QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR TELECOM INDUSTRY

Contents

What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack – Transmission Engineer

SECTOR: TELECOM

SUB-SECTOR: Network Managed Services

OCCUPATION: Network Operation & Maintenance

REFERENCE ID: TEL/Q6203

ALIGNED TO: NCO-2004/3114.1201

Brief Job Description: Transmission Engineer is responsible for maintaining uptime and quality of the network (both media & equipment) segment assigned to him by undertaking periodic preventive maintenance activities. He is to also ensure effective fault management in case of fault occurence and periodically carry out upgrade, capacity augmentation activities as per transmission plan with no/ minimal disruption of services.

Personal Attributes: This job requires the individual to work closely with multiple teams and operate critical telecommunication equipments. The individual should be able to handle high pressure situations and be analytical to successfully perform the assigned responsibilities

Job Details

Qualifications Pack Code	TEL/Q6203		
Job Role	Transmission Engineer		
Credits(NSQF)	6	Version number	1.0
Sector	Telecom	Drafted on	26/04/2013
Sub-sector	Network Managed Service	Last reviewed on	21/06/2018
Occupation	Network Operations & Maintenance	Next review date	31/03/2019
NSQC Clearance on	20/07/2015		

Job Role	Transmission Engineer
Role Description	Transmission Engineer is responsible for maintaining uptime and quality of the network (both media & equipment) segment assigned to him by undertaking periodic preventive maintenance activities. He is to also ensure effective fault management in case of fault occurence and periodic upgrades, capacity augmentation of transmission network as per transmission plan with no/ minimal disruption of services
NSQF level	6
Minimum Educational Qualifications*	Diploma
Training (Suggested but not mandatory)	Training on Transmission Network Management System; Company specific trainings (equipment and software) based on make of transmission equipments deployed
Minimum entry Job Age	24 Year
Experience	Worked as LOS surveyor for minimum 2-3 years
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. TEL/N6212 (Coordinate preventive maintenance of Transmission nodes) 2. TEL/N6213 (Coordinate fault management of Transmission nodes) 3. TEL/N6214(Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in Transmission network)
Performance Criteria	As described in the relevant OS units

Definitions

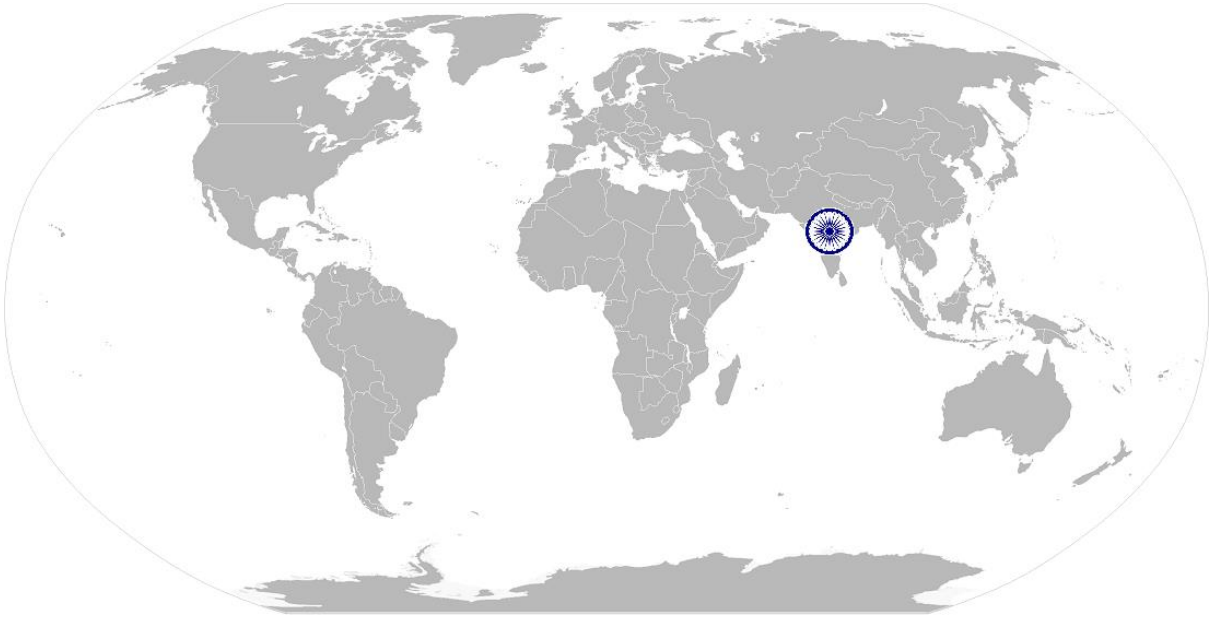
Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further 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 '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.
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

Acronym

Keywords /Terms	Description
BTS	Base Transceiver Station
FME	Field Maintenance Engineer
IF Cable	Intermediate Cable
MMU	Man-Machine Unit
OHS	Organizational Health and Safety
RF Cable	Radio Frequency Cable
SHE	Safety, Health and Environment
IN	Intelligent Network
VAS	Value Added Services
BSC	Base Station Controller
MUX	Multiplexer
SDH	Synchronous Digital Hierarchy
PDH	Plesiochronous Digital Hierarchy

National Occupational Standard



Overview

This unit is about carrying out preventive maintenance of transmission nodes to ensure network availability and high quality network transmission

TEL/N6212 Coordinate Preventive Maintenance of Transmission Nodes

National Occupational Standard

Unit Code	TEL/N6212
Unit Title (Task)	Coordinate preventive maintenance of Transmission nodes
Description	This unit is about carrying out preventive maintenance of transmission nodes to ensure network uptime and high quality network transmission
Scope	This unit/task covers the following: • Obtain preventive maintenance schedule • Coordinate preventive maintenance of transmission nodes (microwave and optical nodes) • Reporting and documenting the status at the end of scheduled activity

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Obtain schedule & notify NOC	To be competent, the user/individual on the job must be able to: PC1. ensure maintenance of site folder containing site capacity, topology and spots (microwave frequency used) PC2. obtain the preventive maintenance schedule and the corresponding checklist from the supervisors PC3. obtain network reports of the previous day from OSS and review network performance on defined parameters PC4. suggest appropriate changes to the planned maintenance schedule considering criticality, capacity, frequency of fading faults, configuration changes PC5. assess the potential impact of the proposed maintenance on customers and network and plan for possible outage or deferral of maintenance PC6. ensure Network Operating Centre (NOC) is notified prior to undertaking the maintenance activities
Arrange for tools & spares	To be competent, the user/individual on the job must be able to: PC1. ensure necessary tools and test equipments are available with the field team PC2. ensure that equipment specific software are installed in the laptop device of field team PC3. ensure that the software versions are current and ready to use PC4. ensure availability of spare hardware equipments like radio, microwave, fiber and raise request for spares, in case the same are not available PC5. ensure that faulty equipments are sent to logistics team for repair and replacement
Conduct/ Co-ordinate maintenance activity	PC6. conduct/ coordinate performance of maintenance activities on periodic basis (monthly, quarterly, half yearly) PC7. obtain performance dump of the transmission nodes from the NOC team and monitor signal strength, CRCbit error percentage, and other KPIs PC8. optimize signal parameters to ensure that they stay within the designed values PC9. review media errors in transmission PC10. ensure adequacy of redundancy for critical network elements like - IN/ Core/ BSC/ VAS nodes

TEL/N6212 Coordinate Preventive Maintenance of Transmission Nodes

	PC11. ensure completion of maintenance activities like antenna re-alignment, checking of connectors of IF, RF cables at BSS location by coordinating with the FM engineers PC12. ensure remote support is provided to the field team/ FM engineers while the change activities are carried out PC13. ensure timely completion of maintenance activity by monitoring activities performed by the field engineers PC14. ensure compliance to enterprise policy while escalating instances of delays
Test effectiveness & close activity	To be competent, the user/individual on the job must be able to: PC1. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team PC2. ensure completion of administrative jobs like site clearance, return of test equipments
Health & Safety	To be competent, the user/individual on the job must be able to: PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms PC2. ensure that work is carried out in accordance to the level of competence and legal requirements PC3. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures PC5. use and maintain protective equipment according to work requirements PC6. ensure availability of first aid box at site PC7. ensure escalation of safety incidents to relevant authorities as per guidelines
Report & Record	To be competent, the user/individual on the job must be able to: PC1. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisors) are notified of the results of the maintenance activities and the sign off is obtained from relevant personnel PC2. ensure that documents that are required to be updated are identified PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines PC4. ensure that documents are available to all appropriate authorities to inspect
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. risk and impact of not following defined procedures/work instructions KA2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures KA3. types of documentation in organization and importance of the same KA4. records to be maintained and implications of non-maintenance of the same KA5. process for obtaining sign-off post completion of the maintenance activities KA6. knowledge of spare management and repair & return process for faulty equipments KA7. SHE and OHS guidelines and regulations as per company's norms KA8. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used KA9. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries

TEL/N6212 Coordinate Preventive Maintenance of Transmission Nodes

	KA10. electrical hazards and precautionary measures KA11. usage of fire safety equipments
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. network topology like ring structure, daisy chain structure and their traffic handling capabilities and characteristics KB2. functionality of telecommunication network transmission nodes like transmission equipments (Multiplexers, Microwave radio - TDM and IP based); transmission medium (Optical and microwave), transmission technology (SDH and PDH) KB3. functionality of transmission media test equipment (Optical light meter, power meter, Optical Time Domain Reflectometer - OTDR) KB4. equipment specific O&M softwares like MiniLink for Ericsson, NEC Passo KB5. cables (RJ45, RS232, and Hi-Speed USB) to login to MMU/ IDU cards KB6. knowledge of Optical fiber characteristics like refraction, polarization, attenuation, dispersion KB7. bands in optical fibre and their usability, loss characteristics KB8. signal strength and quality KPIs – design values and margins KB9. transmission Network Monitoring System KB10. fresnel zone analysis (LOS survey) and microwave survey KB11. standard troubleshooting activities that are performed at transmission nodes
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Personal skills - Communication**
	The user/ individual on the job needs to know and understand how to: SA1. liaise and coordinate with third party vendors SA2. communicate with supervisor SA3. communicate in the local language
	Project Management Skills
	The user/individual on the job needs to know and understand how to: SA4. prioritize and execute tasks in a high-pressure environment and handle high pressure situations SA5. handle multiple tasks and completing them successfully within due timelines SA6. use and maintain resources efficiently and effectively
	Analtytical Skills
	The user/individual on the job needs to know and understand how to: SA7. keep up to date with new technology SA8. interpret reports, readings and numerical data SA9. think through to address complex problems SA10. source technical information by researching enterprise website or manufacturer's technical documentation
	Other Skills
	The user/individual on the job needs to know and understand how to: SA11. maintain security of site records and other confidential data SA12. create and maintain effective working relationships and team environment SA13. take initiatives and progressively assume increased responsibilities

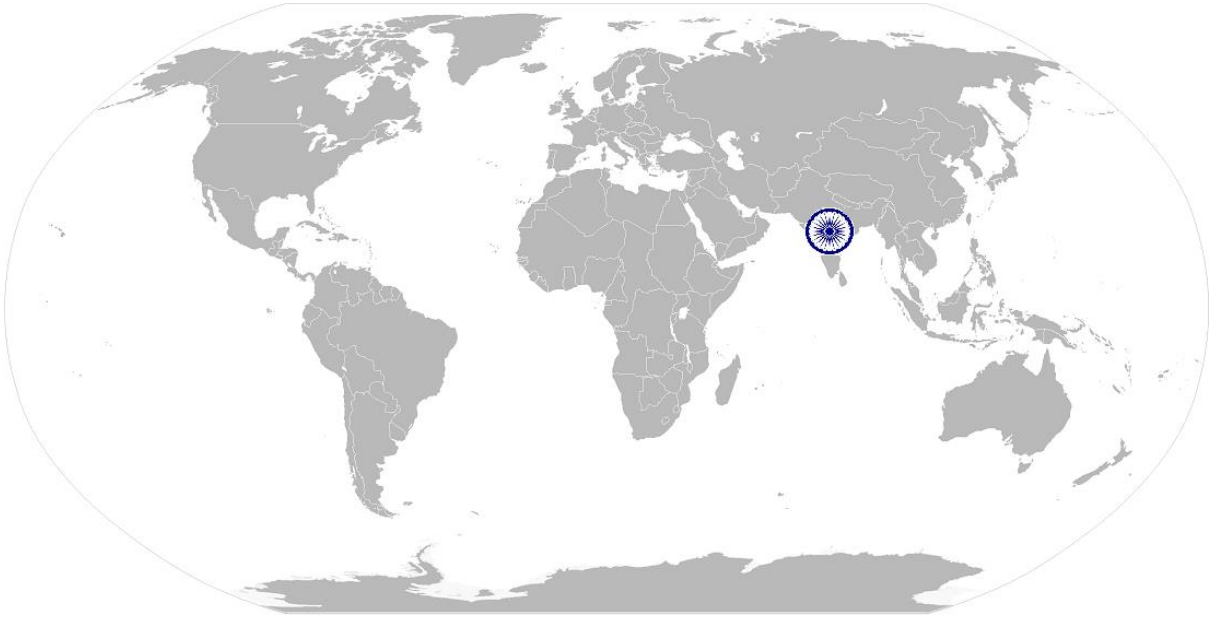
TEL/N6212 Coordinate Preventive Maintenance of Transmission Nodes

	SA14. share knowledge with other team members and colleagues
B. Professional Skills	**Equipment Operating Skills**
	The user/individual on the job needs to know and understand how to: SB1. operate transmission equipments like Microwave (TDM and IP based) radio, multiplexers, antennas and work on SDH and PDH transmission technology SB2. operate equipment specific O&M softwares like MiniLink for Ericsson, NEC Passo SB3. utilize appropriate fiber like single mode and multi mode optical fibre based on specific requirement SB4. utilize appropriate optical test equipments like OTDR, power meter, light meter based on test requirements SB5. connect appropriate login cables (RJ45, RS232, and Hi-Speed USB) to log on to the transmission nodes SB6. re-route traffic in case of link failure SB7. perform Fresnel zone/ Microwave survey and prepare survey reports in an appropriate manner SB8. provision STMs and E1s in appropriate way
	Technical Interpretation Skills
	The user/individual on the job needs to know and understand how to: SB9. interpret OTDR, power meter, light meter test results to localize faults SB10. interpret results of LOS/ Fresnel zone surveys SB11. analyze transmission performance reports and identify instances of signal attenuation/ fading SB12. interpret optical connectivity/ link testing results to ensure link margins

TEL/N6212 Coordinate Preventive Maintenance of Transmission Nodes

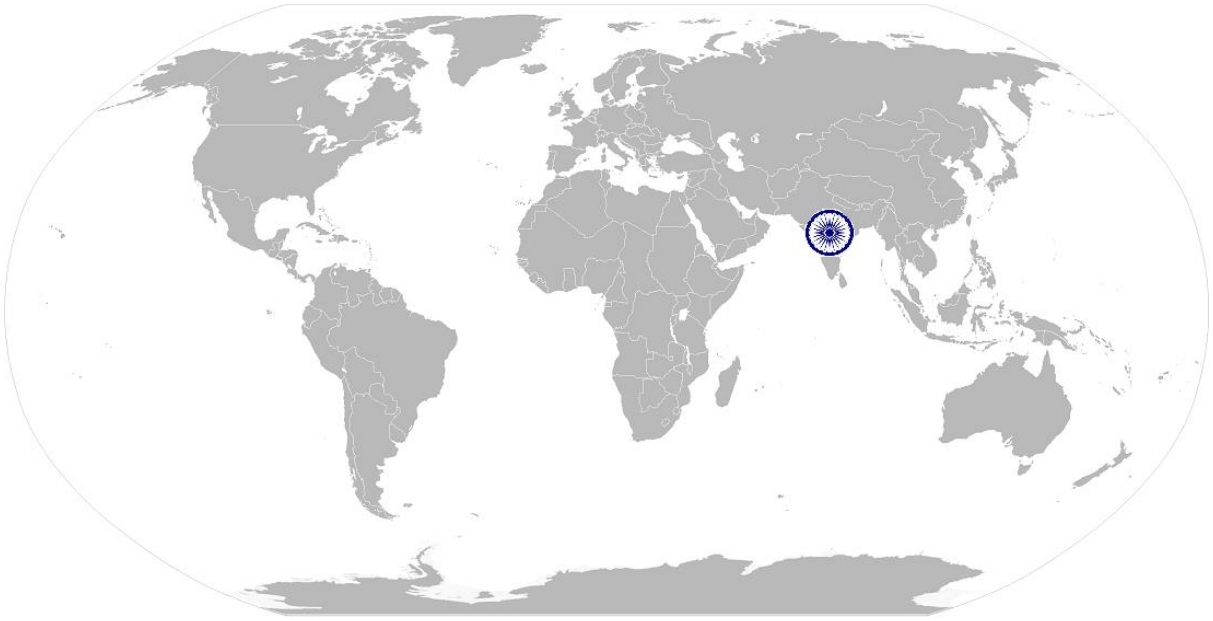
NOS Version Control

NOS Code	TEL/N6212		
Credits (NSQF)	6	Version number	1.0
Industry	Telecom	Drafted on	26/04/2013
Industry Sub-sector	Network Managed Service	Last reviewed on	21/06/2018
Occupation	Network O&M	Next review date	31/03/2019



TEL/N6213 *Coordinate corrective maintenance/ fault management of transmission nodes*

National Occupational Standard



Overview

This unit is about carrying out corrective maintenance/ fault management at transmission nodes to ensure network availability and high quality network transmission

TEL/N6213 *Coordinate corrective maintenance/ fault management of transmission nodes*

National Occupational Standard

Unit Code **Unit Title (Task)**	**TEL/N6213** **Coordinate corrective maintenance/ fault management of transmission nodes**
Description	This unit is about carrying out corrective maintenance/ fault management at transmission nodes to ensure network availability and high quality network transmission.
Scope	This unit/task covers the following: • Ensure timely response to the network alarms/ NOC instructions • Carry out diagnostic tests and coordinate with NOC in case of fibre failure • Rectify fault condition or escalate in case additional technical support in required • Reporting and documenting the status of the activity
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Respons to Network Alarms	To be competent, the user/individual on the job must be able to: PC1. obtain alarm information from the NOC team and determine alarm severity, SLAs and the affected network elements PC2. ensure understanding of nature of alarms, and provide information to/ seek advice from relevant parties to identify the problem and root-cause of the alarm PC3. analyze network topology and prioritise actioning on alarms based on their service impact
Arrange for tools & spares	To be competent, the user/individual on the job must be able to: PC1. ensure necessary tools and test equipments are available with the filed team PC2. ensure that equipment specific software are installed in the laptop device of the field team PC3. ensure that the software versions are current and ready to use PC4. ensure availability of spare hardware equipments like radio, microwave, fiber and raise request for spares, in case the same are not available PC5. ensure that faulty equipments are sent to logistics team for repair and replacement
Fault identification & rectification	To be competent, the user/individual on the job must be able to: PC1. ensure coordination with the field engineers for performance of fault correction activity at transmission nodes PC2. based on the alarm/ other indicators determine the fault details PC3. in case optical fiber faults, ensure coordination with optical NOC to rectify the fault PC4. ensure in coordination with the NOC team that traffic is re-routed in case of transmission system failures PC5. in case of non-fibre alarm coordinate with the field engineers to diagnose the root cause of alarm PC6. determine the options to rectify the fault and confirm with supervisors and fibre NOC if required PC7. ensure a contingency plan is in place to handle transmission system failures

TEL/N6213 *Coordinate corrective maintenance/ fault management of transmission nodes*

	PC8. ensure timely completion of fault rectification by monitoring activities performed by the field engineers PC9. ensure compliance to enterprise policy while escalating unresolved faults/ instances of delays
Test effectiveness & close activity	To be competent, the user/individual on the job must be able to: PC1. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team PC2. ensure completion of administrative jobs like site clearance, return of test equipments
Health & Safety	To be competent, the user/individual on the job must be able to: PC3. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms PC4. ensure that work is carried out in accordance to the level of competence and legal requirements PC5. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures PC6. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures PC7. use and maintain protective equipment according to work requirements PC8. ensure availability of first aid box at site PC9. ensure escalation of safety incidents to relevant authorities as per guidelines
Report and Records	To be competent, the user/individual on the job must be able to: PC1. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisors) are notified of the results of the fault management/ corrective maintenance activities and the sign-off is obtained PC2. ensure that documents that are required to be updated are identified PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines PC4. ensure that documents are available to all appropriate authorities to inspect
Knowledge and Understanding (K)	
B. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. risk and impact of not following defined procedures/work instructions KA2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures KA3. types of documentation in organization and importance of the same KA4. records to be maintained and implications of non-maintenance of the same KA5. process for obtaining sign-off post completion of the maintenance activities KA6. knowledge of spare management and repair & return process for faulty equipments KA7. SHE and OHS guidelines and regulations as per company's norms KA8. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used KA9. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries KA10. electrical and chemical related hazards and precautionary measures KA11. usage of fire safety equipments

TEL/N6213 *Coordinate corrective maintenance/ fault management of transmission nodes*

B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. network topology like ring structure, daisy chain structure and their traffic handling capabilities and characteristics KB2. functionality of telecommunication network transmission nodes like transmission equipments (Multiplexers, Microwave radio - TDM and IP based); transmission medium (Optical and microwave), transmission technology (SDH and PDH) KB3. functionality of transmission media test equipment (Optical light meter, power meter, Optical Time Domain Reflectometer - OTDR) KB4. equipment specific O&M softwares like MiniLink for Ericsson, NEC Passo KB5. cables (RJ45, RS232, and Hi-Speed USB) to login to MMU/ IDU cards KB6. knowledge of Optical fiber characteristics like refraction, polarization, attenuation, dispersion KB7. bands in optical fibre and their usability, loss characteristics KB8. signal strength and quality KPIs – design values and margins KB9. transmission Network Monitoring System KB10. fresnel zone analysis (LOS survey) and microwave survey KB11. standard troubleshooting activities that are performed at transmission nodes KB12. knowledge of alarm types, resolution and remedy SLAs and escalation matrix KB13. implications for non response to tickets within defined SLAs
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Communication Skills**
	The user/ individual on the job needs to know and understand how to: SA1. liaise and coordinate with third party vendors SA2. communicate with supervisor SA3. communicate in the local language
	Project Management Skills
	The user/individual on the job needs to know and understand how to: SA4. prioritize and execute tasks in a high-pressure environment and handle high pressure situations SA5. handle multiple tasks and completing them successfully within due timelines SA6. use and maintain resources efficiently and effectively
	Analytical Skills
	The user/individual on the job needs to know and understand how to: SA7. keep up to date with new technology SA8. interpret reports, readings and numerical data SA9. think through to address complex problems SA10. source technical information by researching enterprise website or manufacturer's technical documentation
	Other Skills
	The user/individual on the job needs to know and understand how to: SA11. maintain security of site records and other confidential data SA12. create and maintain effective working relationships and team environment SA13. take initiatives and progressively assume increased responsibilities SA14. share knowledge with other team members and colleagues

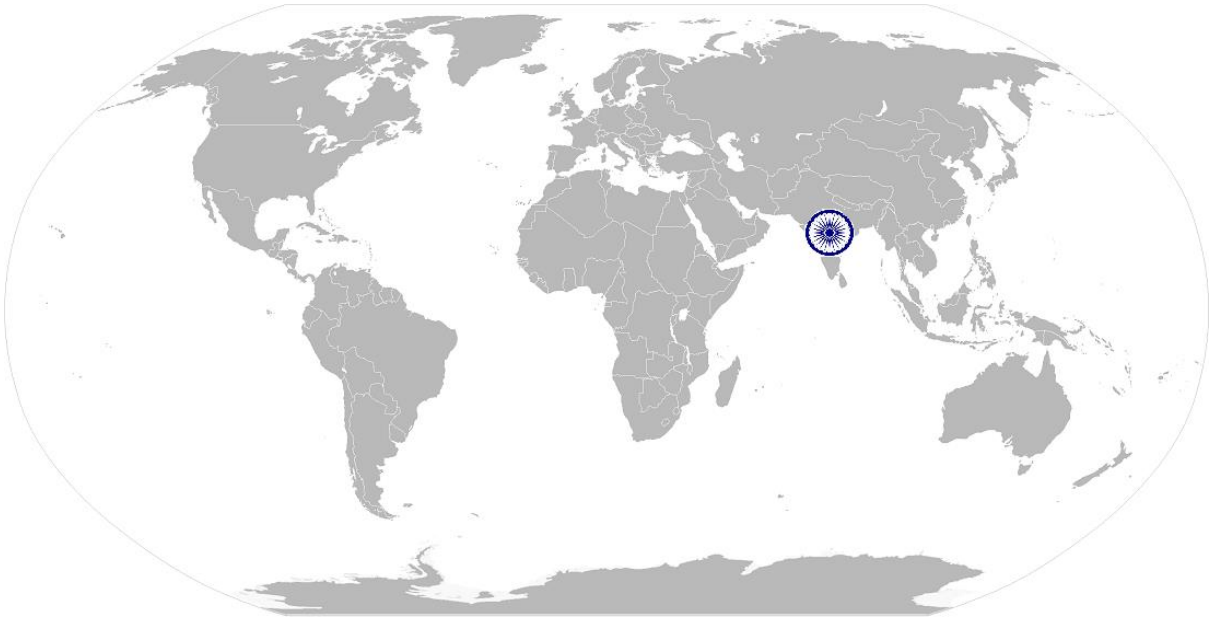
TEL/N6213 *Coordinate corrective maintenance/ fault management of transmission nodes*

B. Professional Skills	**Equipment Operating Skills**
	The user/individual on the job needs to know and understand how to: SB1. operate transmission equipments like Microwave (TDM and IP based) radio, multiplexers, antennas and work on SDH and PDH transmission technology SB2. operate equipment specific O&M softwares like MiniLink for Ericsson, NEC Passo SB3. utilize appropriate fiber like single mode and multi mode optical fibre based on specific requirements SB4. utilize appropriate optical test equipments like OTDR, power meter, light meter based on test requirements SB5. connect appropriate login cables (RJ45, RS232, and Hi-Speed USB) to log on to the transmission nodes SB6. re-route traffic in case of link failure SB7. perform Fresnel zone/ Microwave survey and prepare survey reports in an appropriate manner SB8. provision STMs and E1s in appropriate way
	Technical Interpretation Skills
	The user/individual on the job needs to know and understand how to: SB9. interpret OTDR, power meter, light meter test results to localize faults SB10. interpret results of LOS/ Fresnel zone surveys SB11. analyze transmission performance reports and identify instances of signal attenuation/ fading SB12. interpret optical connectivity/ link testing results to ensure link margins
	Problem Solving Skills
	The user/individual on the job needs to know and understand how to: SB13. troubleshoot common equipment and network related problems SB14. utilize appropriate tools and commands to rectify faults SB15. utilize appropriate communication channels to escalate unresolved problems to relevant personnel SB16. analyze service impact of the fault to prioritize actioning on alarms

TEL/N6213 *Coordinate corrective maintenance/ fault management of transmission nodes*

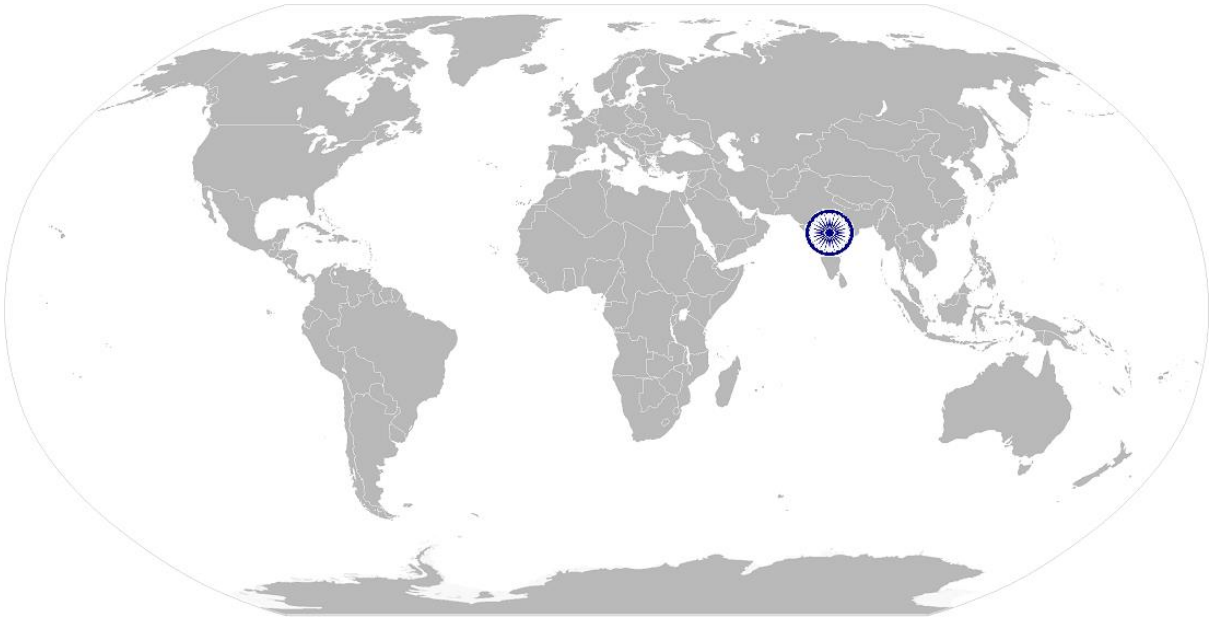
NOS Version Control

NOS Code	TEL/N6213		
Credits (NSQF)	6	Version number	1.0
Industry	Telecom	Drafted on	26/04/2013
Industry Sub-sector	Network Managed Service	Last reviewed on	21/06/2018
Occupation	Network O&M	Next review date	31/03/2019



TEL/N6214 *Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in Transmission network*

National Occupational Standard



Overview

This unit is about carrying out change management activities (system upgrade/transmission capacity augmentation/ re-alignment etc.) for transmission nodes.

TEL/N6214 *Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in Transmission network*

National Occupational Standard

Unit Code	TEL/N6214
Unit Title (Task)	**Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in the transmission network**
Description	This unit is about carrying out change management activities (system upgrade/ transmission capacity augmentation/ re-alignment etc.) for transmission nodes
Scope	This task covers the following: • Ensure timely response to the change work orders • Implement change work order and test effectiveness of change • Reporting and documenting the status
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Determine change/ configuration requirements	To be competent, the user/individual on the job must be able to: PC1. receive change requests from the relevant teams (NOC, change management, network planning team etc.) PC2. identify criticality and timelines for carrying out the changes PC3. develop work plan and identify dependencies if any PC4. assess the potential impact of the proposed activity and plan for possible outage condition or deferral of the activity PC5. ensure that Network Operating Centre (NOC) is notified prior to undertaking the change activities
Arrange for tools and spares	To be competent, the user/individual on the job must be able to: PC1. ensure availability of necessary tools and test equipments with the field team PC2. ensure availability of spare hardware equipments like radio, microwave, fiber etc. and raise request for spares, in case the same are not available PC3. ensure that the login user id and password to the system are current
Coordinate /perform chancge activities at transmission nodes	To be competent, the user/individual on the job must be able to: PC1. login to the transmission nodes and optimize signal parameters - power and transmission frequency to the designed levels PC2. optimize transmission capacity levels (number of STMs and E1s required and available capacity) PC3. ensure the software version of the transmission nodes is current, as per the details available from the NOC PC4. in case field support is required, ensure coordination with the field engineers to carry out change activities at transmission nodes PC5. ensure remote support from NOC/ control room is provided to the field team/ FM engineers while the change activities are carried out PC6. ensure completion of the requested change task as per requestor's requirement PC7. ensure continuous monitoring of progress of change and notify change requestor of problems encountered if any PC8. abort change and implement contingency plan should the change plan not be realized without major disruption to network PC9. ensure compliance with the defined SLA for carrying out changes

	PC10. ensure unresolved faults/ instances of delays in resolution are escalated as per Company's policy
Test effectiveness & close activity	To be competent, the user/individual on the job must be able to: PC1. confirm effectiveness of the change process, by monitoring site's alarm status in co-ordination with the NOC team PC2. ensure completion of administrative jobs like site clearance, return of test equipments etc
Health & Safety	To be competent, the user/individual on the job must be able to: PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms PC2. ensure that work is carried out in accordance to the level of competence and legal requirements PC3. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures PC5. use and maintain protective equipment according to work requirements PC6. ensure availability of first aid box at site PC7. ensure escalation of safety incidents to relevant authorities as per guidelines
Report & Record	To be competent, the user/individual on the job must be able to: PC1. ensure all relevant parties (including NOC team, other supervisors) are notified of the results of the change management activities and sign-off is obtained from relevant personnel PC2. ensure that document that are required to be updated are identified PC3. ensure completion of routine maintenanace logs, activity logs and spare tracker within stipulated timelines PC4. ensure that documents are available to all appropriate authorities to inspect
Knowledge and Understanding (K)	
C. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. risk and impact of not following defined procedures/work instructions KA2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures KA3. types of documentation in organization and importance of the same KA4. records to be maintained and implications of non-maintenance of the same KA5. process for obtaining sign-off post completion of the maintenance activities KA6. knowledge of spare management and repair & return process for faulty equipments KA7. SHE and OHS guidelines and regulations as per company's norms KA8. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used KA9. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries KA10. electrical and chemical related hazards and precautionary measures KA11. usage of fire safety equipments
	The user/individual on the job needs to know and understand:

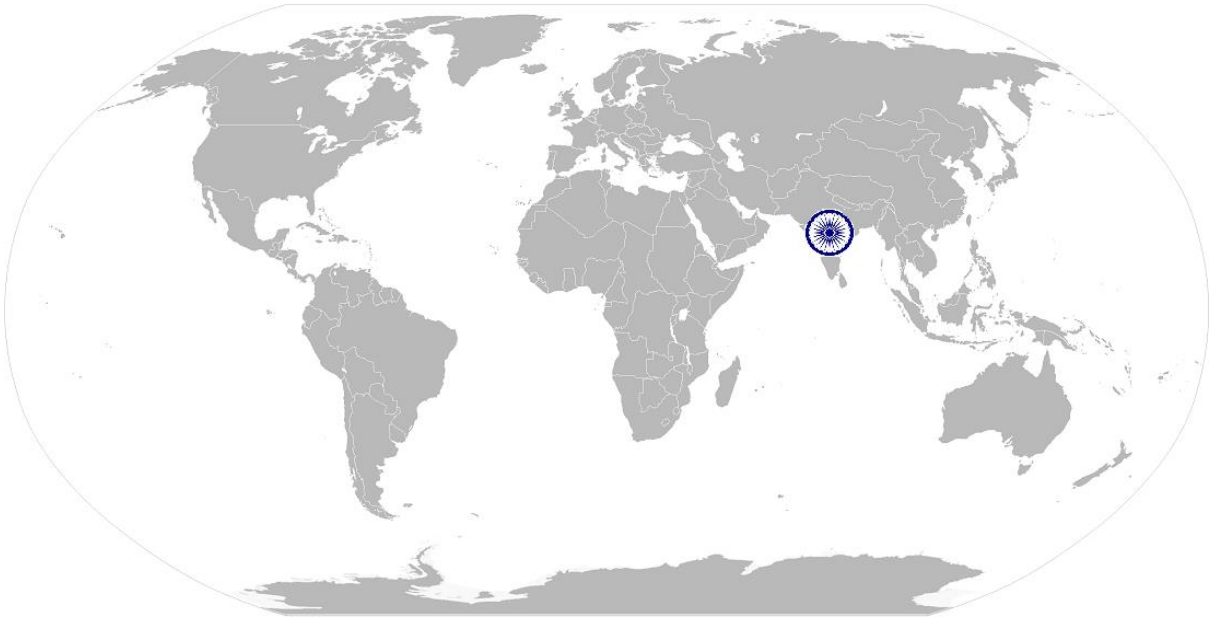
TEL/N6214 *Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in Transmission network*

B.Technical Knowledge	KB1. network topology like ring structure, daisy chain structure and their traffic handling capabilities and characteristics KB2. functionality of telecommunication network transmission nodes like transmission equipments (Multiplexers, Microwave radio - TDM and IP based); transmission medium (Optical and microwave), transmission technology (SDH and PDH) KB3. functionality of transmission media test equipment (Optical light meter, power meter, Optical Time Domain Reflectometer - OTDR) KB4. equipment specific O&M softwares like MiniLink for Ericsson, NEC Passo KB5. cables (RJ45, RS232, and Hi-Speed USB) to login to MMU/ IDU cards KB6. knowledge of Optical fiber characteristics like refraction, polarization, attenuation, dispersion KB7. bands in optical fibre and their usability, loss characteristics KB8. signal strength and quality KPIs – design values and margins KB9. transmission Network Monitoring System
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Personal Skills – Communication**
	The user/ individual on the job needs to know and understand how to: SA1. liaise and coordinate with third party vendors SA2. communicate with supervisor SA3. communicate in the local language
B. Professional Skills	**Equipment Operating Skills**
	The user/individual on the job needs to know and understand how to: SB1. operate transmission equipments like Microwave (TDM and IP based) radio, multiplexers, antennas and work on SDH and PDH transmission technology SB2. operate equipment specific O&M softwares like MiniLink for Ericsson, NEC Passo SB3. utilize appropriate fiber like single mode and multi mode optical fibre based on specific requirements SB4. utilize appropriate optical test equipments like OTDR, power meter, light meter based on test requirements SB5. connect appropriate login cables (RJ45, RS232, and Hi-Speed USB) to log on to the transmission nodes SB6. re-route traffic in case of link failure SB7. perform Fresnel zone/ Microwave survey and prepare survey reports in an appropriate manner SB8. provision STMs and E1s in appropriate way
	Technical Interpretationn Skills
	The user/individual on the job needs to know and understand how to: SB9. interpret OTDR, power meter, light meter test results to localize faults SB10. interpret results of LOS/ Fresnel zone surveys SB11. analyze transmission performance reports and identify instances of signal attenuation/ fading SB12. interpret optical connectivity/ link testing results to ensure link margins SB13. analyze the impact on the network due to the change activity and develop appropriate plans

TEL/N6214 *Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in Transmission network*

NOS Version Control

NOS Code	TEL/N6214		
Credits (NSQF)	6	Version number	1.0
Industry	Telecom	Drafted on	26/04/2013
Industry Sub-sector	Network Managed Service	Last reviewed on	21/06/2018
Occupation	Network O&M	Next review date	31/03/2019



TEL/Q6203 Qualifications Pack for Transmission Engineer

Criteria for Assessment of Trainee

Job Role	Transmission Engineer
Qualification Pack	TEL/Q6203
Sector Skill Council	Telecom

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each 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 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.
4a. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
4b. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
5. To pass the Qualification Pack , every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
6. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Assessable Outcome	AssessmetnCriteria		Total Mark (300)	Total of Sub-Element	Out Of	Theory	Skills Practical
1. TEL/N6212 (Coordinate preventive maintenance ofTransmission nodes)	Obtain schedule & notify NOC	PC1. ensure maintenance of site folder containing site capacity, topology and spots (microwave frequency used)	100	20	3	3	0
		PC2. obtain the preventive maintenance schedule and the corresponding checklist from the supervisors			3	3	0
		PC3. obtain network reports of the previous day from OSS and review network performance on defined parameters			4	4	0
		PC4. suggest appropriate changes to the planned maintenance schedule considering criticality, capacity, frequency of fading faults, configuration changes			5	5	0
		PC5. assess the potential impact of the proposed maintenance on customers and network and plan for possible outage or deferral of maintenance			2	2	0
		PC6. ensure Network Operating Centre (NOC) is notified prior to undertaking the maintenance activities			3	3	0
		PC1. ensure necessary tools and test equipments		5	1	0	1

		are available with the field team				
		PC2. ensure that equipment specific software are installed in the laptop device of field team		1	0	1
		PC3. ensure that the software versions are current and ready to use		1	0	1
	Arrange for tools and spares	PC4. ensure availability of spare hardware equipments like radio, microwave, fiber and raise request for spares, in case the same are not available		1	0	1
		PC5. ensure that faulty equipments are sent to logistics team for repair and replacement		1	1	0
	Conduct/ Co-ordinate maintenance activity	PC1. conduct/ coordinate performance of maintenance activities on periodic basis (monthly, quarterly, half yearly)	40	4	4	0
		PC2. obtain performance dump of the transmission nodes from the NOC team and monitor signal strength, CRCbit error percentage, and other KPIs		5	0	5
		PC3. optimize signal parameters to ensure that they stay within the designed values		8	0	8
		PC4. review media errors in transmission		2	0	2
		PC5. ensure adequacy of redundancy for critical network elements like - IN/ Core/ BSC/ VAS nodes		4	0	4
		PC6. ensure completion of maintenance activities like antenna re-alignment, checking of connectors of IF, RF cables at BSS location by coordinating with the FM engineers		10	0	10
		PC7. ensure remote support is provided to the field team/ FM engineers while the change activities are carried out		2	0	2

	PC8. ensure timely completion of maintenance activity by monitoring activities performed by the field engineers			3	0	3
	PC9. ensure compliance to enterprise policy while escalating instances of delays			2	2	0
Test effectiveness & close activity	PC1. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team		10	5	0	5
	PC2. ensure completion of administrative jobs like site clearance, return of test equipments			5	0	5
Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms		15	2	2	0
	PC2. ensure that work is carried out in accordance to the level of competence and legal requirements			2	0	2
	PC3. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures			5	0	5
	PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures			1	0	1
	PC5. use and maintain protective equipment according to work requirements			2	0	2
	PC6. ensure availability of first aid box at site			1	0	1
	PC7. ensure escalation of safety incidents to relevant authorities as per guidelines			2	2	0
Report & Record	PC1. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisors) are notified		10	2	2	0

		of the results of the maintenance activities and the sign-off is obtained from relevant personnel					
		PC2. ensure that documents that are required to be updated are identified			2	2	0
		PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines			3	3	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			3	3	0
					100	41	59
2. TEL/N6213 (Coordinate corrective maintenance/ fault management of transmission nodes)	Respond to Network Alarm/ NOC instructions	PC1. obtain alarm information from the NOC team and determine alarm severity,SLAs and the affected network elements	100	15	3	3	0
		PC2. ensure understanding of nature of alarms, and provide information to/ seek advice from relevant parties to identify the problem and root-cause of the alarm			8	2	6
		PC3. analyze network topology and prioritise actioning on alarms based on their service impact.			4	0	4
	Arrange for tools and spares	PC1. ensure necessary tools and test equipments are available with the filed team		5	1	0	1
		PC2. ensure that equipment specific software are installed in the laptop device of the field team			1	0	1
		PC3. ensure that the software versions are current and ready to use			1	0	1
		PC4. ensure availability of spare hardware equipments like radio, microwave, fiber and raise request for spares, in case the same are not available			1	0	1

		PC5. ensure that faulty equipments are sent to logistics team for repair and replacement		1	0	1
	Identify & rectify faults	PC1. ensure coordination with the field engineers for performance of fault correction activity at transmission nodes	45	6	0	6
		PC2. based on the alarm/ other indicators determine the fault details		5	5	0
		PC3. in case optical fiber faults, ensure coordination with optical NOC to rectify the fault		6	3	3
		PC4. ensure in coordination with the NOC team that traffic is re-routed in case of transmission system failures		6	0	6
		PC5. in case of non-fibre alarm coordinate with the field engineers to diagnose the root cause of alarm		6	2	4
		PC6. determine the options to rectify the fault and confirm with supervisors and fibre NOC if required		4	0	4
		PC7. ensure a contingency plan is in place to handle transmission system failures		5	0	5
		PC8. ensure timely completion of fault rectification by monitoring activities performed by the field engineers		3	0	3
		PC9. ensure compliance to enterprise policy while escalating unresolved faults/instances of delays		4	0	4
	Test effectiveness & close activity	PC1. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team	10	5	0	5
		PC2. ensure completion of administrative jobs like site clearance, return of test equipments		5	0	5

	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms		15	2	2	0
		PC2. ensure that work is carried out in accordance to the level of competence and legal requirements			2	0	2
		PC3. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures			5	0	5
		PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures			1	0	1
		PC5. use and maintain protective equipment according to work requirements			2	0	2
		PC6. ensure availability of first aid box at site			1	0	1
		PC7. ensure escalation of safety incidents to relevant authorities as per guidelines			2	2	0
	Report & Record	PC1. ensure all relevant parties (including BSS/ BTS support engineer, NOC team,other supervisors) are notified of the results of the fault management/corrective maintenance activities and the sign-off is obtained		10	2	2	0
		PC2. ensure that documents that are required to be updated are identified			2	2	0
		PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines			3	3	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			3	3	0
					100	29	71

3. TEL/N6214 (Undertake upgrade, capacity augmentation and addition/ deletion of new nodes in Transmission network)	Determine change/ configuration requirements	PC1. receive change requests from the relevant teams (NOC, change management, network planning team etc.)	100	15	2	2	0
		PC2. identify criticality and timelines for carrying out the changes			2	2	0
		PC3. develop work plan and identify dependencies if any			0	0	0
		PC4. assess the potential impact of the proposed activity and plan for possible outage condition or deferral of the activity			6	4	2
		PC5. ensure that Network Operating Centre (NOC) is notified prior to undertaking the change activities			3	3	0
	Arrange for tools and spares	PC1. ensure availability of necessary tools and test equipments with the field team		5	2	0	2
		PC2. ensure availability of spare hardware equipments like radio, microwave, fiber etc. and raise request for spares, in case the same are not available			3	2	3
		PC3. ensure that the login user id and password to the system are current			0	0	0
	Co-ordinate/ perform change activities at transmission nodes	PC1. login to the transmission nodes and optimize signal parameters - power and transmission frequency to the designed levels		45	5	5	0
		PC2. optimize transmission capacity levels (number of STMs and E1s required and available capacity)			10	5	5
		PC3. ensure the software version of the transmission nodes is current, as per the details available from the NOC			2	0	2
		PC4. in case field support is required, ensure coordination with the field engineers to carry out change			5	0	5

		activities at transmission nodes				
		PC5. ensure remote support from NOC/ control room is provided to the field team/ FM engineers while the change activities are carried out		2	2	0
		PC6. ensure completion of the requested change task as per requestor's requirement		3	0	3
		PC7. ensure continuous monitoring of progress of change and notify change requestor of problems encountered if any		5	0	5
		PC8. abort change and implement contingency plan should the change plan not be realized without major disruption to network		5	0	5
		PC9. ensure compliance with the defined SLA for carrying out changes		4	2	2
		PC10. ensure unresolved faults/ instances of delays in resolution are escalated as per Company's policy		4	0	4
	Test effectiveness & close activity	PC1. confirm effectiveness of the change process, by monitoring site's alarm status in co-ordination with the NOC team	10	5	5	0
		PC2. ensure completion of administrative jobs like site clearance, return of test equipments equipments etc.		5	5	0
	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms	15	2	2	0
		PC2. ensure that work is carried out in accordance to the level of competence and legal requirements		2	0	2
		PC3. ensure that hazards associated with the workplace that have not been previously		5	0	5

		controlled, are reported in accordance with appropriate procedures					
		PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures			1	0	1
		PC5. use and maintain protective equipment according to work requirements			2	0	2
		PC6. ensure availability of first aid box at site			1	0	1
		PC7. ensure escalation of safety incidents to relevant authorities as per guidelines			2	2	0
	Report & Record	PC1. ensure all relevant parties (including NOC team, other supervisors) are notified of the results of the change management activities and sign-off is obtained from relevant person		10	2	2	0
		PC2. ensure that documents that are required to be updated are identified			2	2	0
		PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines			3	3	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			3	3	0
					100	51	49