

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- Field Maintenance Engineer

SECTOR: TELECOM

SUB-SECTOR: Network Managed Services

OCCUPATION: Network Operations and Maintenance

REFERENCE ID: TEL/Q6202

ALIGNED TO: NCO-2015/3114.0701

Field Maintenance Engineer in the telecom industry is also known as FA Engineer/Field Engineer/FLM Engineer

Brief Job Description: FM engineer is responsible for coordinating with the NOC and transmission team to ensure fault free network through periodic maintenance activities and assisting in fault management in case of fault occurrence at radio locations. He is also responsible for accepting new sites from Projects team and ensuring completion of upgrade/ change activities as required.

Personal Attributes: This job requires the individual to work closely with multiple teams and third party vendors. The individual should be willing to work on-field requiring frequent local travel. He should be analytical and be able to handle high pressure situations to successfully perform the assigned responsibilities.

Job Details	Qualifications Pack Code	TEL/Q6202		
	Job Role	Field Maintenance Engineer		
	Credits NSQF	5	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

Job Role	Field Maintenance Engineer
Role Description	FM engineer is responsible for coordinating with the NOC and transmission team to ensure fault free network through periodic maintenance activities and assisting in fault management in case of fault occurrence at radio locations. He is also responsible for accepting new sites from Projects team and ensuring completion of upgrade/change activities as required.
NSQF level	5
Minimum Educational Qualifications*	ITI/ Diploma
Maximum Educational Qualifications*	Bachelor in Technology (Electronics, Computer Science, IT and related field)
Training	Technical trainings on Active and Passive infrastructure equipments (including transmission equipments) deployed at Radio sites
Experience	Worked as Field technician for minimum 1 year in the same role
Applicable National Occupational Standards (NOS)	Click to open the below hyperlinks Compulsory: <ol style="list-style-type: none"> TEL/N6208 (Undertake site acceptance testing) TEL/N6209 (Perform preventive maintenance at radio locations) TEL/N6210 (Perform change management at radio locations) TEL/N6211 (Perform corrective maintenance/ fault management at radio locations) Optional: <ol style="list-style-type: none"> NA
Performance Criteria	As described in the relevant OS units

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
AMF Panel	Auto Man Failure
BSS	Base station subsystem
BTS	Base Transceiver Station
DG	Diesel Generator
EB connection	Electricity Board Connection
FM Engineer	Field Maintenance Engineer
IF cable	Intermediate Frequency cable
MCB	Miniature Circuit Breaker
O&M	Operations & Maintenance
OHS	Organizational Health & Safety
PIU	Power Interface unit
RF cable	Radio Frequency Cable
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 Site acceptance testing – for the sites handed over by Projects team to O&M team

National Occupational Standard	Unit Code	TEL/N6208
	Unit Title (Task)	Undertake Site acceptance testing
	Description	This unit is about carrying out Site acceptance testing – for the sites handed over by Projects team to O&M team
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> Undertake testing of the site as per the test checklist Communicate testing status to the project engineer
	Performance Criteria (PC) w.r.t. the Scope	
	Element	Criteria
	Prepare to undertake Acceptance Test of new sites	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure checklist for performing site acceptance test is obtained from the supervisors</p> <p>PC2. obtain site documents and specifications from the Project’s team</p> <p>PC3. ensure availability of test equipments required for performing acceptance tests</p> <p>PC4. ensure that equipment specific software are installed in the laptop device</p> <p>PC5. ensure that the software versions are current and ready to use</p>
	Undertake Acceptance Test of new sites	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure completion of physical tests of the site as per the checklist - like physical upkeep, shelter status, weather proofing, equipment grouting, effective cabling, earthing and utilization of connectors</p> <p>PC2. ensure completion of logical tests (VSWR levels, alarm connectivity, equipment connectivity) as per the checklist</p> <p>PC3. ensure co-ordination with the infrastructure engineer and the riggers in completing testing of passive infrastructure antenna tilt, diesel generator working, battery/ SMPS condition</p>
	Communicate test results & Record	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisors and the projects) are notified of the test results</p> <p>PC2. ensure clear communication of the remaining punch points that need to be addressed by the Projects team before site handover</p> <p>PC3. ensure site is approved for handover/ integration only once no punch points are observed during the testing</p> <p>PC4. ensure that documents that are required to be updated are identified and</p>

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Undertake Site acceptance testing

	<p>updated</p> <p>PC5. ensure that documents are available to all appropriate authorities to inspect</p>
<p>Health and Safety</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms</p> <p>PC2. ensure that work is carried out in accordance to the level of competence and legal requirements</p> <p>PC3. ensure that sites are periodically assessed for health and safety risk as per company's guidelines</p> <p>PC4. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures</p> <p>PC5. ensure periodic tool-box talk is carried out for the infra technicians and other third party vendors</p> <p>PC6. ensure that Personal protection equipments like anti-static bands, harness, belts and helmets are appropriately used as required</p> <p>PC7. ensure compliance to health and safety guidelines both contractually and on site by the third party vendors and infra technicians</p> <p>PC8. ensure availability of first aid box at site</p> <p>PC9. ensure escalation of safety incidents to relevant authorities as per guidelines</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<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. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures</p> <p>KA3. types of documentation in organization and importance of the same</p> <p>KA4. records to be maintained and implications of non-maintenance of the same</p> <p>KA5. process for obtaining sign-off post completion of the maintenance activities</p> <p>KA6. knowledge of spare management and repair & return process for faulty equipments</p> <p>KA7. SHE and OHS guidelines and regulations as per company's norms</p> <p>KA8. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used</p> <p>KA9. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries</p> <p>KA10. electrical and chemical related hazards and precautionary measures</p>

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Undertake Site acceptance testing

	<p>KA11. use of safety kit for climbing towers KA12. usage of fire safety equipments</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. functionality of BTS site active equipments like Microwave (TDM and IP based), BTS (Indoor and Outdoor), feeder cables (IF, RF cables) KB2. functionality of Passive infrastructure equipments like DG set, PIU panel, Transformer, SMPS, Air Conditioner, Battery bank KB3. transmission media - optical and microwave 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, RF power meter, Optical meter KB6. software types and versions of BTS and other equipments KB7. need and requirement of earthing the equipments KB8. mechanism to maintain the earthing pit to absolute zero Need and process of Earthing of equipments KB9. knowledge of using and deploying cable connectors, cable ties and cable tray KB10. BTS O&M software tools like Microwave Link KB11. knowledge of IP based network - IP back-hauling and IP networking KB12. process of logging in the BTS site equipments KB13. site acceptance checklist and critical punch points KB14. standard fault-finding (troubleshooting) techniques</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Communication Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. liaise and coordinate with third party vendors SA2. communicate with upstream and downstream teams SA3. communicate in the local language</p> <p>Project Management Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>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 SA7. be flexible and accept changes in job requirements, schedules, or work environments</p> <p>Analytical Skills</p>

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	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA8. interpret reports, readings and numerical data SA9. keep up to date with new technology</p> <p>Other Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>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 SA13. effectively resolve disputes and manage disagreements</p>
<p>B. Professional Skills</p>	<p>Equipment operating skills</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. operate active equipments installed at BTS sites like BTS (Indoor and Outdoor), Microwaves (TDM and IP based), IF, RF cables 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. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter SB5. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB6. use appropriate cables (RF, IF) and connectors for effective cabling</p>
	<p>Problem solving skills</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. troubleshoot common equipment and network related problems SB8. utilize appropriate tools and commands to rectify faults SB9. utilize appropriate communication channels to escalate unresolved problems to relevant personnel</p>

NOS Version Control

NOS Code	TEL/N6208		
Credits NSQF	5	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



National Occupational Standard



Overview

This unit is about carrying out preventive maintenance activities at Radio locations to ensure their optimal working

National Occupational Standard	Unit Code	TEL/N6209
	Unit Title (Task)	Perform preventive maintenance at radio locations
	Description	This unit is about carrying out preventive maintenance activities at Radio locations to ensure their optimal working
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • 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 schedule & notify NOC	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure maintenance of site folder containing list of sites, BTS type, and number of transceivers</p> <p>PC2. obtain the preventive maintenance schedule and the corresponding checklist from the supervisors</p> <p>PC3. coordinate with Network Operating Centre (NOC) prior to undertaking the maintenance activities</p>
	Arrange for tools and spares	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB)</p> <p>PC2. ensure that equipment specific software are installed in the laptop device</p> <p>PC3. ensure that the software versions are current and ready to use</p> <p>PC4. ensure availability of spare hardware equipments like TRX cards and raise request for spares, in case the same are not available</p> <p>PC5. ensure that faulty equipments are sent to logistics team for repair and replacement</p>
	Undertake Maintenance activities	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. conduct periodic (monthly, quarterly, half yearly) maintenance activities</p> <p>PC2. ensure completion of physical maintenance tasks like checking site temperatures, routing of Ethernet cables & optical fibers, fan working condition, battery – voltage levels; DG set – oil filter, lubrication; Air conditioner – refill gas, clean evaporator and condenser, other power equipments (including MCBs, power plan)</p> <p>PC3. ensure review of equipment grouting, earthing connections, watering of</p>

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Perform preventive maintenance at radio locations

	<p>earthing pit, site matting for insulation, adequacy of wiring</p> <p>PC4. ensure completion of logical maintenance tasks like checking alarm status, system availability parameters, logical redundancy</p> <p>PC5. ensure that for 3rd party elements that require maintenance, tickets are raised to the respective vendors by the NOC team</p> <p>PC6. ensure timely escalation of emergency/ unresolved issues according to established Company's procedure</p> <p>PC7. ensure environmental up-keep of sites in coordination with infra engineer and technicians</p>
<p>Test effectiveness & close activity</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team</p> <p>PC2. ensure completion of administrative jobs like site clearance, return of test equipments</p>
<p>Health and Safety</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms</p> <p>PC2. ensure that work is carried out in accordance to the level of competence and legal requirements</p> <p>PC3. ensure that sites are periodically assessed for health and safety risk as per company's guidelines</p> <p>PC4. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures</p> <p>PC5. ensure periodic tool-box talk is carried out for the infra technicians and other third party vendors</p> <p>PC6. ensure that Personal protection equipments like anti-static bands, harness, belts and helmets are appropriately used as required</p> <p>PC7. ensure compliance to health and safety guidelines both contractually and on site by the third party vendors and infra technicians</p> <p>PC8. ensure availability of first aid box at site</p> <p>PC9. ensure escalation of safety incidents to relevant authorities as per guidelines</p>
<p>Report & Record</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>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</p> <p>PC2. ensure that documents that are required to be updated are identified</p> <p>PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines</p>

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	<p>PC4. ensure that documents are available to all appropriate authorities to inspect</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> 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 KA1. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries KA2. electrical and chemical related hazards and precautionary measures KA3. use of safety kit for climbing towers KA4. usage of fire safety equipments
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> KB1. functionality of BTS site active equipments like Microwave (TDM and IP based), BTS (Indoor and Outdoor), feeder cables (IF, RF cables) KB2. functionality of Passive infrastructure equipments like DG set, PIU panel, Transformer, SMPS, Air Conditioner, Battery bank KB3. transmission media - optical and microwave 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, RF power meter, Optical meter KB6. software types and versions of BTS and other equipments KB7. need and requirement of earthing the equipments KB8. mechanism to maintain the earthing pit to absolute zero KB9. knowledge of using and deploying cable connectors, cable ties and cable tray KB10. BTS O&M software tools like Microwave Link KB11. knowledge of IP based network - IP back-hauling and IP networking KB12. process of logging in the BTS site equipments KB13. standard maintenance activities that are performed at Radio site locations KB14. standard fault-finding (troubleshooting) techniques
<p>Skills (S)</p>	

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Perform preventive maintenance at radio locations

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 upstream and downstream teams 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 SA7. be flexible and accept changes in job requirements, schedules, or work environments
	Analytical Skills
The user/individual on the job needs to know and understand how to:	
SA8. interpret reports, readings and numerical data SA9. keep up to date with new technology	
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 SA13. effectively resolve disputes and manage disagreements	
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 BTS sites like BTS (Indoor and Outdoor), Microwaves (TDM and IP based), IF, RF cables SB2. operate passive infrastructure equipments like DG set, PIU panel, Earthing systems, Transformer, SMPS, Air Conditioner, Battery SB1. operate equipment specific software like network manager SB2. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter SB3. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB4. use appropriate cables (RF, IF) and connectors for effective cabling
	Technical interpretation Skills

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Perform preventive maintenance at radio locations

	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none">SB5. interpret VSWR, E1, power meter test results to localize faults and undertake appropriate steps to be rectify the sameSB6. analyze periodic reports to identify instances of deteriorating cell site performance like frequent service affecting faults and excessive diesel useSB7. prioritize actioning on alarms based on fault's service impact analysis
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NOS Version Control

NOS Code	TEL/N6209		
Credits NSQF	5	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 (System upgrade/ Site capacity augmentation/ Re-alignment of antenna/ Physical optimization at Radio locations)

National Occupational Standard	Unit Code	TEL/N6210
	Unit Title (Task)	Perform Change management at radio locations
	Description	This unit is about carrying out change management activities (System upgrade/ Site capacity augmentation/ Re-alignment of antenna/ Physical optimization) at Radio locations
	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 • Reporting and documenting the status
	Performance Criteria (PC) w.r.t. the Scope	
	Element	Criteria
	Determine change requirement	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. receive change requests from the relevant teams (NOC, change management, network planning team)</p> <p>PC2. identify activity type to be performed – hardware upgrade, software upgrade, capacity augmentation, antenna re-alignment, Microwave back-up</p> <p>PC3. identify criticality, and timelines for carrying out the changes</p> <p>PC4. develop work plan and identify dependencies if any</p> <p>PC5. assess the potential impact of the proposed activity and plan for possible outage condition or deferral of the activity</p> <p>PC6. ensure that Network Operating Centre (NOC) is notified prior to undertaking the change activities</p>
	Arrange for tools and spares	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB)</p> <p>PC2. ensure that equipment specific software are installed in the laptop device</p> <p>PC3. ensure that the software versions are current and ready to use</p> <p>PC4. ensure availability of spare hardware equipments like TRX cards and raise request for spares, in case the same are not available</p> <p>PC5. ensure that faulty equipments are sent to logistics team for repair and replacement</p>
	Carry out change and perform post change monitoring	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure completion of the requested change task as per requestor’s requirement</p> <p>PC2. ensure continuous monitoring of progress of change and notify change</p>

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Perform Change management at radio locations

	<p>requestor of problems encountered if any</p> <p>PC3. abort change and implement contingency plan should the change plan not be realized without major disruption to network</p> <p>PC4. ensure compliance with the defined SLA for carrying out changes</p>
<p>Test effectiveness & close activity</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. confirm effectiveness of the change process, by monitoring site's alarm status in co-ordination with the NOC team</p> <p>PC2. ensure completion of administrative jobs like site clearance, return of test equipments</p>
<p>Health and Safety</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms</p> <p>PC2. ensure that work is carried out in accordance to the level of competence and legal requirements</p> <p>PC3. ensure that sites are periodically assessed for health and safety risk as per company's guidelines</p> <p>PC4. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures</p> <p>PC5. ensure periodic tool-box talk is carried out for the infra technicians and other third party vendors</p> <p>PC6. ensure that Personal protection equipments like anti-static bands, harness, belts and helmets are appropriately used as required</p> <p>PC7. ensure compliance to health and safety guidelines both contractually and on site by the third party vendors and infra technicians</p> <p>PC8. ensure availability of first aid box at site</p> <p>PC3. ensure escalation of safety incidents to relevant authorities as per guidelines</p>
<p>Report & Record</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>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</p> <p>PC2. ensure that documents that are required to be updated are identified</p> <p>PC3. ensure completion of routine maintenance logs, activity logs and spare tracker within stipulated timelines</p> <p>PC4. ensure that documents are available to all appropriate authorities to inspect</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context</p>	<p>The user/individual on the job needs to know and understand:</p>

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Perform Change management at radio locations

<p>(Knowledge of the company / organization and its processes)</p>	<p>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. use of safety kit for climbing towers KA12. usage of fire safety equipments</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. functionality of BTS site active equipments like Microwave (TDM and IP based), BTS (Indoor and Outdoor), feeder cables (IF, RF cables) KB2. functionality of Passive infrastructure equipments like DG set, PIU panel, Transformer, SMPS, Air Conditioner, Battery bank KB3. transmission media - optical and microwave 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, RF power meter, Optical meter KB6. software types and versions of BTS and other equipments KB7. need and requirement of earthing the equipments KB8. mechanism to maintain the earthing pit to absolute zero KB9. knowledge of using and deploying cable connectors, cable ties and cable tray KB10. BTS O&M software tools like Microwave Link KB11. knowledge of IP based network - IP back-hauling and IP networking KB12. process of logging in the BTS site equipments KB13. standard fault-finding (troubleshooting) techniques</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Communication Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. liaise and coordinate with third party vendors SA2. communicate with upstream and downstream teams SA3. communicate in the local language</p> <p>Project Management Skills</p>

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Perform Change management at radio locations

	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA4. prioritize and execute tasks in a high-pressure environment</p> <p>SA5. multi-task by handling multiple tasks and completing them successfully within due timelines</p> <p>SA6. use and maintain resources efficiently and effectively</p> <p>SA7. be flexible and accept changes in job requirements, schedules, or work environments</p> <p>Analytical Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA8. interpret reports, readings and numerical data</p> <p>SA9. keep up to date with new technology</p> <p>Other Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA10. create and maintain effective working relationships and team environment</p> <p>SA11. take initiatives and progressively assume increased responsibilities</p> <p>SA12. share knowledge with other team members and colleagues</p> <p>SA13. effectively resolve disputes and manage disagreements</p>
<p>B. Professional Skills</p>	<p>Equipment operating Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. operate active equipments installed at BTS sites like BTS (Indoor and Outdoor), Microwaves (TDM and IP based), IF, RF cables</p> <p>SB2. operate passive infrastructure equipments like DG set, PIU panel, Earthing systems, Transformer, SMPS, Air Conditioner, Battery</p> <p>SB3. operate equipment specific software like network manager</p> <p>SB4. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter</p> <p>SB5. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes</p> <p>SB6. use appropriate cables (RF, IF) and connectors for effective cabling</p> <p>Technical interpretation Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. interpret VSWR, E1, power meter test results to localize faults and undertake appropriate steps to be rectify the same</p> <p>SB8. analyze periodic reports to identify instances of deteriorating cell site performance like frequent service affecting faults and excessive diesel use</p> <p>SB9. analyze the impact of the activity on the network and develop appropriate</p>

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NOS Version Control

NOS Code	TEL/N6210		
Credits NSQF	5	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



National Occupational Standard



Overview

This unit is about carrying out corrective maintenance/ fault management activities at Radio locations to ensure their optimal working

National Occupational Standard	Unit Code	TEL/N6211
	Unit Title (Task)	Perform corrective maintenance/ fault management at radio locations
	Description	This unit is about carrying out corrective maintenance/ fault management activities at Radio locations (BTS, NodeB, RNC) to ensure their optimal working
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • 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 is required • Reporting and documenting the status of the activity
	Performance Criteria (PC) w.r.t. the Scope	
	Element	Performance Criteria
	Respond to Network Alarm	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. obtain alarm information from the NOC team and determine alarm severity, SLAs and the affected network elements</p> <p>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</p> <p>PC3. prioritize actioning on alarms based on fault's service impact analysis in coordination with the NOC engineer</p>
	Arrange for tools and spares	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure availability of login cables (RJ45, RS232, Hi-speed USB)</p> <p>PC2. ensure that equipment specific software are installed in the laptop device</p> <p>PC3. ensure that the software versions are current and ready to use</p> <p>PC4. ensure availability of spare hardware equipments like TRX cards and raise request for spares, in case the same are not available</p> <p>PC5. ensure that faulty equipments are sent to logistics team for repair and replacement</p>
	Fault identification & rectification	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ascertain if the alarms are due to passive infrastructure based on the alarm/ other site indicators</p> <p>PC2. coordinate with Infra engineer/ technicians if the fault was due to passive infrastructure</p> <p>PC3. in case of non-infra alarm, ensure that appropriate login cables are used to</p>

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	<p>login to BTS, IDU (for microwave)</p> <p>PC4. ensure necessary diagnostic tests are carried out to identify the root cause of the alarm by logging in onto equipment specific application tool</p> <p>PC5. determine the options to rectify the fault and confirm with supervisors if required</p> <p>PC6. ensure rectification of network problem/ fault within the alarm SLAs</p> <p>PC7. ensure timely completion of work by monitoring activities performed by the Infra engineer and technicians</p> <p>PC8. ensure compliance to enterprise policy while escalating unresolved faults/ instances of delays</p>
<p>Test effectiveness & close activity</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. confirm effectiveness of the maintenance process, by monitoring site's alarm status in co-ordination with the NOC team</p> <p>PC2. ensure completion of administrative jobs like site clearance, return of test equipments</p>
<p>Health and Safety</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms</p> <p>PC2. ensure that work is carried out in accordance to the level of competence and legal requirements</p> <p>PC3. ensure that sites are periodically assessed for health and safety risk as per company's guidelines</p> <p>PC4. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures</p> <p>PC5. ensure periodic tool-box talk is carried out for the infra technicians and other third party vendors</p> <p>PC6. ensure that Personal protection equipments like anti-static bands, harness, belts and helmets are appropriately used as required</p> <p>PC7. ensure compliance to health and safety guidelines both contractually and on site by the third party vendors and infra technicians</p> <p>PC8. ensure availability of first aid box at site</p> <p>PC9. ensure escalation of safety incidents to relevant authorities as per guidelines</p>
<p>Report & Record</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>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</p> <p>PC2. ensure that documents that are required to be updated are identified</p> <p>PC3. ensure completion of routine maintenance logs, activity logs and spare tracker</p>

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	<p>within stipulated timelines</p> <p>PC4. ensure that documents are available to all appropriate authorities to inspect</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<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. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures</p> <p>KA3. types of documentation in organization and importance of the same</p> <p>KA4. records to be maintained and implications of non-maintenance of the same</p> <p>KA5. process for obtaining sign-off post completion of the maintenance activities</p> <p>KA6. knowledge of spare management and repair & return process for faulty equipments</p> <p>KA7. SHE and OHS guidelines and regulations as per company's norms</p> <p>KA8. protection equipments (anti-static bands, anti-static packaging, appropriate insulations) that are required to be used</p> <p>KA9. first aid requirements in case of electrical shocks, cuts, fall from height and other common injuries</p> <p>KA10. electrical and chemical related hazards and precautionary measures Use of safety kit for climbing towers</p> <p>KA11. usage of fire safety equipments</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. functionality of BTS site active equipments like Microwave (TDM and IP based), BTS (Indoor and Outdoor), feeder cables (IF, RF cables)</p> <p>KB2. functionality of Passive infrastructure equipments like DG set, PIU panel, Transformer, SMPS, Air Conditioner, Battery bank</p> <p>KB3. transmission media - optical and microwave</p> <p>KB4. login cables (RJ45, RS232, and Hi-Speed USB) for different site equipments</p> <p>KB5. functionality of test equipments like E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter</p> <p>KB6. software types and versions of BTS and other equipments</p> <p>KB7. need and requirement of earthing the equipments</p> <p>KB8. mechanism to maintain the earthing pit to absolute zero</p> <p>KB9. knowledge of using and deploying cable connectors, cable ties and cable tray</p> <p>KB10. BTS O&M software tools like Microwave Link</p> <p>KB11. knowledge of IP based network - IP back-hauling and IP networking</p> <p>KB12. process of logging in the BTS site equipments</p> <p>KB13. standard fault-finding (troubleshooting) techniques</p> <p>KB14. alarm types, resolution and remedy SLAs and escalation matrix</p> <p>KB15. implications for non response to tickets within defined SLAs</p>

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Perform corrective maintenance/ fault management at radio locations

Skills (S)	
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 upstream and downstream teams 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 SA7. be flexible and accept changes in job requirements, schedules, or work environments
	Analytical Skills
The user/individual on the job needs to know and understand how to:	
SA8. interpret reports, readings and numerical data SA9. keep up to date with new technology	
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 SA13. effectively resolve disputes and manage disagreements	
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 BTS sites like BTS (Indoor and Outdoor), Microwaves (TDM and IP based), IF, RF cables 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. utilize appropriate test and measurement equipments - E1 tester, Ethernet tester, VSWR meter, RF power meter, Optical meter SB5. connect appropriate login cables (RJ45, RS232, Hi-speed USB) to log on to the core nodes SB6. use appropriate cables (RF, IF) and connectors for effective cabling

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Perform corrective maintenance/ fault management at radio locations

	Technical interpretation Skills
	The user/individual on the job needs to know and understand how to:
	<p>SB7. interpret VSWR, E1, power meter test results to localize faults and undertake appropriate steps to be rectify the same</p> <p>SB8. analyze periodic reports to identify instances of deteriorating cell site performance like frequent service affecting faults and excessive diesel use</p> <p>SB9. analyze service impact of the fault to prioritize actioning on alarms</p>
	Problem solving Skills
	The user/individual on the job needs to know and understand how to:
	<p>SB10. troubleshoot common equipment and network related problems</p> <p>SB11. utilize appropriate tools and commands to rectify faults</p> <p>SB12. utilize appropriate communication channels to escalate unresolved problems to relevant personnel</p>



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PERFORMANCE CRITERIA

Job Role : Field Maintenance Engineer
Qualification Pack : TEL/Q6202
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
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.

			Total Mark (400+100)	Total of Sub-Element	Out Of	Theory	Skills Practical
1. TEL/N6208 (Undertake Site acceptance testing)	Prepare to undertake Acceptance Test of new sites	PC1. ensure checklist for performing site acceptance test is obtained from the supervisors.	100	15	2	2	0
		PC2. obtain site documents and specifications from the Project's team			2	2	0
		PC3. ensure availability of test equipments required for performing acceptance tests			4	4	0
		PC4. ensure that equipment specific software are installed in the laptop device			5	3	2
		PC5. ensure that the software versions are current and ready to use			2	2	0
	Undertake Acceptance Test of new sites	PC1. ensure completion of physical tests of the site as per the checklist - like physical upkeep, shelter status, weather proofing, equipment grouting, effective cabling, earthing and utilization of connectors		15	10	5	
		PC2. ensure completion of logical tests (VSWR levels, alarm connectivity, equipment connectivity) as per the checklist		15	8	7	
		PC3. ensure co-ordination with the infrastructure engineer and the riggers in completing testing of passive infrastructure antenna tilt, diesel generator working, battery/ SMPS condition		10	5	5	
	Communicate test results & Record	PC1. ensure all relevant parties (including BSS/ BTS support engineer, NOC team, other supervisors and the projects) are notified of the test results		4	0	4	
		PC2. ensure clear communication of the remaining punch points that need to be addressed by the Projects team before site handover		6	0	6	
		PC3. ensure site is approved for handover/ integration only once no punch points are observed during the testing		6	3	3	
		PC4. ensure that documents that are required to be updated are identified and updated		2	2	0	
		PC5. ensure that documents are available to all appropriate authorities to inspect		2	2	0	
	Health and Safety	PC1. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms		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 sites are periodically assessed for health and safety risk as per company's guidelines		5	3	2	
		PC4. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures		5	0	5	
		PC5. ensure periodic tool-box talk is carried out for the infra technicians and other third party vendors		2	2	0	
		PC6. ensure that Personal protection equipments like anti-static bands, harness, belts and helmets are appropriately used as required		3	3	0	
		PC7. ensure compliance to health and safety guidelines both contractually and on site by the third party vendors and infra technicians		2	2	0	
PC8. ensure availability of first aid box at site		2	0	2			
PC9. ensure escalation of safety incidents to relevant authorities as per guidelines		2	2	0			
					100	57	43
2. TEL/N6209(Perform preventive maintenance at radio locations)	Obtain schedule & notify NOC	PC1. ensure maintenance of site folder containing list of sites, BTS type, and number of transceivers	100	15	5	5	0
		PC2. obtain the preventive maintenance schedule and the corresponding checklist from the supervisors			5	5	0
		PC3. coordinate with Network Operating Centre (NOC) 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)		1	0	1	
		PC2. ensure that equipment specific software 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 like TRX cards 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	
	Undertake Maintenance activities	PC1. conduct periodic (monthly, quarterly, half yearly) maintenance activities		4	4	0	
		PC2. ensure completion of physical maintenance tasks like checking site temperatures, routing of Ethernet cables & optical fibers, fan working condition, battery – voltage levels; DG set – oil filter, lubrication; Air conditioner – refill gas, clean evaporator and condenser, other power equipments (including MCBs, power plan)		20	10	10	
		PC3. ensure review of equipment grouting, earthing connections, watering of earthing pit, site matting for insulation, adequacy of wiring		8	4	4	
		PC4. ensure completion of logical maintenance tasks like checking alarm status, system availability parameters, logical redundancy		2	2	0	
		PC5. ensure that for 3rd party elements that require maintenance, tickets are raised to the respective vendors by the NOC team		3	3	0	
		PC6. ensure timely escalation of emergency/ unresolved issues according to established Company's procedure		1	1	0	
		PC7. ensure environmental up-keep of sites in coordination with infra engineer and technicians		2	2	0	

4.TEL/N6211 (Perform corrective maintenance/ fault management at radio locations)	Respond to Network Alarm	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	15	8	2	6
		PC3. prioritize actioning on alarms based on fault's service impact analysis in coordination with the NOC engineer		4	4	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 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 like TRX cards 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
	Fault identification & rectification	PC1. ascertain if the alarms are due to passive infrastructure based on the alarm/ other site indicators	40	5	5	0
		PC2. coordinate with Infra engineer/ technicians if the fault was due to passive infrastructure		4	4	0
		PC3. in case of non-infra alarm, ensure that appropriate login cables are used to login to BTS, IDU (for microwave)		5	5	0
		PC4. ensure necessary diagnostic tests are carried out to identify the root cause of the alarm by logging in onto equipment specific application tool		10	5	5
		PC5. determine the options to rectify the fault and confirm with supervisors if required		4	4	0
		PC6. ensure rectification of network problem/ fault within the alarm SLAs		4	4	0
		PC7. ensure timely completion of work by monitoring activities performed by the Infra engineer and technicians		4	4	0
		PC8. ensure compliance to enterprise policy while escalating unresolved faults/ instances of delays		4	4	0
		PC9. ensure that faulty equipments are sent to logistics team for repair and replacement		4	4	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	20	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 sites are periodically assessed for health and safety risk as per company's guidelines		3	3	0
		PC4. ensure that hazards associated with the workplace that have not been previously controlled, are reported in accordance with appropriate procedures		3	0	3
		PC5. ensure periodic tool-box talk is carried out for the infra technicians and other third party vendors		2	2	0
		PC6. ensure that Personal protection equipments like anti-static bands, harness, belts and helmets are appropriately used as required		3	3	0
PC7. ensure compliance to health and safety guidelines both contractually and on site by the third party vendors and infra technicians		2		2	0	
PC8. ensure availability of first aid box at site		2		0	2	
PC9. ensure escalation of safety incidents to relevant authorities as per guidelines		1		1	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	4	4	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		2	2	0	
	PC4. ensure that documents are available to all appropriate authorities to inspect		2	2	0	
			100	68	32	