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

Contact Us:
2nd Floor, Plot No: 105, Sector - 44,
Gurgaon - 122003
T: 0124 - 4148029
E-mail:
tssc@tsscindia.com

Introduction

Qualifications Pack- Core Engineer

SECTOR: TELECOM

SUB-SECTOR: Network Managed Services

OCCUPATION: Network Operations and Maintenance

REFERENCE ID: TEL/Q6201

ALIGNED TO: NCO-2015/2153.0601

Core Engineer in the telecom industry is also known as NSS Engineer/Switch Engineer

Brief Job Description: Core engineer is responsible for error free performance of radio and data core nodes through preventive maintenance and effective fault management in case of fault occurrence. He is also responsible for performing upgrade, configuration change activities and for carrying out Point of interconnect testing for customers.

Personal Attributes: This job requires the individual to work closely with multiple teams and operate on critical telecommunication equipments. He should be able to analyse, interpret data and apply professional judgement to carry out assigned responsibilities.

Job Details

Qualifications Pack Code	TEL/Q6201		
Job Role	**Core Engineer**		
Credits NSQF	TBD	**Version number**	1.0
Sector	Telecom	**Drafted on**	26/04/13
Sub-sector	Network Managed Services	**Last reviewed on**	29/04/15
Occupation	Network Operations and Maintenance	**Next review date**	31/05/17
NSQC Clearance On	**18/06/2015**		

Job Role	**Core Engineer**
Role Description	Core engineer is responsible for error free performance of radio and data core nodes through preventive maintenance and effective fault management in case of fault occurrence. He is also responsible for performing upgrade, configuration change activities and for carrying out Point of interconnect testing for customers.
NSQF level **Minimum Educational Qualifications*** **Maximum Educational Qualifications***	6 Diploma/ B Tech (Electronics, CS, IT and related field) Masters in Technology
Training	Company specific trainings (equipment and software) based on make of Core Equipments deployed Certification courses like CCNA
Minimum Job Entry Age	21
Experience	Worked as Core engineer for minimum 2-3 years.
Applicable National Occupational Standards (NOS)	Click to open the below hyperlinks **Compulsory:** 1. TEL/N6204 (**Perform preventive maintenance at Core nodes**) 2. TEL/N6205 (**Perform corrective maintenance/ fault management at Core nodes**) 3. TEL/N6206 (**Undertake upgrade, capacity augmentation and configuration change activities at Core nodes**) 4. TEL/N6207 (**Undertake Point of Interconnect testing**) **Optional:** NA
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.

Acronyms

Keywords /Terms	Description
FTP	File Transfer Protocol
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
HLR	Home Location Register
IF cable	Intermediate frequency cable
IP network	Internet Protocol Network
MGW	Media Gateway
MML	Man-Machine Language
MSC	Mobile Switching Centre
OHS	Organizational Health & Safety
RF cable	Radio Frequency Cable
SDP	Service Delivery Platform
SGSN	Serving GPRS Support Node
SHE	Safety, Health & Environment
SMPS	Switch Mode Power Supply
VSWR	Voltage Standing Wave Ratio

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National Occupational Standard

Overview

This unit is about carrying out preventive maintenance activities at Core nodes (like MSC, SGSN, GGSN, MGWs, HLR)

National Occupational Standard

Unit Code Unit Title (Task)	TEL/N6204 Perform preventive maintenance at Core nodes
Description	This unit is about carrying out preventive maintenance activities at Core nodes
Scope	This unit/task covers the following: • Ensure adherence to the preventive maintenance schedule • Carry out preventive maintenance activities at radio locations • Reporting and documenting the status at the end of scheduled activity

Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Obtain/ Plan schedule & notify NOC	To be competent, the user/individual on the job must be able to: PC1. obtain/ Plan the preventive maintenance schedule PC2. obtain the maintenance activity checklist from the supervisors PC3. assess the potential impact of the proposed maintenance on network and plan for possible outage or deferral of the activity PC4. ensure that Network Operating Centre (NOC) is notified prior to undertaking the maintenance activities
Arrange for tools and spares	To be competent, the user/individual on the job must be able to: PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB) PC2. ensure that equipment specific software like network manager, Citrix, traffic manager are installed in the laptop device PC3. ensure that the software versions are current and ready to use PC4. ensure availability of spare hardware equipments and raise request for spares, in case the same are not available as per company's process PC5. ensure that faulty equipments are sent to logistics team for repair and replacement
Undertake maintenance activities	To be competent, the user/individual on the job must be able to: PC1. conduct periodic (monthly, quarterly, half yearly) maintenance activities PC2. ensure timely completion of physical maintenance tasks like checking temperatures, routing of Ethernet cables & optical fibers, cable ties, fan working condition, earthing, equipment grouting, distribution of cables PC3. conduct logical maintenance tasks like PM counter checking, checking alarm status, system availability parameters, logical redundancy PC4. ensure periodic back-ups of core node configuration, and maintenance of back-

	up media PC5. ensure interconnectivity uptime and lease line uptime by coordinating with other vendors PC6. ensure environmental up-keep of sites and co-ordinate with core infrastructure team for maintenance of passive infrastructure at core nodes PC7. ensure timely completion of maintenance activity by monitoring activities performed by the technicians and field engineers PC8. 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 return of test equipments and follow activity closure procedures
Health and 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 that all relevant parties (including 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 relevant documents 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	The user/individual on the job needs to know and understand: KA1. risk and impact of not following defined procedures/work instructions

company / organization and its processes)	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 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. functionality of Radio Core equipments like MSC, MGW, HLR, SDP KB2. functionality if Data core nodes like GGSN, SGSN, GPRS KB3. functionality of passive infrastructure equipments like SMPS, Diesel generators, SMPS, Air conditioner, Battery bank KB4. login cables (RJ45, RS232, and Hi-Speed USB) for different site equipments KB5. functionality of test equipments like E1 tester, Ethernet tester, VSWR meter, Optical meter KB6. knowledge of IP based network - IP back-hauling and IP networking KB7. network manager, transmission manager and other equipment specific software KB8. UNIX, LINUX and SOLARIS system and commands KB9. SS7/SIGTRAN - Signaling protocols KB10. MML commands - Z based commands, R, X based commands, POSIX commands KB11. need and process of Earthing of equipments KB12. knowledge of Network Monitoring System KB13. knowledge of using and deploying cable connectors, cable ties and cable tray KB14. standard preventive maintenance activities that need to be carried out KB15. standard fault-finding (troubleshooting) techniques
Skills (S)	
A. Generic Skills	**Communication Skills** The user/ individual on the job needs to know and understand how to: SA1. communicate with supervisor SA2. provide advice and guidance to peers & juniors SA3. respond appropriately to queries from upstream and downstream teams **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 and business critical environment SA5. multi-task by handling 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
B. Professional Skills	**Equipment operating Skills**
	The user/individual on the job needs to know and understand how to: SB1. operate Radio Core equipments like MSC, MGW, HLR, SDP SB2. operate Data core nodes like GGSN, SGSN, GPRS SB3. operate UNIX, LINIX and SOLARIS operating systems SB4. operate equipment specific software like network manager, transmission manager SB5. execute instructions through MML commands - Z based commands, R based commands, POSIX commands SB6. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter SB7. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB8. use appropriate Telnet and FTP commands for file sharing SB9. appropriately back-up core nodes on periodic basis SB10. use appropriate cables (RF, IF) and connectors for effective cabling
	Technical interpretation Skills

	The user/individual on the job needs to know and understand how to: SB11. interpret VSWR, E1, power meter test results to localize faults and undertake appropriate steps to be rectify the same SB12. analyze performance reports and identify instances of deteriorating cell site performance like call drops, signal quality deterioration.

NOS Version Control

NOS Code	**TEL/N6204**		
Credits NSQF	TBD	**Version number**	**1.0**
Industry	**Telecom**	**Drafted on**	**26/04/13**
Industry Sub-sector	**Network Managed Services**	**Last reviewed on**	**29/04/15**
		Next review date	**31/05/17**

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National Occupational Standard

Overview

This unit is about carrying out corrective maintenance/ fault management activities at Core nodes (MSC, SGSN, GGSN, MGWs, HLR)

National Occupational Standard

Unit Code Unit Title (Task)	TEL/N6205 Perform corrective maintenance/ fault management at Core nodes
Description	This unit is about carrying out corrective maintenance/ fault management activities at Core nodes (MSC, SGSN, GGSN, MGWs, HLR)
Scope	This unit/task covers the following: • Ensure timely response to the network alarms/ trouble tickets • Carry out diagnostic tests at site location and identify root cause of fault • Rectify fault condition or escalate in case additional technical support in required
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Respond to Network Alarm	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 alarm, and provide information to/ seek advice from relevant parties to identify the problem and root-cause of the alarm PC3. prioritize actioning on alarms based on fault's service impact analysis
Arrange for tools and spares	To be competent, the user/individual on the job must be able to: PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB) PC2. ensure that equipment specific software like network manager, Citrix, traffic manager are installed in the laptop device PC3. ensure that the software versions are current and ready to use PC4. ensure availability of spare hardware equipments and raise request for spares, in case the same are not available as per company's process PC5. ensure that faulty equipments are sent to logistics team for repair and replacement
Identify & rectify faults	To be competent, the user/individual on the job must be able to: PC1. ensure that appropriate cables are used to login to the core node PC2. based on the alarm code/ other indicators determine the fault details PC3. ensure necessary diagnostic tests are carried out to identify the root cause of the alarm PC4. determine the options to rectify the fault and confirm with supervisors if required PC5. ensure rectification of network problem/ fault within the alarm SLAs

	PC6. ensure environmental up-keep of sites and co-ordinate with core infrastructure team for maintenance of passive infrastructure at core nodes PC7. ensure timely completion of maintenance activity by monitoring activities performed by the technicians and field engineers PC8. ensure compliance to enterprise policy while escalating unresolved faults/ instances of delays
Obtain back-up, test effectiveness & close activity	To be competent, the user/individual on the job must be able to: PC1. ensure back-up of core nodes are taken both pre and post performance of corrective maintenance/ fault correction activities PC2. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team PC3. ensure completion of administrative jobs like return of test equipments and follow activity closure procedures
Health and 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 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)	
A. Organizational Context (Knowledge of the company / organization and	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

its processes)	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 KA12. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used KA13. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries KA8. electrical hazards and precautionary measures KA9. usage of fire safety equipments
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. functionality of Radio Core equipments like MSC, MGW, HLR, SDP KB2. functionality if Data core nodes like GGSN, SGSN, GPRS KB3. functionality of passive infrastructure equipments like SMPS, Diesel generators, SMPS, Air conditioner, Battery bank KB4. login cables (RJ45, RS232, and Hi-Speed USB) for different site equipments KB5. functionality of test equipments like E1 tester, Ethernet tester, VSWR meter, Optical meter KB6. knowledge of IP based network - IP back-hauling and IP networking KB7. network manager, transmission manager and other equipment specific software KB8. UNIX, LINUX and SOLARIS system and commands KB9. SS7/SIGTRAN - Signaling protocols KB10. MML commands - Z based commands, R, X based commands, POSIX commands KB11. need and process of Earthing of equipments KB12. knowledge of Network Monitoring System KB13. knowledge of using and deploying cable connectors, cable ties and cable tray KB14. standard fault-finding (troubleshooting) techniques KB15. alarm types, resolution and remedy SLAs and escalation matrix KB16. implications for non response to tickets within defined SLAs
Skills (S)	
A. Core Skills/ Generic Skills	**Communication Skills** The user/ individual on the job needs to know and understand how to: SA1. communicate with supervisor SA2. provide advice and guidance to peers & juniors SA3. respond appropriately to queries from upstream and downstream teams
	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 and business critical

	environment SA5. multi-task by handling 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
B. Professional Skills	**Equipment operating Skills**
	The user/individual on the job needs to know and understand how to: SB1. operate Radio Core equipments like MSC, MGW, HLR, SDP SB2. operate Data core nodes like GGSN, SGSN, GPRS SB3. operate UNIX, LINIX and SOLARIS operating systems SB4. operate equipment specific software like network manager, transmission manager SB5. execute instructions through MML commands - Z based commands, R based commands, POSIX commands SB6. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter SB7. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB8. use appropriate Telnet and FTP commands for file sharing SB9. appropriately back-up core nodes on periodic basis SB10. use appropriate cables (RF, IF) and connectors for effective cabling
	Technical interpretation Skills
	The user/individual on the job needs to know and understand how to: SB11. interpret VSWR, E1, power meter test results to localize and identify root cause of faults SB12. analyze performance reports and identify instances of deteriorating cell site

		performance like call drops, signal quality deterioration. SB13. analyze service impact of the fault to prioritize actioning on alarms
		Problem solving skills
		The user/individual on the job needs to know and understand how to: SB14. troubleshoot common equipment and network related problems SB15. utilize appropriate tools and commands to rectify faults SB16. utilize appropriate communication channels to escalate unresolved problems to relevant personnel

NOS Version Control

NOS Code	**TEL/N6205**		
Credits NSQF	**TBD**	**Version number**	**1.0**
Industry	**Telecom**	**Drafted on**	**26/04/13**
Industry Sub-sector	**Network Managed Services**	**Last reviewed on**	**29/04/15**
		Next review date	**31/05/17**

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National Occupational Standard

Overview

This unit is about carrying out change management activities (Upgrade/ Capacity augmentation/ Configuration changes) at Core nodes

National Occupational Standard

Unit Code	TEL/N6206
Unit Title (Task)	Undertake upgrade, capacity augmentation and configuration change activities at Core nodes
Description	This unit is about carrying out change management activities (Upgrade/ Capacity augmentation/ Configuration changes) at Core nodes
Scope	This unit/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 requirement	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) PC2. identify criticality, and timelines for carrying out the changes Develop work plan and identify dependencies if any PC3. assess the potential impact of the proposed change activity on network and plan for possible outage or deferral of the activity PC4. ensure that Network Operating Centre (NOC) is notified prior to undertaking the maintenance activities
Arrange for tools and spares	To be competent, the user/individual on the job must be able to: PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB) PC2. ensure that equipment specific software like network manager, Citrix, traffic manager are installed in the laptop device PC3. ensure that the software versions are current and ready to use PC4. ensure availability of spare hardware equipments and raise request for spares, in case the same are not available as per company's process PC5. ensure that faulty equipments are sent to logistics team for repair and replacement
Carry out change and perform post change monitoring	To be competent, the user/individual on the job must be able to: PC1. ensure performance of pre-testing so that output of configuration changes can be observed prior to deployment in live environment PC2. perform changes like traffic migrations, capacity augmentation, feature

	activations, routing configuration PC3. implement configurations changes like routing plans, charging/ billing plans, short code definitions, HLR configuration as per requirements PC4. ensure completion of the requested change task as per requestor's requirement PC5. ensure continuous monitoring of progress of change and notify change requestor of problems encountered if any PC6. abort change and implement contingency plan should the change plan not be realized without major disruption to network PC7. ensure compliance with the defined SLA for carrying out changes
Obtain back-up, test effectiveness & close activity	To be competent, the user/individual on the job must be able to: PC1. obtain back-up of core nodes both pre and post performance of change activities PC2. confirm effectiveness of the change process, by monitoring site's alarm status in co-ordination with the NOC team PC3. ensure completion of administrative jobs like return of test equipments and follow activity closure procedures
Health and 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 change management activities and 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

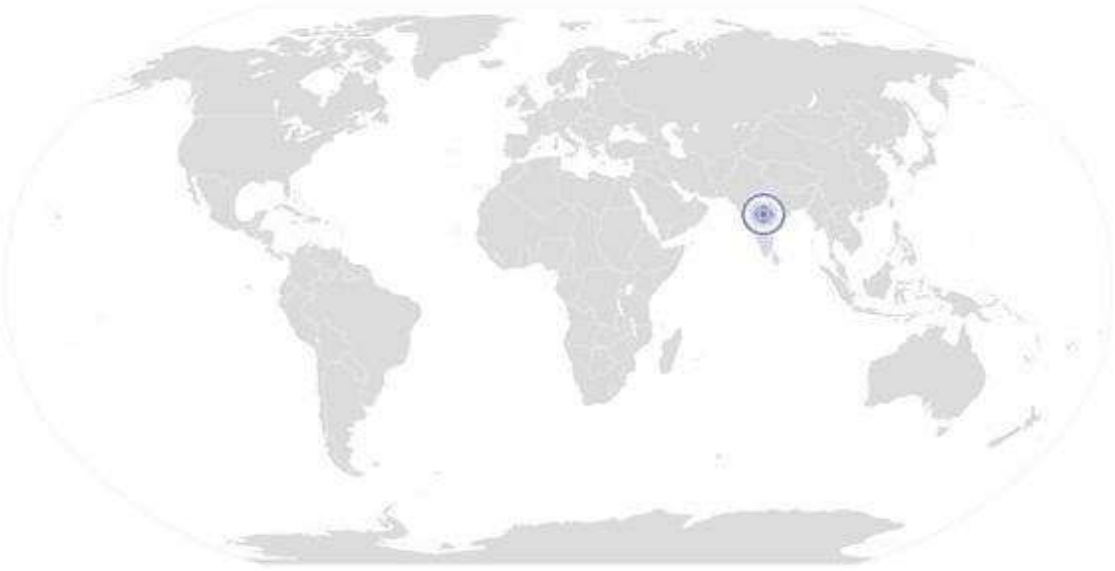
	PC4. ensure that documents are available to all appropriate authorities to inspect
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. risk and impact of not following 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 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. functionality of Radio Core equipments like MSC, MGW, HLR, SDP KB2. functionality if Data core nodes like GGSN, SGSN, GPRS KB3. functionality of passive infrastructure equipments like SMPS, Diesel generators, SMPS, Air conditioner, Battery bank KB4. login cables (RJ45, RS232, and Hi-Speed USB) for different site equipments KB5. functionality of test equipments like E1 tester, Ethernet tester, VSWR meter, Optical meter KB6. knowledge of IP based network - IP back-hauling and IP networking KB7. network manager, transmission manager and other equipment specific software KB8. UNIX, LINUX and SOLARIS system and commands KB9. SS7/SIGTRAN - Signaling protocols KB10. MML commands - Z based commands, R, X based commands, POSIX commands KB11. need and process of Earthing of equipments KB12. knowledge of Network Monitoring System KB13. knowledge of using and deploying cable connectors, cable ties and cable tray KB14. standard fault-finding (troubleshooting) techniques KB15. alarm types, resolution and remedy SLAs and escalation matrix
Skills (S)	

A. Core Skills/ Generic Skills	**Communication Skills**
	The user/ individual on the job needs to know and understand how to: SA1. communicate with supervisor SA2. provide advice and guidance to peers & juniors SA3. respond appropriately to queries from upstream and downstream teams
	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 and business critical environment SA5. multi-task by handling 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
B. Professional Skills	**Equipment operating Skills**
	The user/individual on the job needs to know and understand how to: SB1. operate Radio Core equipments like MSC, MGW, HLR, SDP SB2. operate Data core nodes like GGSN, SGSN, GPRS SB3. operate UNIX, LINIX and SOLARIS operating systems SB4. operate equipment specific software like network manager, transmission manager SB5. execute instructions through MML commands - Z based commands, R based commands, POSIX commands SB6. utilize appropriate test and measurement equipments - E1 tester, Ethernet

		tester, VSWR meter, RF power meter, Optical meter SB7. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB8. use appropriate Telnet and FTP commands for file sharing SB9. appropriately back-up core nodes on periodic basis SB10. use appropriate cables (RF, IF) and connectors for effective cabling
		Technical interpretation Skills
		The user/individual on the job needs to know and understand how to: SB11. interpret VSWR, E1, power meter test results to localize and identify root cause of faults SB12. analyze performance reports and identify instances of deteriorating cell site performance like call drops, signal quality deterioration. SB13. analyze the impact on the network due to the activity and develop appropriate plans

NOS Version Control

NOS Code	**TEL/N6206**		
Credits NSQF	TBD	**Version number**	**1.0**
Industry	**Telecom**	**Drafted on**	**26/04/13**
Industry Sub-sector	**Network Managed Services**	**Last reviewed on**	**29/04/15**
		Next review date	**31/05/17**



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National Occupational Standard

Overview

This unit is about carrying out Point of Interconnect testing prior to approving for link commissioning/ integration

National Occupational Standard

Unit Code	TEL/N6207
Unit Title (Task)	Undertake Point of Interconnect testing
Description	This unit is about carrying out Point of Interconnect testing prior to approving for link commissioning/ integration
Scope	This unit/task covers the following: • Undertake testing of the POI (Point of Interconnect) as per the test checklist • Communicate testing status to the project engineer/ customer • Approve for integration/ link commissioning
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Prepare to undertake Point of Interconnect testing	To be competent, the user/individual on the job must be able to: PC1. obtain the POI testing checklist from the supervisors PC2. identify timelines for carrying out POI testing PC3. ensure availability of test equipments required for performing acceptance tests
Undertake Point of Interconnect testing	To be competent, the user/individual on the job must be able to: PC1. carry out physical tests of the POI as per the checklist PC2. ensure checklist for performing site acceptance test is obtained from the supervisors PC3. ensure completion of logical tests (connectivity, redundancy, power levels) as per the checklist PC4. ensure performance of routing analysis, error rate/ quality analysis, congestion, signaling analysis PC5. ensure defining of new trunk groups PC6. co-ordinate with Interconnect vendors for carrying out configuration changes as required
Report & Record	To be competent, the user/individual on the job must be able to: PC1. communicate status of tests to the client team and obtain sign-off PC2. ensure clear communication of the punch points that need to be addressed by the interconnect vendor prior to link integration/ commissioning PC3. ensure POI is approved for commissioning only once no punch points are observed during the testing PC4. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisors and the projects) are notified of the test results

Health and Safety	To be competent, the user/individual on the job must be able to: PC5. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms PC6. ensure that work is carried out in accordance to the level of competence and legal requirements PC7. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures PC8. ensure compliance with all organizational security arrangements (like using valid ID cards) and approved procedures PC9. use and maintain protective equipment according to work requirements PC10. ensure availability of first aid box at site PC11. ensure escalation of safety incidents to relevant authorities as per guidelines
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 testing 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 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. functionality of Radio Core equipments like MSC, MGW, HLR, SDP KB2. functionality if Data core nodes like GGSN, SGSN, GPRS KB3. functionality of passive infrastructure equipments like SMPS, Diesel generators, SMPS, Air conditioner, Battery bank KB4. login cables (RJ45, RS232, and Hi-Speed USB) for different site equipments KB5. functionality of test equipments like E1 tester, Ethernet tester, VSWR meter, Optical meter KB6. knowledge of IP based network - IP back-hauling and IP networking KB7. network manager, transmission manager and other equipment specific

	software KB8. UNIX, LINUX and SOLARIS system and commands KB9. SS7/SIGTRAN - Signaling protocols KB10. MML commands - Z based commands, R, X based commands, POSIX commands KB11. standard logical tests (connectivity, redundancy, power levels) that are performed for POI testing KB12. trunk blocking, circuit group utilization analysis KB13. routing analysis, error rate/ quality analysis, congestion, signaling analysis KB14. knowledge of Network Monitoring System
Skills (S)	
A. Core Skills/ Generic Skills	**Communication Skills** The user/ individual on the job needs to know and understand how to: SA1. communicate with supervisor SA2. provide advice and guidance to peers & juniors SA3. respond appropriately to queries from upstream and downstream teams **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 and business critical environment SA5. multi-task by handling 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
B. Professional Skills	**Equipment operating Skills**

	The user/individual on the job needs to know and understand how to: SB1. operate Radio Core equipments like MSC, MGW, HLR, SDP SB2. operate Data core nodes like GGSN, SGSN, GPRS SB3. operate UNIX, LINIX and SOLARIS operating systems SB4. operate equipment specific software like network manager, transmission manager SB5. execute instructions through MML commands - Z based commands, R based commands, POSIX commands SB6. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter SB7. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB8. use appropriate Telnet and FTP commands for file sharing SB9. appropriately back-up core nodes on periodic basis SB10. use appropriate cables (RF, IF) and connectors for effective cabling
	Technical interpretation Skills
	The user/individual on the job needs to know and understand how to: SB11. analyze results of various logical tests (connectivity, redundancy, power levels) performed during POI testing SB12. interpret results of trunk blocking, circuit group utilization analysis SB13. interpret results of routing analysis, error rate/ quality analysis, congestion and signaling analysis

NOS Version Control

NOS Code	**TEL/N6207**		
Credits NSQF	TBD	**Version number**	**1.0**
Industry	**Telecom**	**Drafted on**	**26/04/13**
Industry Sub-sector	**Network Managed Services**	**Last reviewed on**	**29/04/15**
		Next review date	**31/05/17**

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Qualification Pack for Core Engineer

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

PERFORMANCE CRITERIA

Job Role : Core Engineer
Qualification Pack : TEL/Q6201
Sector Skill Council : Telecom

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 Skill's Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Individual assessment agencies will create unique question papers for theory and skill practical part for each candidate at each examination/training center.
4. To pass the Qualification Pack , every trainee should score a minimum of 40% in every NOS and Overall 50% pass percentage.

6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessment Outcome		Assessment Criteria	Total Mark (400+100)		Out Of	Theory	Skills Practical
1.TEL/N6204 (Perform preventive maintenance at Corenodes)	Obtain/ Plan schedule & notify NOC	PC1. obtain/ Plan the preventive maintenance schedule	100	20	5	5	0
		PC2. obtain the maintenance activity checklist from the supervisors			5	5	0
		PC3. assess the potential impact of the proposed maintenance on network and plan for possible outage or deferral of the activity			5	0	5
		PC4. ensure that Network Operating Centre (NOC) is notified prior to undertaking the maintenance activities			5	5	0
	Arrange for tools and spares	PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB)		5	1	0	1
		PC2. ensure that equipment specific software like network manager, Citrix, traffic manager are installed in the laptop device			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 and raise request for spares, in case the sa			1	1	0
		PC5. ensure that faulty equipments are sent to logistics team for repair and replacement			1	1	0
	Undertake maintenance activities	PC1. conduct periodic (monthly, quarterly, half yearly) maintenance activities		40	4	0	4
		PC2. ensure timely completion of physical maintenance tasks like checking temperatures, routing of Ethernet cables & optical fibers, cable ties, fan working condition, earthing, equipment grouting, distribution of cables			10	5	5
		PC3. conduct logical maintenance tasks like PM counter checking, checking alarm status, system availability parameters, logical redundancy			5	5	0
		PC4. ensure periodic back-ups of core node configuration, and maintenance of back-up media			5	5	0
		PC5. ensure interconnectivity uptime and lease line uptime by coordinating with other vendors			6	6	0
		PC6. ensure environmental up-keep of sites and co-ordinate with core infrastructure team for maintenance of passive infrastructure at core nodes			4	4	0
		PC7. ensure timely completion of maintenance activity by monitoring activities performed by the technicians and field engineers			4	4	0
		PC8. 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-ord		10	5	0	5
		PC2. ensure completion of administrative jobs like return of test equipments and follow activity cl			5	0	5
	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as pe		15	2	2	0
		PC2. ensure that work is carried out in accordance to the level of competence and legal requireme			2	0	2
		PC3. ensure that hazards associated with the workplace that have not been previously controlled,			5	0	5
		PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) an			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 that all relevant parties (including NOC team, other supervisors) are notified of the re		10	2	2	0
		PC2. ensure that relevant documents are identified			2	2	0
		PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipula			3	3	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			3	3	0
					100	62	38
2. TEL/N6205 (Perform corrective maintenance/ faultmanagement at Core nodes)	Respond to Network Alarm	PC1. obtain alarm information from the NOC team and determine alarm severity, SLAs and the affected network elements	100	20	7	2	5
		PC2. ensure understanding of nature of alarm, and provide information to/ seek advice from relevant parties to identify the problem and root-cause of the alarm			10	4	6
		PC3. prioritize actioning on alarms based on fault's service impact analysis			3	1	2
	Arrange for tools and spares	PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB)		5	1	0	1
		PC2. ensure that equipment specific software like network manager, Citrix, traffic manager are in			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 and raise request for spares, in case the sa			1	1	0
		PC5. ensure that faulty equipments are sent to logistics team for repair and replacement			1	1	0
	Identify & rectify faults	PC1. ensure that appropriate cables are used to login to the core node		35	4	4	0
		PC2. based on the alarm code/ other indicators determine the fault details			4	4	0
		PC3. ensure necessary diagnostic tests are carried out to identify the root cause of the alarm			8	4	4
		PC4. determine the options to rectify the fault and confirm with supervisors if required			5	0	5
		PC5. ensure rectification of network problem/ fault within the alarm SLAs			4	0	4
		PC6. ensure environmental up-keep of sites and co-ordinate with core infrastructure team for maintenance of passive infrastructure at core nodes			4	4	0
		PC7. ensure timely completion of maintenance activity by monitoring activities performed by the technicians and field engineers			3	0	3
		PC8. ensure compliance to enterprise policy while escalating unresolved faults/instances of delays			3	0	3
	Obtain back-up, test effectiveness & close activity	PC1. ensure back-up of core nodes are taken both pre and post performance of corrective mainte		15	5	5	0
		PC2. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ord			5	5	0
		PC3. ensure completion of administrative jobs like return of test equipments and follow activity cl			5	5	0
	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as pe		15	2	2	0
		PC2. ensure that work is carried out in accordance to the level of competence and legal requireme			2	0	2
		PC3. ensure that hazards associated with the workplace that have not been previously controlled,			5	0	5
		PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) an			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		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 stipula			3	3	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			3	3	0
					100	54	46
3. TEL/N6206 (Undertake upgrade, capacity augmentationand configuration change activities at Core nodes)	Determine change requirement	PC1. receive change requests from the relevant teams (NOC, change management, network planning team)	100	25	4	2	2
		PC2. identify criticality, and timelines for carrying out the changes Develop work plan and identify dependencies if any			12	4	8
		PC3. assess the potential impact of the proposed change activity on network and plan for possible outage or deferral of the activity			4	0	4
		PC4. ensure that Network Operating Centre (NOC) is notified prior to undertaking the maintenance activities			5	0	5
	Arrange for tools and spares	PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB)		5	1	0	1
		PC2. ensure that equipment specific software like network manager, Citrix, traffic manager are installed in the laptop device			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 and raise request for in case the same are not available as per company's processspares,			1	1	0
		PC5. ensure that faulty equipments are sent to logistics team for repair and replacement			1	1	0
	Carry out change and perform post change monitoring	PC1. ensure performance of pre-testing so that output of configuration changes can be observed prior to deployment in live environment		30	3	3	
		PC2. perform changes like traffic migrations, capacity augmentation, feature activations, routing configuration			6	0	6
		PC3. implement configurations changes like routing plans, charging/ billing plans, short code definitions, HLR configuration as per requirements			5	5	0
		PC4. ensure completion of the requested change task as per requestor's requirement			4	4	
		PC5. ensure continuous monitoring of progress of change and notify change requestor of problems encountered if any			4	2	2
		PC6. abort change and implement contingency plan should the change plan not be realized without major disruption to network			4	0	4
		PC7. ensure compliance with the defined SLA for carrying out changes			4	4	0
	Obtain back-up, test effectiveness & close activity	PC1. obtain back-up of core nodes both pre and post performance of change activities		15	5	5	0
		PC2. confirm effectiveness of the change process, by monitoring site's alarm status in co-ordination with the NOC team			5	5	0
		PC3. ensure completion of administrative jobs like return of test equipments and follow activity closure procedures			5	5	0
	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as pe		15	2	2	0
		PC2. ensure that work is carried out in accordance to the level of competence and legal requireme			2	0	2
		PC3. ensure that hazards associated with the workplace that have not been previously controlled,			5	0	5
		PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) an			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 change management activities and sign-off is obtained from relevant personnel		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 stipula			3	3	0
		PC4. ensure that documents are available to all appropriate authorities to inspect			3	3	0
					100	55	45
4. TEL/N6207 (Undertake Point of Interconnect testing)	Prepare to undertake Point of Interconnect testing	PC1. obtain the POI testing checklist from the supervisors	100	20	10	10	0
		PC2. identify timelines for carrying out POI testing			5	5	0
		PC3. ensure availability of test equipments required for performing acceptance tests			5	5	0
	Undertake Point of Interconnect testing	PC1. carry out physical tests of the POI as per the checklist		50	10	4	6
		PC2. ensure checklist for performing site acceptance test is obtained from the supervisors			7	7	0
		PC3. ensure completion of logical tests (connectivity, redundancy, power levels) as per the checklist			10	10	0
		PC4. ensure performance of routing analysis, error rate/ quality analysis, congestion, signaling analysis			10	10	0
		PC5. ensure defining of new trunk groups			7	7	0
		PC6. co-ordinate with Interconnect vendors for carrying out configuration changes as required			6	6	0
	Report & Record	PC1. communicate status of tests to the client team and obtain sign-off		10	2	2	0
		PC2. ensure clear communication of the punch points that need to be addressed by the interconn			2	2	0
		PC3. ensure POI is approved for commissioning only once no punch points are observed during th			3	3	0
		PC4. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisor			3	3	0
	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as pe		20	3	3	0
		PC2. ensure that work is carried out in accordance to the level of competence and legal requireme			3	0	3
		PC3. ensure that hazards associated with the workplace that have not been previously controlled,			5	0	5
		PC4. ensure compliance with all organizational security arrangements (like using valid ID cards) an			2	0	2
		PC5. use and maintain protective equipment according to work requirements			3	0	3
		PC6. ensure availability of first aid box at site			2	0	2
		PC7. ensure escalation of safety incidents to relevant authorities as per guidelines			2	2	0
					100	79	21