

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR TELECOM INDUSTRY

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 – Fault Management Engineer

SECTOR: TELECOM

SUB-SECTOR: Network Managed Services

OCCUPATION: Network Fault Management

REFERENCE ID: TEL/Q6500

ALIGNED TO: NCO-2015/7422.0201

Fault Management Engineer in the telecom industry is also known as NOC L1 Support Engineer

Brief Job Description: Fault management engineer is responsible for monitoring network from NOC location and maintaining network uptime by ensuring that faults are effectively resolved within shortest period of time. He is also responsible for directing and coordinating with the field team to carry out corrective/ change activities on site in case field support is required.

Personal Attributes: This job requires the individual to work closely with multiple teams and operate in a high pressure, time constrained work environment. He should be analytical and be able to apply professional judgement to successfully perform the assigned responsibilities.

Qualifications Pack For Fault Management Engineer

Job Details	Qualifications Pack Code	TEL/Q6500		
	Job Role	Fault Management Engineer		
	Credits NSQF	5	Version number	1.0
	Sector	Telecom	Drafted on	22/05/13
	Sub-sector	Network Managed Services	Last reviewed on	29/04/15
	Occupation	Network Fault Management	Next review date	31/05/17
	NSQF Clearance on	18/06/2015		

Job Role	Fault Management Engineer
Role Description	Fault management engineer is responsible for monitoring network from NOC location and maintaining network uptime by ensuring that faults are effectively resolved within shortest period of time. He is also responsible for directing and coordinating with the field team to carry out corrective/ change activities on site in case field support is required.
NSQF level	5
Minimum Educational Qualifications*	ITI or Diploma (Electronics, Computer Science, IT and related field)
Maximum Educational Qualifications*	Bachelor in Technology (Electronics, Computer Science, IT and related field)
Training	Theoretical and on-job field trainings on radio/ core network elements
Minimum Job Entry Age	18 Years
Experience	Worked as Field engineer for minimum 2-3 years (Click to open the below hyperlinks)
Applicable National Occupational Standards (NOS)	<p>Compulsory:</p> <ol style="list-style-type: none"> TEL/N6500 (Undertake fault rectification) TEL/N6501 (Undertake configuration changes, upgrades and node back-up activities) <p>Optional:</p> <ol style="list-style-type: none"> NA
Performance Criteria	As described in the relevant OS units

Qualifications Pack For Fault Management Engineer

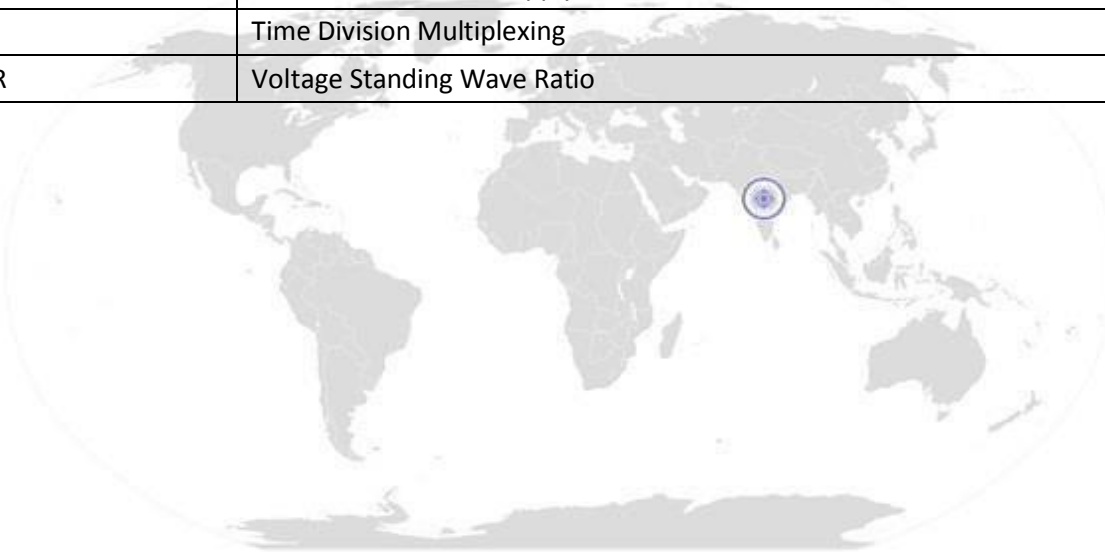
Definitions

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.

Qualifications Pack For Fault Management Engineer

Acronyms

Keywords /Terms	Description
BSC	Base Station Controller
BTS	Base Transceiver Station
DG Set	Diesel Generator Set
FTP	File Transfer Protocol
IF cable	Intermediate frequency cable
IP	Internet Protocol
OHS	Organizational Health & Safety
PIU	Power Interface unit
RF cable	Radio Frequency Cable
SHE	Safety, Health & Environment
SMPS	Switch Mode Power Supply
TDM	Time Division Multiplexing
VSWR	Voltage Standing Wave Ratio



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National Occupational Standard



Overview

This unit is about carrying out rectification of faults in the BSS network in coordination with the field teams

Unit Code	TEL/N6500
Unit Title (Task)	Undertake fault rectification
Description	This unit is about carrying out rectification of faults in the BSS/ NSS network in coordination with the field teams. It is critical to appropriately respond to network alarms and conduct fault diagnosis.
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> Respond to network alarms Conduct diagnose from NOC location to identify root cause of fault Rectify fault condition and escalate to field engineers in case field support is required Documentation and ticket closure
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Monitor & Respond to Network Alarm	<p>To be competent, the user/individual on the job must be able to</p> <p>PC1. ensure that user id and password to access the alarm management system is current</p> <p>PC2. ensure continuous monitoring of network alarms on the NMS</p> <p>PC3. ensure monitoring of threshold levels to prevent occurrence of faults</p> <p>PC4. ensure tickets are raised for all alarms as per the priority matrix</p> <p>PC5. determine alarm severity, priority, SLAs and the affected network elements</p> <p>PC6. obtain previous day's dump of system configuration and alarm logs from the surveillance team to verify configuration changes related faults if required</p> <p>PC7. coordinate with the Infra NOC to verify if alarm was caused by fault with Passive infrastructure at sites</p> <p>PC8. prioritize actioning on alarms based on fault's service impact analysis</p>
Fault diagnosis and rectification	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. refer the MoPs (method of procedures) or other company specific technical database to identify root cause of alarm and to determine options to rectify the fault</p> <p>PC2. in case details are not available in MoPs, isolate the cause of fault by conducting appropriate diagnostic test like remotely interrogating the active equipments</p> <p>PC3. determine the options to rectify the fault and confirm with supervisors if required</p> <p>PC4. check applicability of system reset and other common fault resolution mechanisms</p> <p>PC5. in case on field support is required, ensure dispatch of field engineers to the fault location</p>

	<p>PC6. in coordination with field team to check if any faulty hardware is required to be replaced with its spare</p> <p>PC7. ensure clear and concise instructions are given to field staff to facilitate fault rectification efforts</p> <p>PC8. ensure rectification of network problem/ fault within the alarm SLAs and monitor the activities performed by the Infra engineer and technicians</p>
Test effectiveness & close activity	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. confirm effectiveness of the fault correction activity, by monitoring site's alarm status</p> <p>PC2. undertake appropriate cause and effect studies to prevent re-occurrence of problem</p>
Report & Record	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure that all relevant parties (field engineers, other supervisors) are notified of the results of the fault management activities</p> <p>PC2. ensure reasons of alarm and details of the restoration actions are filled up the in the alarm management system and the ticket is closed</p> <p>PC3. ensure periodic updation of the MoPs to ensure repeat faults are corrected promptly</p> <p>PC4. ensure timely closure of tickets and perform periodic follow-up if required</p>
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. risk and impact of not following defined procedures/work instructions</p> <p>KA2. ticketing process and lifecycle of tickets</p> <p>KA3. whistle blowing & refusal to work policy</p> <p>KA4. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures</p> <p>KA5. SHE and OHS guidelines and regulations as per company's norms</p> <p>KA6. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. basic computer systems and commands</p> <p>KB2. basics of Linux Operating system and commands</p> <p>KB3. network topology like ring structure, daisy chain structure and their characteristics</p> <p>KB4. service networks – GSM Network, WCDMA network and service applications characteristics and capabilities</p> <p>KB5. knowledge of service application implementation and integration processes with Access, Core, Transport & Service Networks</p> <p>KB6. functionality of BSC and BTS site equipments like BSC node, Indoor and</p>

	<p>Outdoor BTS, feeder cables (IF, RF cables), Microwaves (TDM and IP based), Optical fiber</p> <p>KB7. functionality of Passive infrastructure equipments like DG set, PIU panel, Transformer, SMPS, Air Conditioner, Battery bank</p> <p>KB8. transmission media - optical and microwave</p> <p>KB9. software types and versions of BSC, BTS and other equipments</p> <p>KB10. knowledge of IP based network - IP back-hauling and IP networking</p> <p>KB11. knowledge of functionality of Network Monitoring System</p> <p>KB12. standard fault-finding (troubleshooting) techniques</p> <p>KB13. knowledge of alarm types, resolution and remedy SLAs and escalation matrix</p> <p>KB14. implications for non response to tickets within defined SLAs</p>
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 upstream and downstream teams
	SA2. provide advice and guidance to peers & juniors
	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	
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	
Other Skills	
The user/individual on the job needs to know and understand how to:	
SA10. create and maintain effective working relationships and team environment	
SA11. take initiatives and progressively assume increased responsibilities	
SA12. 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 active equipments installed at BSC and BTS sites like BSC, indoor and outdoor BTS, cables, connectors, Microwaves (TDM and IP based), TRX, optical fiber
	SB2. monitor network through NMS
SB3. operate passive infrastructure equipments like DG set, PIU panel, Earthing	

	<p>systems, Transformer, SMPS, Air Conditioner, Battery</p> <p>SB4. operate equipment specific software like network manager</p> <p>SB5. use appropriate Telnet and FTP protocols</p> <p>SB6. utilize ticketing tools to raise alarm tickets</p>
	Technical interpretation Skills
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. interpret MoPs to promptly address repeat faults</p> <p>SB8. interpret VSWR, E1 test results to localize faults and undertake appropriate steps to be rectify the same</p> <p>SB9. analyze performance reports and identify instances of deteriorating cell site performance like call drops, effectiveness of call handover among others</p> <p>SB10. analyze system and alarm logs to identify root cause of alarms</p> <p>SB11. analyze service impact of the fault to prioritize actioning on alarms</p>
	Problem solving skills
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. troubleshoot common equipment and network related problems</p> <p>SB13. utilize appropriate tools and commands to rectify faults</p> <p>SB14. utilize appropriate communication channels to escalate unresolved problems to relevant personnel</p>



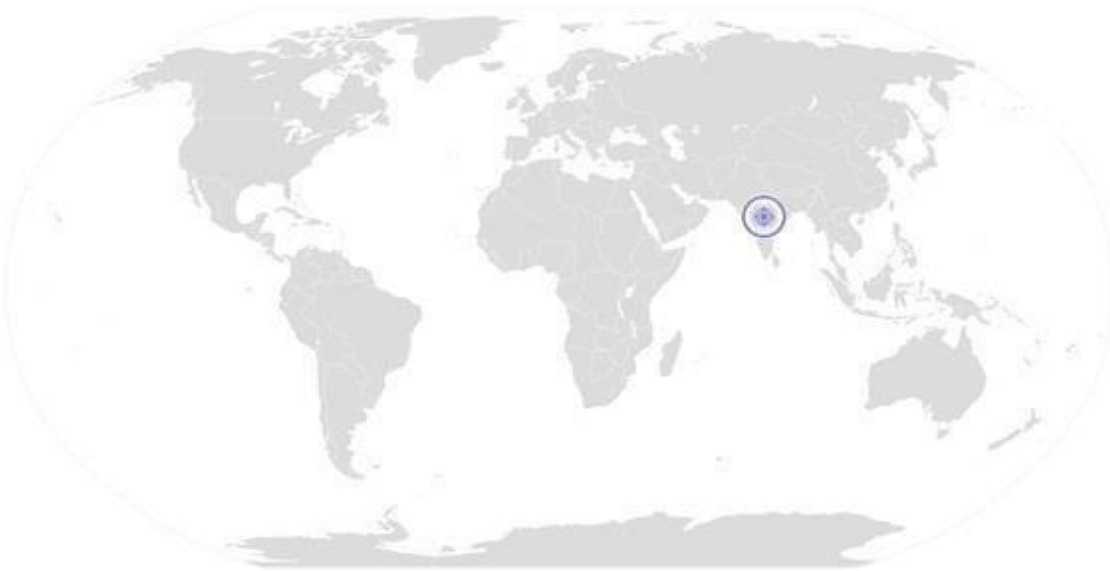
NOS Version Control

NOS Code	TEL/N6500		
Credits NSQF	5	Version number	1.0
Industry	Telecom	Drafted on	22/05/13
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 change management and node back-up activities in the BSS network

TEL/N6501

Undertake configuration changes, upgrades and node back-up activities

National Occupational Standard

Unit Code	TEL/N6501
Unit Title (Task)	Undertake configuration changes, upgrades and node back-up activities
Description	The role involves carrying change management (software upgrade/ capacity augmentation/ Physical optimization) and node back-up activities in the BSS network.
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Ensure timely response to the change work orders • Implement change work order and test effectiveness of change • Documentation and ticket closure
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Determine change requirement	<p>To be competent, the user/individual on the job must be able to</p> <p>PC1. determine change requirement as per schedule (for back-up) or as per directions from other teams (in case of configuration changes, upgrades, updates) and understand the need for change</p> <p>PC2. identify criticality, and timelines for carrying out the changes</p> <p>PC3. develop work plan and identify dependencies if any</p> <p>PC4. assess the potential impact of the proposed activity and plan for possible outage condition or deferral of the activity</p> <p>PC5. ensure customer is informed and an approval is obtained in case of service impacting change activity</p> <p>PC6. ensure that Network Operating Centre (NOC) is notified prior to undertaking the activities</p>
Carry out change and perform post change monitoring from NOC location	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. perform required changes (configuration change, upgrade activity) as per change work order</p> <p>PC2. obtain back-up of nodes both pre and post performance of change activities and as per planned schedule</p> <p>PC3. monitor progress of change and notify change requestor of problems encountered if any</p> <p>PC4. abort change and implement contingency plan should the change activity leads to major service disruption</p> <p>PC5. ensure compliance with the defined SLA for carrying out changes</p> <p>PC6. confirm effectiveness of the change process, by monitoring site's alarm status</p>
Report & Record	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure that all relevant parties (field engineers, other supervisors) are notified of the results of the change management activities</p> <p>PC2. ensure status of change activity is captured in the the system and the change ticket is closed</p>

TEL/N6501

Undertake configuration changes, upgrades and node back-up activities

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. change request process KA2. risk and impact of not following defined procedures/work instructions KA3. whistle blowing & refusal to work policy KA4. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures KA5. SHE and OHS guidelines and regulations as per company’s norms
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. basic computer systems and commands KB2. basics of Linux Operating system and commands KB3. network topology like ring structure, daisy chain structure and their characteristics KB4. service networks – GSM Network, WCDMA network and service applications characteristics and capabilities KB5. knowledge of service application implementation and integration processes with Access, Core, Transport & Service Networks KB6. functionality of BSC and BTS site equipments like BSC node, Indoor and Outdoor BTS, feeder cables (IF, RF cables), Microwaves (TDM and IP based), Optical fiber KB7. functionality of Passive infrastructure equipments like DG set, PIU panel, Transformer, SMPS, Air Conditioner, Battery bank KB8. transmission media - optical and microwave KB9. software types and versions of BSC, BTS and other equipments KB10. knowledge of IP based network - IP back-hauling and IP networking KB11. knowledge of functionality of Network Monitoring System KB12. standard fault-finding (troubleshooting) techniques
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 upstream and downstream teams SA2. provide advice and guidance to peers & juniors 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 SA5. multi-task by handling multiple tasks and completing them successfully within due timelines SA6. use and maintain resources efficiently and effectively

TEL/N6501

Undertake configuration changes, upgrades and node back-up activities

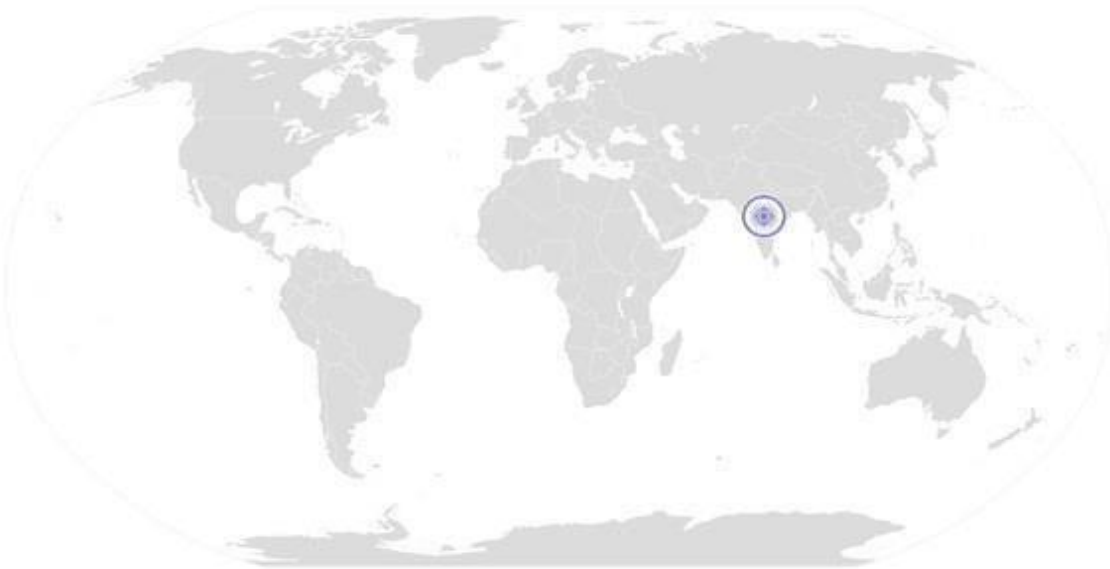
	Analytical Skills
	The user/individual on the job needs to know and understand how to: SA7. keep up to date with new technology SA8. interpret reports, readings and numerical data SA9. think through to address complex problems
	Other Skills
	The user/individual on the job needs to know and understand how to: SA10. create and maintain effective working relationships and team environment SA11. take initiatives and progressively assume increased responsibilities SA12. 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 active equipments installed at BSC and BTS sites like BSC, indoor and outdoor BTS, cables, connectors, Microwaves (TDM and IP based), TRX, optical fiber SB2. operate passive infrastructure equipments like DG set, PIU panel, Earthing systems, Transformer, SMPS, Air Conditioner, Battery SB3. operate equipment specific software like network manager SB4. appropriately back-up BSC and microwave configuration on periodic basis SB5. use appropriate Telnet and FTP protocols
	Technical interpretation Skills
	The user/individual on the job needs to know and understand how to: SB6. interpret VSWR, E1 test results to localize faults and undertake appropriate steps to be rectify the same SB7. analyze performance reports and identify instances of deteriorating cell site performance like call drops, effectiveness of call handover among others SB8. analyze system and alarm logs to identify root cause of alarms SB9. analyze service impact of the fault to prioritize actioning on alarms

TEL/N6501

Undertake configuration changes, upgrades and node back-up activities

NOS Version Control

NOS Code	TEL/N6501		
Credits NSQF	5	Version number	1.0
Industry	Telecom	Drafted on	22/05/13
Industry Sub-sector	Network Managed Services	Last reviewed on	29/04/15
		Next review date	31/05/17



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PERFORMANCE CRITERIA

Job Role : Fault Management Engineer
Qualification Pack : TEL/Q6500
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 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. 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 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.

		Total Mark (200)	Out Of	Theory	Skills Practical		
TEL/N6500 Monitor & Respond to Network Alarm	PC1. ensure that user id and password to access the alarm management system is current	100	1	1	0		
	PC2. ensure continuous monitoring of network alarms on the NMS		5	3	2		
	PC3. ensure monitoring of threshold levels to prevent occurrence of faults		5	2	3		
	PC4. ensure tickets are raised for all alarms as per the priority matrix		5	3	2		
	PC5. determine alarm severity, priority, SLAs and the affected network elements		6	3	3		
	PC6. obtain previous day's dump of system configuration and alarm logs from the surveillance team to verify configuration changes related faults if required		6	4	2		
	PC7. coordinate with the Infra NOC to verify if alarm was caused by fault with Passive infrastructure at sites		2	2	0		
	PC8. prioritize actioning on alarms based on fault's service impact analysis		5	3	2		
	To be competent, the user/individual on the job must be able to:						
	PC1. refer the MoPs (method of procedures) or other company specific technical database to identify root cause of alarm and to determine options to rectify the fault		4	3	1		
Fault diagnosis and rectification	PC2. in case details are not available in MoPs, isolate the cause of fault by conducting appropriate diagnostic test like remotely interrogating the active equipments	100	7	2	5		
	PC3. determine the options to rectify the fault and confirm with supervisors if required		2	2	0		
	PC4. check applicability of system reset and other common fault resolution		6	2	4		
	PC5. in case on field support is required, ensure dispatch of field engineers to the mechanisms		3	1	2		
	PC6. in coordination with field team to check if any faulty hardware is required to be replaced with its spare		0	0	0		
	PC7. ensure clear and concise instructions are given to field staff to facilitate fault rectification efforts		1	1	0		
	PC8. ensure rectification of network problem/ fault within the alarm SLAs and monitor the activities performed by the infra engineer and technicians		7	3	4		
	To be competent, the user/individual on the job must be able to:						
Test effectiveness & close activity	PC1. confirm effectiveness of the fault correction activity, by monitoring site's alarm status	100	5	5	0		
	PC2. undertake appropriate cause and effect studies to prevent re-occurrence of problem		5	5	0		
	To be competent, the user/individual on the job must be able to:						
	PC1. ensure that all relevant parties (field engineers, other supervisors) are notified		3	3	0		
Report & Record	PC2. ensure reasons of alarm and details of the restoration actions are filled up the in the alarm management system and the ticket is closed	100	10	5	5		
	PC3. ensure periodic updation of the MoPs to ensure repeat faults are corrected promptly		10	5	5		
	PC4. ensure timely closure of tickets and perform periodic follow-up if required		2	2	0		
	To be competent, the user/individual on the job must be able to:						
TEL/N6501 Determine change requirement	PC1. determine change requirement as per schedule (for back-up) or as per directions from other teams (in case of configuration changes, upgrades,updates) and understand the need for change	100	5	5	0		
	PC2. identify criticality, and timelines for carrying out the changes		10	5	5		
	PC3. develop work plan and identify dependencies if any		5	5	0		
	PC4. assess the potential impact of the proposed activity and plan for possible outage condition or deferral of the activity		15	15	0		
	PC5. ensure customer is informed and an approval is obtained in case of service impacting change activity		5	5	0		
	PC6. ensure that Network Operating Centre (NOC) is notified prior to undertaking the activities		5	5	0		
Carry out change and perform post change monitoring from NOC location	To be competent, the user/individual on the job must be able to:	100					
	PC1. perform required changes (configuration change, upgrade activity) as per change work order		10	5	5		
	PC2. obtain back-up of nodes both pre and post performance of change activities and as per planned schedule		10	5	5		
	PC3. monitor progress of change and notify change requestor of problems encountered if any		10	5	5		
	PC4. abort change and implement contingency plan should the change activity leads to major service disruption		5	5	0		
	PC5. ensure compliance with the defined SLA for carrying out changes		5	5	0		
	PC6. confirm effectiveness of the change process, by monitoring site's alarm status		5	0	5		
	To be competent, the user/individual on the job must be able to:						
	Report & Record		PC1. ensure that all relevant parties (field engineers, other supervisors) are notified of the results of the change management activities	100	5	5	0
			PC2. ensure status of change activity is captured in the the system and the change ticket is closed		5	5	0