are correctly plugged in	3	3	-	-
PC8. ping service provider gateway	3	3	-	-
PC9. analyze test results for connectivity and throughput parameters	3	5	-	-
Establishing connectivity between WiFi Backhaul Eqpt and WiFi Access Points and End user devices	**6**	**6**	**-**	**-**
PC10. configure end user device to establish connectivity with the WiFi Access Point	3	3	-	-
PC11. ping WiFi access point from end user device and analyze response	3	3	-	-
Record configuration setting and testing steps	**15**	**15**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. record WiFi Backhaul Equipment (5 GHz) configuration settings & test results at all sites	3	3	-	-
PC13. record WiFi Access Equipment (2.4 GHz) configuration settings&test results at all sites	3	3	-	-
PC14. record end user device configuration setting	3	3	-	-
PC15. record pinging procedure and expected result parameters	3	3	-	-
PC16. brief customer on basic trouble-shooting steps/self-help	3	3	-	-
NOS Total	**48**	**52**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4123
NOS Name	Configuration of Equipment and establishing broadband connectivity
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operation & Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	22/08/2019
Next Review Date	22/08/2023
NSQC Clearance Date	22/08/2019

TEL/N4124: Troubleshoot to localize and rectify faults

Description

This unit is about Performing corrective maintenance ,troubleshooting and testing effectiveness

Scope

This unit/task covers the following:

- Locate and trouble shoot cable & connector fault.
- Troubleshoot WiFi Backhaul Equipment (5Ghz)
- Trouble shoot WiFi Access Points (2.4 GHz)
- Rectify the faults with cable,connectors, backhaul equipments at service provider gateway, access point and end user devices
- Complete documentation and clean up worksite

Elements and Performance Criteria

Locate and trouble shoot cable & connector fault

To be competent, the user/individual on the job must be able to:

PC1. differentiate between types of cables

PC2. identify correct cable pairs

PC3. undertake continuity check and localize fault distance

Troubleshoot WiFi Backhaul Equipment (5 GHz)

To be competent, the user/individual on the job must be able to:

PC4. understand relevance of various indicative lights on the WiFiBackhaulequipment

PC5. connect Handheld Network Tester portable device for fault diagnostic

PC6. connect Cable & Antenna tester if required

PC7. check for Antenna orientation if required

PC8. decipher results to localize fault

Trouble shoot WiFi Access Points (2.4 GHz)

To be competent, the user/individual on the job must be able to:

PC9. understand relevance of various indicative lights on the WiFi Access Points equipment

PC10. connect Handheld Network Tester portable device for fault diagnostic

PC11. decipher results to localize fault

PC12. access WiFi Access Point through browser/software application and run diagnostic application

Rectify the faults with cable,connectors, backhaul equipments at service provider gateway, access point and end user devices

To be competent, the user/individual on the job must be able to:

PC13. carry out re-conectorization/crimping (of cable pairs with connector) or replace cable, if required

PC14. replace feeder cable / antenna, if required

PC15. re-configure the WiFi Backhaul Eqptto correct settings, backhaul equipments at service provider gateway and end user devices if required

PC16. reset WiFi Access points, if required

Complete documentation and clean up worksite

To be competent, the user/individual on the job must be able to:

PC17. record steps undertaken for fault localization/isolation

PC18. record changes undertaken for fault rectification

PC19. restore any changes made to the worksite during fault repair to the client's satisfaction

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. risk and impact of not following defined procedures/work instructions National Occupational

KU2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures,fire and power failures

KU3. knowledge of sourcing equipment and base configuration details

KU4. guidelines and regulations as per companys norms

KU5. first aid requirements in case of electrical shocks, cuts, fall and other common injuries usage of fire safety equipment

KU6. correct identifications of cables and cable pairs, feeder cable

KU7. knowledge of cable connectors, feeder cable connectors

KU8. crimping or soldering expertise

KU9. knowledge of supported cable lengths to achieve designed throughput

KU10. basic knowledge of EMI/EMC and preventive approach specific to modem

KU11. use of test equipment such as Network Tester, cable & Antenna Tester etc

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. maintain proper records as per given format

GS2. read and comprehend technical manual and literature

GS3. read and understand work orders, health and safety instructions, memos,reports etc

GS4. be courteous to end users/customers

GS5. liase with local authorities, especially for outdoor cabling

GS6. communicate with supervisor and peers

GS7. communicate in the local language

GS8. utilize appropriate tools for fault rectification

GS9. use appropriate commands to reconfigure/rectify fault

GS10. assess correct applications and reconfigure in end user device SB4. utilize appropriate communication channels to escalate unresolved problems

GS11. interpret data on CPE interface accessed through laptop browser

GS12. interpret right cable pairs for connecterisation

GS13. interpret output of trouble shooting equipment/device

GS14. operate trouble-shooting equipment for localizing cable & connector faults

GS15. operate crimping and soldering equipment

GS16. operate laptop or other specific portable device to connect to WiFi eqpt, WiFi access points and carryout fault diagnostics & repairs

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Locate and trouble shoot cable & connector fault	**9**	**6**	**-**	**-**
PC1. differentiate between types of cables	3	2	-	-
PC2. identify correct cable pairs	3	2	-	-
PC3. undertake continuity check and localize fault distance	3	2	-	-
Troubleshoot WiFi Backhaul Equipment (5 GHz)	**15**	**11**	**-**	**-**
PC4. understand relevance of various indicative lights on the WiFiBackhaulequipment	3	2	-	-
PC5. connect Handheld Network Tester portable device for fault diagnostic	3	2	-	-
PC6. connect Cable & Antenna tester if required	3	2	-	-
PC7. check for Antenna orientation if required	3	2	-	-
PC8. decipher results to localize fault	3	3	-	-
Trouble shoot WiFi Access Points (2.4 GHz)	**12**	**10**	**-**	**-**
PC9. understand relevance of various indicative lights on the WiFi Access Points equipment	3	2	-	-
PC10. connect Handheld Network Tester portable device for fault diagnostic	3	2	-	-
PC11. decipher results to localize fault	3	3	-	-
PC12. access WiFi Access Point through browser/software application and run diagnostic application	3	3	-	-
Rectify the faults with cable,connectors, backhaul equipments at service provider gateway, access point and end user devices	**12**	**10**	**-**	**-**
PC13. carry out re-conectorization/crimping (of cable pairs with connector) or replace cable, if required	3	2	-	-
PC14. replace feeder cable / antenna, if required	3	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. re-configure the WiFi Backhaul Eqptto correct settings, backhaul equipments at service provider gateway and end user devices if required	3	3	-	-
PC16. reset WiFi Access points, if required	3	3	-	-
Complete documentation and clean up worksite	**9**	**6**	**-**	**-**
PC17. record steps undertaken for fault localization/isolation	3	2	-	-
PC18. record changes undertaken for fault rectification	3	2	-	-
PC19. restore any changes made to the worksite during fault repair to the client's satisfaction	3	2	-	-
NOS Total	**57**	**43**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4124
NOS Name	Troubleshoot to localize and rectify faults
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operation & Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	22/08/2019
Next Review Date	22/08/2023
NSQC Clearance Date	22/08/2019

TEL/N4125: UPS Installation & Domestic Power Supply Checks

Description

This unit is about undertaking power supply checks & UPS installation at service provider / customer premise

Scope

This unit/task covers the following:

Elements and Performance Criteria

Installation of UPS and checking the electrical parameters

To be competent, the user/individual on the job must be able to:

PC1. carry out voltage, current checks

PC2. carry out earthing checks

PC3. installation of UPS

PC4. routing of power supply through UPS

PC5. calculate equipment load vis--vis UPS rating

PC6. exercise precautions whilst handling power supplies

PC7. UPS battery checks & replacement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. UPS installation norms

KU2. compliance to Voltage/Current norms

KU3. UPS & compatible batteries

KU4. the basic process for maintaining AC

KU5. UPS & types of UPS

KU6. power rating of UPS

KU7. basic load calculations

KU8. routing of power supply through UPS

KU9. earth & continuity checks for power supply

KU10. use of test equipment for checking/measuring power supply

KU11. checks & replacement of UPS batteries

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. maintain proper records as per given format

GS2. read and comprehend technical manual and literature

GS3. read and understand work orders, health and safety instructions, memos,reports etc

GS4. be courteous to end users/customers

GS5. liase with local authorities, especially for outdoor cabling

GS6. communicate with supervisor and peers

GS7. communicate in the local language

GS8. plan installation/check activities

GS9. carry out installation with minimum disturbance

GS10. analyse basic wiring diagrams to facilitate correct installation of UPS

GS11. analyse house-hold circuits for correct installation of devices

GS12. calculate equipment load and suggest UPS connection configuration

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Installation of UPS and checking the electrical parameters	**48**	**52**	**-**	**-**
PC1. carry out voltage, current checks	-	5	-	-
PC2. carry out earthing checks	4	6	-	-
PC3. installation of UPS	5	15	-	-
PC4. routing of power supply through UPS	4	6	-	-
PC5. calculate equipment load vis--vis UPS rating	15	5	-	-
PC6. exercise precautions whilst handling power supplies	10	10	-	-
PC7. UPS battery checks & replacement	10	5	-	-
NOS Total	**48**	**52**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4125
NOS Name	UPS Installation & Domestic Power Supply Checks
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operation & Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	10/07/2016
Next Review Date	31/03/2022
NSQC Clearance Date	NA

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
TEL/N4122.WiFi Backhaul Equipment (5 GHz) &WiFi Access Points (2.4 GHz) wiring & Installation at different sites.	54	46	-	-	100	25
TEL/N4123.Configuration of Equipment and establishing broadband connectivity	48	52	-	-	100	25
TEL/N4124.Troubleshoot to localize and rectify faults	57	43	-	-	100	25
TEL/N4125.UPS Installation & Domestic Power Supply Checks	48	52	-	-	100	25
Total	**207**	**193**	**-**	**-**	**400**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
OFC	Optical Fiber Cable
UTP	Un-shielded Twisted pair
STP	Shielded Twisted Pair
PoP	Point of Presence
TCP	Transmission Control Protocol
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.

Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard, which is denoted by an â€˜Nâ€™.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Wireless Technician

QP Code: TEL/Q4105

Version: 2.0

NSQF Level: 4

Telecom Sector Skill Council || 3rd Floor, Plot No 126, Sector - 44 Gurgaon - 122003

Contents

TEL/Q4105: Wireless Technician

Brief Job Description

The individual in this job is responsible for installing, configuring and testing of Wi-Fi backhaul equipment (5 GHz) and Wi-Fi access points (2.4 GHz) for broadband access. They are also responsible for establishing connectivity in the backhaul between Wi-Fi nodes and access points at multiple sites and carrying out basic troubleshooting for identifying, localizing and rectifying cable, connectivity and equipment faults in coordination with Network Operation Centre (NOC).

Personal Attributes

This individual must have good communication skills with a clear diction, regional language proficiency, strong customer service focus and pleasant personality. They should be self-motivated, should be able to apply practical judgment to successfully perform the assigned responsibilities and possess qualities of a team player.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [TEL/N4122: Wiring and Installing Equipment at Different Sites](#)

2. [TEL/N4123: Configuring Equipment and Establishing Connectivity](#)

3. [TEL/N4124: Troubleshoot and rectify Faults](#)

4. [TEL/N4125: UPS Installation and Domestic Power Supply Checks](#)

5. [TEL/N9101: Organise Work and Resources as per Health and Safety Standards](#)

6. [TEL/N9102: Interact Effectively with Team Members and Customers](#)

Qualification Pack (QP) Parameters

Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
Country	India

NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7422.0206
Minimum Educational Qualification & Experience	12th Class OR 10th Class + I.T.I (2 years in Electronics/Telecom/IT and other relevant fields) OR Diploma (after Class 10th (2 years in Electronics/Telecom/IT and other relevant fields)) OR 10th Class with 2 Years of experience of relevant experience OR 8th Class (+ ITI (2 years in Electronics/Telecom/IT and other relevant fields)) with 2 Years of experience of relevant experience
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	NA
Minimum Job Entry Age	17 Years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2026
Deactivation Date	31/03/2026
NSQC Approval Date	31/03/2022
Version	2.0
Reference code on NQR	2022/TEL/TSSC/05796
NQR Version	1.0

TEL/N4122: Wiring and Installing Equipment at Different Sites

Description

This OS unit is about cable/system wiring and installation of Wi-Fi backhaul equipment (5 GHz) along with antenna at different sites as well as Wi-Fi access points (2.4 GHz) as per the surveyed plan. Cables include OFC, UTP/STP, Co-axial cable and feeder cable for connecting the Wi-Fi backhaul equipment (5 GHz) with antenna on mast tower.

Scope

The scope covers the following :

- Prepare and install the system
- Complete documentation and clean-up worksite

Elements and Performance Criteria

Prepare and install the system

To be competent, the user/individual on the job must be able to:

PC1. interact with the superiors to understand the job requirements

PC2. plan access to sites for installation/testing activities as per the schedule

PC3. collect required tools, equipment and materials for a given work

PC4. match cable type including feeder cable and connectors to installation environment/site requirements as per the plan

PC5. check cable length for continuity

PC6. verify that the cable running length is free of electrical hazards and outdoors/indoors obstructions

PC7. liase with local authorities especially for outdoor cabling

PC8. select suitable location for equipment installation at different site adhering to cabling norms and signal coverage

PC9. ensure structured wiring from PoP to different sites

PC10. install neat wiring and clipping at all points up to the equipment

PC11. use proper cable terminators/connectors

PC12. install proper feeder cable termination between equipment and antenna

PC13. test the cable/joints for transmission loss and strength, re-terminate if loss exceeds prescribed limits

PC14. install equipment following electrical safety principles and manufacturer's instructions

PC15. arrange proper earthing to power-up the system

Complete documentation and clean-up worksite

To be competent, the user/individual on the job must be able to:

PC16. remove/dispose installation waste properly

PC17. restore worksite to customer satisfaction

PC18. update records with details of installation and test results

PC19. complete all installation documents and collect necessary payments if any

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. policies, standards and procedures to conduct lead generation activities

KU2. impact of not following defined procedures/work instructions issued as per guidelines

KU3. risk of working above the ground level on mast/towers

KU4. cabling types (OFC, UTP, STP, Twisted Pair etc.) and connectors (RJ-45, RJ- 11 etc.) as well as feeder cable and connectors

KU5. reasons of compliance/technical issues in Customer Enrolment Forms (CEFs)

KU6. structured cabling norms (pertaining to laying the cables)

KU7. process of cable laying, feeder cable laying and connectorisation

KU8. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures, fire and power failures

KU9. safety norms to be followed when climbing mast/tower

KU10. process of obtaining cables/equipment from company and keeping them in safe conditions at sites

KU11. formats for filling technical forms/activity logs

KU12. payment options and procedures

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. write records as per given format

GS2. read and understand manuals, work orders, health and safety instructions, memos, reports etc

GS3. interact respectfully with supervior/peers

GS4. communicate in the local language with the customers

GS5. work efficiently and effectively

GS6. work systematically with required attention to detail and adherence to all safety requirements

GS7. maintain proper etiquette in front of the customers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare and install the system	**23**	**44**	**-**	**7**
PC1. interact with the superiors to understand the job requirements	-	1	-	-
PC2. plan access to sites for installation/testing activities as per the schedule	1	2	-	-
PC3. collect required tools, equipment and materials for a given work	1	2	-	1
PC4. match cable type including feeder cable and connectors to installation environment/site requirements as per the plan	1	2	-	1
PC5. check cable length for continuity	1	2	-	1
PC6. verify that the cable running length is free of electrical hazards and outdoors/indoors obstructions	2	3	-	-
PC7. liase with local authorities especially for outdoor cabling	2	3	-	1
PC8. select suitable location for equipment installation at different site adhering to cabling norms and signal coverage	2	3	-	-
PC9. ensure structured wiring from PoP to different sites	2	3	-	1
PC10. install neat wiring and clipping at all points up to the equipment	2	3	-	-
PC11. use proper cable terminators/connectors	2	4	-	-
PC12. install proper feeder cable termination between equipment and antenna	2	4	-	1
PC13. test the cable/joints for transmission loss and strength, re-terminate if loss exceeds prescribed limits	2	4	-	1
PC14. install equipment following electrical safety principles and manufacturer's instructions	2	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. arrange proper earthing to power-up the system	1	4	-	-
Complete documentation and clean-up worksite	**7**	**16**	**-**	**3**
PC16. remove/dispose installation waste properly	2	4	-	1
PC17. restore worksite to customer satisfaction	1	4	-	1
PC18. update records with details of installation and test results	2	4	-	-
PC19. complete all installation documents and collect necessary payments if any	2	4	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4122
NOS Name	Wiring and Installing Equipment at Different Sites
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2026
NSQC Clearance Date	31/03/2022

TEL/N4123: Configuring Equipment and Establishing Connectivity

Description

This OS unit is about configuring of Wi-Fi backhaul equipment (5 GHz), Wi-Fi access points (2.4 GHz) and establishing broadband connectivity between two ends and service provider gateway and between the Wi-Fi backhaul equipment and access points.

Scope

The scope covers the following :

- Configuration of equipment
- Establish connectivity
- Record configuration setting and testing steps

Elements and Performance Criteria

Configuration of equipment

To be competent, the user/individual on the job must be able to:

PC1. connect feeder cable with antenna at different sites and measure VSWR/return loss

PC2. connect Wi-Fi backhaul equipment with feeder cable to check antenna orientation for surveyed receive levels

PC3. connect Wi-Fi backhaul equipment with Wi-Fi access points

PC4. connect laptop/PC, and other appropriate device to the interface equipment at Wi-Fi backhaul equipment and establish connectivity with Wi-Fi access points

PC5. access setting using default login credentials

PC6. configure equipment as per the base setting (IP, Gateway, Mask etc.)

Establish connectivity with the service provider gateway

To be competent, the user/individual on the job must be able to:

PC7. ensure all cables/connectors are correctly plugged in

PC8. apply steps to ping service provider gateway

PC9. analyze test results for connectivity and throughout parameters

PC10. configure end user device to establish connectivity with the Wi-Fi access point

PC11. use commands and processes to ping the Wi-Fi access point from the end user device and analyze the response of the command/process

Record configuration setting and testing steps

To be competent, the user/individual on the job must be able to:

PC12. record Wi-Fi access equipment (2.4 GHz and 5GHz) configuration settings and test results at all sites

PC13. record end user device configuration setting

PC14. record pinging procedure and expected result parameters

PC15. brief customer on basic troubleshooting steps/self-help

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. basic concepts of wireless technologies including Wi-Fi conforming to IEEE 802.11 standards, antennas, feeder cables, Wi-Fi access points

KU2. risk and impact of not following defined procedures/work instructions as per guidelines

KU3. network topologies, broadband network elements, Gateways, TCP/IP, IP address, subnet masks, Ethernet address, MAC address, IPv4, IPv6

KU4. basic commands like ping and IP configuration and acceptable round-trip time for IP packets

KU5. configuration settings at Wi-Fi equipment and Wi-Fi access points

KU6. sourcing equipment and base configuration details

KU7. first aid requirements in case of electrical shocks, cuts, fall and other common injuries

KU8. command line access and command prompts to execute basic commands

KU9. functioning of customer premise equipment

KU10. features and operating requirements of test equipment

KU11. how to test the speed of connection and to demonstrate same to customer

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and comprehend technical data on networks, configurations and testing

GS2. interact respectfully with supervior/peers

GS3. communicate in the local language with the customers

GS4. maintain proper etiquette in front of the customers

GS5. work efficiently and effectively

GS6. work systematically with required attention to detail and adherence to all safety requirements

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Configuration of equipment	**13**	**26**	**-**	**3**
PC1. connect feeder cable with antenna at different sites and measure VSWR/return loss	1	5	-	-
PC2. connect Wi-Fi backhaul equipment with feeder cable to check antenna orientation for surveyed receive levels	1	5	-	-
PC3. connect Wi-Fi backhaul equipment with Wi-Fi access points	2	4	-	-
PC4. connect laptop/PC, and other appropriate device to the interface equipment at Wi-Fi backhaul equipment and establish connectivity with Wi-Fi access points	3	2	-	1
PC5. access setting using default login credentials	3	5	-	1
PC6. configure equipment as per the base setting (IP, Gateway, Mask etc.)	3	5	-	1
Establish connectivity with the service provider gateway	**9**	**20**	**-**	**4**
PC7. ensure all cables/connectors are correctly plugged in	2	5	-	1
PC8. apply steps to ping service provider gateway	2	5	-	1
PC9. analyze test results for connectivity and throughout parameters	1	4	-	-
PC10. configure end user device to establish connectivity with the Wi-Fi access point	2	3	-	1
PC11. use commands and processes to ping the Wi-Fi access point from the end user device and analyze the response of the command/process	2	3	-	1
Record configuration setting and testing steps	**8**	**14**	**-**	**3**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. record Wi-Fi access equipment (2.4 GHz and 5GHz) configuration settings and test results at all sites	4	7	-	1
PC13. record end user device configuration setting	2	3	-	1
PC14. record pinging procedure and expected result parameters	1	2	-	-
PC15. brief customer on basic troubleshooting steps/self-help	1	2	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4123
NOS Name	Configuring Equipment and Establishing Connectivity
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2026
NSQC Clearance Date	31/03/2022

TEL/N4124: Troubleshoot and rectify Faults

Description

This OS unit is about performing corrective maintenance, troubleshooting and testing effectiveness.

Scope

The scope covers the following :

- Troubleshoot wiring faults
- Troubleshoot Wi-Fi backhaul equipment (5 GHz)
- Troubleshoot Wi-Fi access points (2.4 GHz)
- Complete documentation and clean-up worksite

Elements and Performance Criteria

Troubleshoot wiring faults

To be competent, the user/individual on the job must be able to:

PC1.   differentiate between various types of cables

PC2.   identify correct cable pairs

PC3.   undertake continuity check and localize fault distance

PC4.   carry out re-conectorization/crimping (of cable pairs with connector) or replace cable, if required

PC5.   replace feeder cable/antenna, if required

PC6.   re-configure the Wi-Fi backhaul equipment to correct settings at service provider gateway/end user devices, if required

PC7.   reset Wi-Fi access points, if required

Troubleshoot Wi-Fi backhaul equipment (5 GHz)

To be competent, the user/individual on the job must be able to:

PC8.   identify relevance of various indicative lights on the Wi-Fi backhaul equipment

PC9.   connect handheld network tester portable device for fault diagnostic

PC10. connect cable and antenna tester, if required

PC11. check for antenna orientation, if required

PC12. obtain results to localize fault

Troubleshoot Wi-Fi access points (2.4 GHz)

To be competent, the user/individual on the job must be able to:

PC13. identify relevance of various indicative lights on the Wi-Fi access point equipment

PC14. connect handheld network tester portable device for fault diagnostic

PC15. analyse output of trouble shooting equipment/device

PC16. access Wi-Fi access point through browser/software application to run diagnostic application

Complete documentation and clean-up worksite

To be competent, the user/individual on the job must be able to:

PC17. record steps undertaken for fault localization/isolation

PC18. record changes undertaken for fault rectification

PC19. restore any changes made to the worksite during fault repair to the client satisfaction

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. proper cables and cable pairs, feeder cable

KU2. cable connectors, feeder cable connectors

KU3. crimping/soldering process and equipment

KU4. sourcing equipment and base configuration details

KU5. supported cable lengths to achieve designed throughput

KU6. EMI/EMC concepts and preventive approach specific to modem

KU7. appropriate commands to reconfigure/rectify fault

KU8. how to use appropriate tools for fault rectification

KU9. functioning of test equipment such as network tester, cable and antenna tester etc

KU10. functioning of laptop or other specific portable to carryout fault diagnostics and repairs

KU11. risk and impact of not following defined procedures/work instructions

KU12. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures, fire and power failures

KU13. first aid requirements in case of electrical shocks, cuts, fall and other common injuries usage of fire safety equipment

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. document status and other information in records as per given format

GS2. read and comprehend technical manual and literature

GS3. work orders, health and safety instructions, memos, reports etc

GS4. communicate with supervisor and fellow technicians

GS5. communicate in the local language with the customers

GS6. maintain proper etiquettes in front of the customers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Troubleshoot wiring faults	**15**	**15**	**-**	**4**
PC1. differentiate between various types of cables	1	1	-	-
PC2. identify correct cable pairs	1	1	-	-
PC3. undertake continuity check and localize fault distance	1	1	-	-
PC4. carry out re-conectorization/crimping (of cable pairs with connector) or replace cable, if required	3	3	-	1
PC5. replace feeder cable/antenna, if required	3	3	-	1
PC6. re-configure the Wi-Fi backhaul equipment to correct settings at service provider gateway/end user devices, if required	2	4	-	1
PC7. reset Wi-Fi access points, if required	4	2	-	1
Troubleshoot Wi-Fi backhaul equipment (5 GHz)	**10**	**16**	**-**	**4**
PC8. identify relevance of various indicative lights on the Wi-Fi backhaul equipment	2	2	-	1
PC9. connect handheld network tester portable device for fault diagnostic	4	4	-	1
PC10. connect cable and antenna tester, if required	2	4	-	-
PC11. check for antenna orientation, if required	1	2	-	1
PC12. obtain results to localize fault	1	4	-	1
Troubleshoot Wi-Fi access points (2.4 GHz)	**9**	**12**	**-**	**-**
PC13. identify relevance of various indicative lights on the Wi-Fi access point equipment	2	2	-	-
PC14. connect handheld network tester portable device for fault diagnostic	2	4	-	-
PC15. analyse output of trouble shooting equipment/device	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. access Wi-Fi access point through browser/software application to run diagnostic application	3	4	-	-
Complete documentation and clean-up worksite	**6**	**7**	**-**	**2**
PC17. record steps undertaken for fault localization/isolation	2	2	-	1
PC18. record changes undertaken for fault rectification	2	2	-	-
PC19. restore any changes made to the worksite during fault repair to the client satisfaction	2	3	-	1
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4124
NOS Name	Troubleshoot and rectify Faults
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2026
NSQC Clearance Date	31/03/2022

TEL/N4125: UPS Installation and Domestic Power Supply Checks

Description

This OS unit is about undertaking power supply checks and UPS installation at service provider/customer premise

Scope

The scope covers the following :

- Install UPS and check the electrical parameters

Elements and Performance Criteria

Install UPS and check electrical parameters

To be competent, the user/individual on the job must be able to:

PC1. perform checks for voltage, current and earthing
PC2. plan installation activities
PC3. analyse basic wiring diagrams to facilitate correct installation of UPS
PC4. install UPS as per manufacturer's instructions
PC5. route the power supply through UPS
PC6. calculate equipment load vis-à-vis UPS rating
PC7. exercise precautions while handling power supplies
PC8. perform checks to replace the battery in case of a defective UPS

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. voltage/current norms
KU2. norms for checking earthing and continuity of power supply
KU3. UPS installation norms
KU4. types of UPS
KU5. power rating of UPS
KU6. functioning of test equipment for checking/measuring power supply
KU7. types of batteries compatible with UPS

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. maintain proper records as per given format
GS2. read and comprehend technical manual and literature

GS3. read and understand work orders, health and safety instructions, memos, reports etc

GS4. communicate with supervisor and fellow technicians

GS5. communicate in the local language with the customers

GS6. maintain proper etiquette in front of the customers

GS7. work with minimum disturbance

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Install UPS and check electrical parameters	**30**	**60**	**-**	**10**
PC1. perform checks for voltage, current and earthing	4	8	-	2
PC2. plan installation activities	4	7	-	1
PC3. analyse basic wiring diagrams to facilitate correct installation of UPS	4	9	-	2
PC4. install UPS as per manufacturer's instructions	3	8	-	1
PC5. route the power supply through UPS	4	7	-	1
PC6. calculate equipment load vis-à-vis UPS rating	3	7	-	1
PC7. exercise precautions while handling power supplies	4	7	-	1
PC8. perform checks to replace the battery in case of a defective UPS	4	7	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N4125
NOS Name	UPS Installation and Domestic Power Supply Checks
Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2026
NSQC Clearance Date	31/03/2022

TEL/N9101: Organise Work and Resources as per Health and Safety Standards

Description

This OS unit is about planning work and following sustainable as well as healthy practices for safety and optimal use of resources.

Scope

The scope covers the following :

- Perform work as per quality standards
- Maintain safe, healthy and secure working environment
- Conserve material/energy/electricity
- Use effective waste management/recycling practices

Elements and Performance Criteria

Perform work as per quality standards

To be competent, the user/individual on the job must be able to:

PC1. keep workspace clean and tidy

PC2. perform individual role and responsibilities as per the job role while taking accountability for the work

PC3. record/document tasks completed as per the requirements within specific timelines

PC4. implement schedules to ensure timely completion of tasks

PC5. identify the cause of a problem related to own work and validate it

PC6. analyse problems accurately and communicate different possible solutions to the problem

Maintain safe, healthy and secure working environment

To be competent, the user/individual on the job must be able to:

PC7. comply with organisation's current health, safety, security policies and procedures

PC8. check for water spills in and around the work space and escalate these to the appropriate authority

PC9. report any identified breaches in health, safety, and security policies and procedures to the designated person

PC10. use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.

PC11. avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence

PC12. identify hazards such as illness, accidents, fires or any other natural calamity safely, as per organisation's emergency procedures, within the limits of individual's authority

PC13. participate regularly in fire drills or other safety related workshops organised by the company

PC14. report any hazard outside the individual's authority to the relevant person in line with organisational procedures and warn others who may be affected

PC15. maintain appropriate posture while sitting/standing for long hours

PC16. handle heavy and hazardous materials with care, while maintaining appropriate posture

PC17. sanitize workstation and equipment regularly

PC18. clean hands with soap, alcohol-based sanitizer regularly

PC19. avoid contact with anyone suffering from communicable diseases and take necessary precautions

PC20. take safety precautions while travelling e.g. maintain 1m distance from others, sanitize hands regularly, wear masks, etc.

PC21. report hygiene and sanitation issues to appropriate authority

PC22. follow recommended personal hygiene and sanitation practices, for example, washing/sanitizing hands, covering face with a bent elbow while coughing/sneezing, using PPE, etc.

Conserve material/energy/electricity

To be competent, the user/individual on the job must be able to:

PC23. optimize usage of material including water in various tasks/activities/processes

PC24. use resources such as water, electricity and others responsibly

PC25. carry out routine cleaning of tools, machine and equipment

PC26. optimize use of electricity/energy in various tasks/activities/processes

PC27. perform periodic checks of the functioning of the equipment/machine and rectify wherever required

PC28. report malfunctioning and lapses in maintenance of equipment

PC29. use electrical equipment and appliances properly

Use effective waste management/recycling practices

To be competent, the user/individual on the job must be able to:

PC30. identify recyclable, non-recyclable and hazardous waste

PC31. deposit recyclable and reusable material at identified location

PC32. dispose non-recyclable and hazardous waste as per recommended processes

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. strategies pertinent to their field (such as internet searches, asking peers and managers, enrolling for courses and certifications, etc.) that can be used to pursue an advancement in their skills

KU2. key performance indicators for the new tasks

KU3. feedback processes and formats

KU4. timelines and goals as well as their relevance to work allocated

KU5. importance of quality and timely delivery of the product/service

KU6. escalation matrix and its importance, especially in case of emergencies

KU7. ways of time and cost management

KU8. rules/regulation for maintaining health and safety at workplace

KU9. meaning of hazard, different types of health and safety hazards found in the workplace, risks and threats based on the nature of work

KU10. relevant signage, warnings, labels or descriptions on equipment, etc. while carrying out work activities

KU11. procedures to report breaches in health, safety and security

KU12. organisation's procedures for different emergency situations and the importance of following the same

KU13. different methods of cleaning, disinfection, sterilization, and sanitization

KU14. significance of personal hygiene practice including hand hygiene

KU15. path of disease transmission

KU16. correct method of donning and doffing of PPE

KU17. ways of managing resources and material efficiently

KU18. common electrical problems and common practices of conserving electricity

KU19. categorization of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics and use of different colours of dustbins

KU20. organisation's procedures for minimizing waste

KU21. waste management and methods of waste disposal

KU22. common sources of pollution and ways to minimize it

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. improve and modify work practices

GS2. complete tasks efficiently and accurately within stipulated time

GS3. develop skills and mastery of the technologies prevalent in the industry

GS4. write in at least one language and complete written work with attention to detail

GS5. utilize time and manage workload efficiently

GS6. read and comprehend instructions and documents

GS7. accept feedback in a constructive way

GS8. seek clarifications from superior about the job requirement

GS9. read and comprehend statutory documents relevant to safety and hygiene

GS10. refer all anomalies to the concerned persons

GS11. analyze situations and make appropriate decisions

GS12. decide the most suitable course of action for completing the task within resources

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform work as per quality standards	**4**	**9**	**-**	**2**
PC1. keep workspace clean and tidy	-	1	-	-
PC2. perform individual role and responsibilities as per the job role while taking accountability for the work	1	1	-	1
PC3. record/document tasks completed as per the requirements within specific timelines	-	1	-	1
PC4. implement schedules to ensure timely completion of tasks	-	2	-	-
PC5. identify the cause of a problem related to own work and validate it	2	2	-	-
PC6. analyse problems accurately and communicate different possible solutions to the problem	1	2	-	-
Maintain safe, healthy and secure working environment	**16**	**27**	**-**	**4**
PC7. comply with organisation's current health, safety, security policies and procedures	1	1	-	-
PC8. check for water spills in and around the work space and escalate these to the appropriate authority	1	2	-	1
PC9. report any identified breaches in health, safety, and security policies and procedures to the designated person	1	2	-	1
PC10. use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.	1	2	-	1
PC11. avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence	2	3	-	1
PC12. identify hazards such as illness, accidents, fires or any other natural calamity safely, as per organisation's emergency procedures, within the limits of individual's authority	2	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. participate regularly in fire drills or other safety related workshops organised by the company	1	3	-	-
PC14. report any hazard outside the individual's authority to the relevant person in line with organisational procedures and warn others who may be affected	1	3	-	-
PC15. maintain appropriate posture while sitting/standing for long hours	1	1	-	-
PC16. handle heavy and hazardous materials with care, while maintaining appropriate posture	1	1	-	-
PC17. sanitize workstation and equipment regularly	1	2	-	-
PC18. clean hands with soap, alcohol-based sanitizer regularly	-	1	-	-
PC19. avoid contact with anyone suffering from communicable diseases and take necessary precautions	-	1	-	-
PC20. take safety precautions while travelling e.g. maintain 1m distance from others, sanitize hands regularly, wear masks, etc.	1	2	-	-
PC21. report hygiene and sanitation issues to appropriate authority	1	1	-	-
PC22. follow recommended personal hygiene and sanitation practices, for example, washing/sanitizing hands, covering face with a bent elbow while coughing/sneezing, using PPE, etc.	1	1	-	-
Conserve material/energy/electricity	**7**	**16**	**-**	**3**
PC23. optimize usage of material including water in various tasks/activities/processes	1	2	-	-
PC24. use resources such as water, electricity and others responsibly	1	2	-	1
PC25. carry out routine cleaning of tools, machine and equipment	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC26. optimize use of electricity/energy in various tasks/activities/processes	1	3	-	1
PC27. perform periodic checks of the functioning of the equipment/machine and rectify wherever required	1	3	-	1
PC28. report malfunctioning and lapses in maintenance of equipment	1	2	-	-
PC29. use electrical equipment and appliances properly	1	2	-	-
Use effective waste management/recycling practices	**3**	**8**	**-**	**1**
PC30. identify recyclable, non-recyclable and hazardous waste	1	2	-	1
PC31. deposit recyclable and reusable material at identified location	1	3	-	-
PC32. dispose non-recyclable and hazardous waste as per recommended processes	1	3	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N9101
NOS Name	Organise Work and Resources as per Health and Safety Standards
Sector	Telecom
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2026
NSQC Clearance Date	31/03/2022

TEL/N9102: Interact Effectively with Team Members and Customers

Description

This OS unit is about interacting with superiors and colleagues as well as customers and other stakeholders in own or other work groups within as well as outside the organisation.

Scope

The scope covers the following :

- Interact effectively with superiors
- Interact effectively with colleagues and customers
- Respect differences of gender and ability

Elements and Performance Criteria

Interact effectively with superiors

To be competent, the user/individual on the job must be able to:

PC1. receive work requirements from superiors and customers and interpret them correctly

PC2. inform the supervisor and/or concerned person about any unforeseen disruptions or delays

PC3. participate in decision making by providing facts and figures, giving/accepting constructive suggestions

PC4. rectify errors as per feedback and ensure the errors are not repeated

Interact effectively with colleagues and customers

To be competent, the user/individual on the job must be able to:

PC5. comply with organisation's policies and procedures for working with team members

PC6. communicate professionally using appropriate mode of communication such as face-to-face, telephonic and written

PC7. respond to queries and seek/provide clarifications if required

PC8. co-ordinate with team to integrate work as per requirements

PC9. resolve conflicts within the team/with customers to achieve smooth workflow

PC10. recognize emotions accurately in self and others to build good relationships

PC11. prioritize team and organization goals above personal goals

Respect differences of gender and ability

To be competent, the user/individual on the job must be able to:

PC12. maintain a conducive environment for all the genders at the workplace

PC13. encourage appropriate behavior and conduct with people across gender

PC14. assist team members with disability in overcoming any challenges faced in work

PC15. practice appropriate verbal and non-verbal communication while interacting with People with Disability (PwD)

PC16. ensure equal participation of the people across genders in discussions

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation's policies on dress code, workplace timings, workplace behaviour, performance management, incentives, delivery standards, information security, etc.

KU2. organisation's hierarchy and escalation matrix

KU3. importance of establishing good working relationships with colleagues and superiors

KU4. importance of helping colleagues with problems, in order to meet quality and time standards as a team

KU5. different means and methods of communication

KU6. different types of information that colleagues might need and the importance of providing this information in an appropriate manner

KU7. organisation's policies and procedures for working with colleagues and superiors

KU8. importance of understanding consequences of gender biased behaviour

KU9. gender based concepts, issues and legislation

KU10. organisation standards and guidelines to be followed for PwD and knowledge about laws, acts and provisions defined for PwD by the statutory bodies and the right way to use them including various medical conditions associated with PwD

KU11. health and safety requirements at workplace for PwD

KU12. process of recruiting people for a particular job profile w.r.t PwD and gender

KU13. various government/private schemes and benefits available for PwD and information about various institutes working for PwD to enable in providing livelihood opportunities for PwD

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and comprehend forms, documents and records

GS2. read and write in English and/or local language

GS3. complete work with attention to detail

GS4. listen effectively and orally communicate information

GS5. work as per customer requirements

GS6. communicate with empathy across genders and PwD

GS7. improve and modify work practices

GS8. maintain positive and effective relationships with colleagues and customers

GS9. evaluate the possible solution(s) to the problem

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Interact effectively with superiors	**7**	**15**	**-**	**2**
PC1. receive work requirements from superiors and customers and interpret them correctly	1	2	-	-
PC2. inform the supervisor and/or concerned person about any unforeseen disruptions or delays	2	4	-	1
PC3. participate in decision making by providing facts and figures, giving/accepting constructive suggestions	2	5	-	1
PC4. rectify errors as per feedback and ensure the errors are not repeated	2	4	-	-
Interact effectively with colleagues and customers	**7**	**26**	**-**	**4**
PC5. comply with organisation's policies and procedures for working with team members	1	2	-	-
PC6. communicate professionally using appropriate mode of communication such as face-to-face, telephonic and written	2	4	-	1
PC7. respond to queries and seek/provide clarifications if required	2	4	-	1
PC8. co-ordinate with team to integrate work as per requirements	-	3	-	-
PC9. resolve conflicts within the team/with customers to achieve smooth workflow	1	5	-	1
PC10. recognize emotions accurately in self and others to build good relationships	1	4	-	-
PC11. prioritize team and organization goals above personal goals	-	4	-	1
Respect differences of gender and ability	**11**	**24**	**-**	**4**
PC12. maintain a conducive environment for all the genders at the workplace	2	5	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. encourage appropriate behavior and conduct with people across gender	2	5	-	1
PC14. assist team members with disability in overcoming any challenges faced in work	3	4	-	1
PC15. practice appropriate verbal and non-verbal communication while interacting with People with Disability (PwD)	2	4	-	1
PC16. ensure equal participation of the people across genders in discussions	2	6	-	-
NOS Total	**25**	**65**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	TEL/N9102
NOS Name	Interact Effectively with Team Members and Customers
Sector	Telecom
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2026
NSQC Clearance Date	31/03/2022

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
TEL/N4122.Wiring and Installing Equipment at Different Sites	30	60	0	10	100	20
TEL/N4123.Configuring Equipment and Establishing Connectivity	30	60	0	10	100	20
TEL/N4124.Troubleshoot and rectify Faults	40	50	0	10	100	20
TEL/N4125.UPS Installation and Domestic Power Supply Checks	30	60	0	10	100	20
TEL/N9101.Organise Work and Resources as per Health and Safety Standards	30	60	-	10	100	10
TEL/N9102.Interact Effectively with Team Members and Customers	25	65	-	10	100	10
Total	**185**	**355**	**-**	**60**	**600**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
OFC	Optical Fiber Cable
UTP	Un-shielded Twisted pair
STP	Shielded Twisted Pair
PoP	Point of Presence
TCP	Transmission Control Protocol
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.

Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard, which is denoted by an â€˜Nâ€™.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.