Model Curriculum

QP Name: Field Management (FM) Engineer

QP Code: TEL/Q6202

QP Version: 2.0

NSQF Level: 5

Model Curriculum Version: 2.0

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Table of Contents

Training Parameters 2

Program Overview 3

- Training Outcomes 3
- Compulsory Modules 3

Module Details 5

- Module 1: Role and Responsibilities of a Field Management (FM) Engineer 5
- Module 2: Perform Site Acceptance Testing 6
- Module 3: Perform Preventive and Corrective Maintenance at Radio Locations 7
- Module 4: Perform change management at radio locations 8
- Module 5: Perform Fault Rectification 9
- Module 6: Perform Configuration Changes, Upgrades and Node Back-up Activities 10
- Module 7: Communication and Interpersonal Skills 11
- Module 8: Manage Work, Resources and Safety at Workplace 12
- Module 9: On-the-Job Training 14

ANNEXURE 15

- Trainer Requirements 15
- Assessor Requirements 16
- Assessment Strategy 17

References 18

- Glossary 18
- Acronyms and Abbreviations 19

Training Parameters

Sector	Telecom
Sub-Sector	Network Managed Services
Occupation	Network Operation and Maintenance
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3114.0701
Minimum Educational Qualification & Experience	Post-Graduate in relevant field **OR** B.E./B.Tech (Electronics/Telecom /IT and other relevant fields) **OR** Graduate in relevant filed with 1 year of relevant experience **OR** Diploma after Class 12th (3 years in Electronics/Telecom /IT and other relevant fields) with 1 year of relevant experience **OR** Certified in NSQF-L4 Active Network Management Associate with 3 years of relevant experience
Pre-Requisite License or Training	Technical training on Active and Passive infrastructure equipment (including transmission equipment) deployed at radio locations
Minimum Job Entry Age	21 Years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2022
NSQC Approval Date	31/03/2026
Version	2.0
Model Curriculum Creation Date	31/03/2022
Model Curriculum Valid Up to Date	31/03/2026
Model Curriculum Version	2.0
Minimum Duration of the Course	600 Hours, 0 Minutes
Maximum Duration of the Course	600 Hours, 0 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Perform Acceptance tests (AT) of new sites
- Maintain and update the test results
- Prepare and perform preventive maintenance operations
- Perform up-gradation of location infrastructure
- Maintain the effectiveness of change process
- Plan work effectively, implement safety practices and optimize use of resources
- Communicate, develop interpersonal skills and develop sensitization towards gender and persons with disability
- Diagnose and rectify the fault
- Demonstrate and monitor changes

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**08:00**	**08:00**	**00:00**	-	**16:00**
Role and Responsibilities of a Field Management engineer Module 1 (Bridge Module)	08:00	08:00	00:00	-	16:00
TEL/N6208 – Undertake Site Acceptance Testing **NOS Version No. 2.0** **NSQF Level 5**	**15:00**	**30:00**	**20:00**	-	**65:00**
Module 2: Perform Site Acceptance Testing	15:00	30:00	20:00	-	65:00
TEL/N6209 – Perform Preventive and Corrective Maintenance at Radio Locations **NOS Version No. 2.0** **NSQF Level 5**	**45:00**	**60:00**	**25:00**	-	**130:00**
Module 3: Perform Preventive and Corrective Maintenance at Radio Locations	45:00	60:00	25:00	-	130:00

TEL/N6210 – Perform change management at radio locations **NOS Version No. 2.0** **NSQF Level 5**	**30:00**	**34:00**	**25:00**	-	**89:00**
Module 4: Perform change management at radio locations	30:00	34:00	25:00	-	89:00
TEL/N6500 – Undertake Fault Rectification **NOS Version No. 2** **NSQF Level 5**	**40:00**	**45:00**	**25:00**	-	**110:00**
Module 7: Perform Fault Rectification	40:00	45:00	25:00	-	110:00
TEL/N6501 – Undertake Configuration Changes, Upgrades and Node Backup Activities **NOS Version No. 2** **NSQF Level 5**	**40:00**	**45:00**	**25:00**	-	**110:00**
Module 8: Perform Configuration Changes, Upgrades and Node Back-up Activities	40:00	45:00	25:00	-	110:00
TEL/N9103 – Implement effective interaction between team members and customers **NOS Version No. 1.0** **NSQF Level 5**	**16:00**	**24:00**	**00:00**	-	**40:00**
Module 5: Communication and Interpersonal skills	16:00	24:00	00:00	-	40:00
TEL/N9104 – Manage work and safety at workplace **NOS Version No. 1.0** **NSQF Level 5**	**16:00**	**24:00**	**00:00**	-	**40:00**
Module 6: Manage Work, Resources and Safety at Workplace	16:00	24:00	00:00	-	40:00
Total Duration	**210:00**	**270:00**	**120:00**	**-**	**600:00**

Module Details

Module 1: Role and Responsibilities of a Field Management (FM) Engineer

Mapped to Bridge Module

Terminal Outcomes:

- Explain the role and responsibilities of a Field Management Engineer

Duration: ***08:00***	**Duration**: ***08:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the role and responsibilities of a Field Management Engineer • Describe the various electrical and electronic components. • Prepare a list of the standard operating procedures (SOP) to be followed for use of tools and equipment, service and minor repairs. • Discuss the documentation involved in the different processes of maintenance. • State the safety, health and environmental policies and regulations for the workplace as well as for telecom sites in general.	• Use BSC and BTS site equipment, such as BSC node, BTS, feeder cables etc. • Guide about the standard checklists and schedules to engineers and workers recommended by the operating companies (OPCOs). • Arrange and use the tools and equipment required for site maintenance • Demonstrate the functionality of active and passive infrastructure equipment such as DG set, PIU panel, transformer, battery bank etc.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min. 2 Mbps Dedicated), Documents of Standard Operating Procedure (SOP), code of conduct, checklists, schedules, tools and equipment list, status report	

Module 2: Perform Site Acceptance Testing
Mapped to TEL/N6208, v2.0

Terminal Outcomes:

- Perform Acceptance tests (AT) of new sites
- Maintain and update the test results

Duration: ***15:00***	**Duration**: ***30:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Highlight the documents and checklists required before testing as per organizational standards • Explain the need of coordinating with infrastructure engineer for passive infrastructure requirements • Outline the organizational structure to inform concerned authorities about unresolved issues/tasks	• Prepare a checklist of the required equipment and software to be used for AT purposes • Monitor the completion process of physical and logical tests as performed by team • Maintain and update the documents of testing results to be sent to higher authorities for approval
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Computer logs, black box logs, Power Interface Unit panel, Switch Mode Power Supply (SMPS), Battery bank, microwave, login cables, E1 tester, Ethernet tester, voltage standing wave Ratio meter etc. Tools like pliers, power drill, screwdrivers, spanner, measurement tools, like multi-meter and thermometer, diagnostic tools Sample of preventive and corrective maintenance formats and checklists Laptop with software such as MS Office and CRM	

Module 3: Perform Preventive and Corrective Maintenance at Radio Locations
Mapped to TEL/N6209, v2.0

Terminal Outcomes:

- Prepare and perform preventive maintenance operations
- Record the maintenance status

Duration: ***45:00***	**Duration**: ***60:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of coordinating with NOC team for obtaining information and performing maintenance operations • Suggest the factors to judge the criticality of network alarms' faults and their impact • Discuss the need of coordinating with third part elements for maintenance activities • State the organizational procedure to report unresolved issues to higher concerned authorities • Describe the safety and environment standards that a Field Management (FM) engineer and his team must follow • Compare different solution alternatives after analysing the fault and its cause • Explain the importance of coordinating with infra engineers and technicians for rectifying passive infrastructure within the given timelines • Highlight the factors to judge the effective completion of maintenance and administrative tasks	• Prepare a task list of the equipment and components while distinguishing if they require preventive or corrective maintenance • Use the provided information and other reports to identify the cause of fault in network alarms • Prepare a checklist of the tools and equipment required for testing purposes at radio locations • Follow the organizational process for getting the faulty equipment repaired and replaced • Demonstrate the steps of performing physical and logical maintenance tasks as per requirement • Conduct the review of wiring, grouting earthing connections and insulation requirements at radio locations • Perform the diagnostic tests to identify the fault in network alarm • Maintain and update maintenance related documents that need to be send for higher authority approval
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Network cables, electrical wires, alarms, indicators, tools and equipment, AC, DG, PIU, SMPS and battery bank, Auto Man Failure (AMF) panel, USB, alarm panel, tools like pliers, power drill, screwdrivers, spanner, measurement tools, like multi-meter and thermometer, diagnostic tools etc.	

Module 4: Perform change management at radio locations

Mapped to TEL/N6210, v2.0

Terminal Outcomes:

- Perform up-gradation of location infrastructure
- Maintain the effectiveness of change process

Duration: ***30:00***	**Duration**: ***34:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Highlight the factors to judge the criticality of the faults and their impact • State the SLA and organizational guidelines that a FM Engineer and his team must follow at the workplace • Explain the organizational procedure to obtain sign-off from all the relevant parties • Summarise the administrative tasks that need to be completed after completing the upgradation activities	• Strategize a work plan while distinguishing the upgradation activities into different categories • Prepare an alternative work plan to be used in case of disruption in original plan • Arrange the required equipment and software at the workplace • Follow the organizational structure to get the components repaired or replaced • Monitor the upgradation activities performed by the team and communicate the issues, if any, to the customer • Demonstrate the steps to check the working and status of site alarm • Maintain and update maintenance documents to be approved by higher authorities
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
BSC, BTS, Feeder cables, microwave, optical fiber cables, cable connectors, cable ties, cable tray, IP network etc.	

Module 5: Perform Fault Rectification

Mapped to TEL/N6500, v2.0

Terminal Outcomes:

- Diagnose and rectify the fault
- Record the test results

Duration: ***40:00***	**Duration**: ***45:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Highlight the factors to check the alarm status, its severity and impact • Discuss the solutions for fault rectification after comparing their feasibilities • Summarise the conditions which may require system reset as per fault analysis • State the organizational path to follow to send and monitor the team activities for fault rectification • Discuss the factors to consider the effective completion of maintenance and administrative tasks	• Demonstrate the steps of identifying faults by checking the network alarm on NMS • Perform the steps of raising ticket for alarm maintenance activities • Prepare a report of the faults in alarm infrastructure and its causes • Use the organizational procedure and other diagnostic tests to identify the root cause of the alarm fault • Maintain and update the organizational logs and reports for higher authority approval
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
BSC, BTS, Feeder cables, microwave, optical fiber cables, cable connectors, cable ties, cable tray, IP network etc.	

Module 6: Perform Configuration Changes, Upgrades and Node Back-up Activities
Mapped to TEL/N6501, v2.0

Terminal Outcomes:

- Demonstrate and monitor changes
- Record the test results

Duration: ***40:00***	**Duration**: ***45:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the need of informing and obtaining information from NOC and customer before starting upgradation activity • State the organizational guidelines and instructions that an engineer and his team must follow at the workplace • Explain the process of sharing maintenance results and obtaining sign-off from all the relevant parties • Describe the importance of coordinating with NOC team to ensure the effectiveness of maintenance process	• Prepare a work plan of the configuration change requirements as per their criticality and timelines • Develop an alternative plan to be implemented in case of any emergency or failure of original plan • Demonstrate the steps of configuration changes and taking back-up of nodes
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
BSC, BTS, Feeder cables, microwave, optical fiber cables, cable connectors, cable ties, cable tray, IP network etc.	

Module 7: Communication and Interpersonal Skills
Mapped to TEL/N9103, v1.0

Terminal Outcomes:

- Communicate effectively
- Develop interpersonal skills
- Develop sensitization towards gender and person with disability

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify roles and responsibilities and understand organisation's policies. • List organisational guidelines for dress code, time schedules, language and other soft skill aspects. • List the different methods of communication. • Explain the importance of effective communication and interpersonal skills. • Analyse the common reasons for interpersonal conflicts and ways of managing them effectively. • Identify types of information needed by colleagues and its importance. • Identify the need for implementing standards, guidelines and practices pertaining to gender sensitivity, including work ethics and workplace etiquettes. • Explain the work ethics, workplace etiquettes as well as standards and guidelines for all genders and PwD. • List health and safety requirements for persons with disability. • List the rights, duties and benefits available at workplace for person with disability. • Identify the process of recruiting people with disability for a specific job. • Analyse the specific ways to help persons with disability overcome the challenges.	• Demonstrate how to interact with superiors in terms of escalating problems, reporting work completion and receiving feedback. • Apply team building skills to assist colleagues in maximising effectiveness and efficiency of carrying out tasks. • Demonstrate appropriate communication skills and etiquettes while interacting with others. • Resolve conflicts with colleagues and adhere to commitment. • Demonstrate ideal workplace ethics while interacting with colleagues with respect to sharing information, co-ordinating work and showing respect. • Follow organisation's policy for working with team members. • Illustrate importance of team goals over individual goals. • Use inclusive language irrespective of the gender/ disability of the person. • Demonstrate appropriate behaviour towards all genders and differently abled people.
Classroom Aids:	
White board/ black board marker/chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 8: Manage Work, Resources and Safety at Workplace
Mapped to TEL/N9104, v1.0

Terminal Outcomes:

- Plan work effectively
- Implement safety practices
- Optimize use of resources

Duration: *16:00*	**Duration**: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the importance of following the standard operating procedures of the company w.r.t. privacy, confidentiality and security. • List the key performance indicators for the new tasks. • Identify the opportunities for team building workshops and motivational trainings. • List and explain work requirements to be followed by the team. • Identify the issues with and handle them. • Discuss correct way to show emotions at workplace. • Describe the importance of timely completion of tasks. • Explain the importance of escalation matrix. • Explain the importance of providing and receiving feedback constructively. • Analyse ways to optimize usage of resources. • List the importance, cause and effect of greening of jobs. • Identify different types of hazards such as illness, accidents, fires etc. • List the causes of risks and potential hazards in a work area and ways to prevent them. • List the steps to report accident and health related issues as per SOP. • Explain the concept of waste management. • List the methods of waste disposal. • Identify the different categories of waste for the purpose of segregation.	• Demonstrate techniques to save on cost and time. • Demonstrate routine cleaning of tools, equipment and machines to ensure team follows the same. • Use resources such as water judiciously. • Check for malfunctions in equipment and report as per SOP. • Report any breaches in safety and security to the concerned person. • Illustrate ways to keep work area clean such as mopping spills and leaks, cleaning grease stains etc. • Check for spills and leaks and plug the same. • Demonstrate segregation of types of hazardous waste. • Illustrate steps to minimise waste. • Illustrate proper waste disposal procedures and how to dispose-off hazardous waste. • Illustrate ways to find exact cause of a problem and validate the same in case done by a team member.

• Differentiate between recyclable and non-recyclable waste. • List electronic waste disposal procedures.	
Classroom Aids:	
White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher and first aid kit	

Module 9: On-the-Job Training
Mapped to Field Management (FM) Engineer

Mandatory Duration: ***120:00***	**Recommended Duration**: ***00:00***
Location: On-Site	
Terminal Outcomes 1. Create a checklist of the required equipment and software. 2. Monitor the processes for physical and logical tests. 3. Maintain and update documents of testing results. 4. Create a task list of the equipment and components. 5. Ensure that the team adheres organizational process for getting the faulty equipment repaired and replaced. 6. Perform physical and logical maintenance tasks as per requirement. 7. Review of wiring, grouting earthing connections, and insulation requirements at radio locations. 8. Conduct diagnostic tests to identify the fault in the network alarm. 9. Maintain and update maintenance-related documents. 10. Manage a work plan while distinguishing the up-gradation activities into different classifications. 11. Organize the equipment and software at the workplace. 12. Adhere to the organizational structure to get the components repaired or replaced. 13. Monitor the upgradation activities. 14. Check the working and status of the site alarm. 15. Maintain and update maintenance documents.	

ANNEXURE

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E./B.Tech/ BCA/B.SC	Science/Electronics/ Telecom/IT and other relevant fields	2	Tower Maintenance	0		Eligible for ToT Program

Trainer Certification	
Domain Certification	**Platform Certification**
Job Role: "**Field Management Engineer** Level 5" "TEL/Q6202 v2.0", Minimum accepted score is 80%	Job Role: "**Trainer**", "MEP/Q2601" v1.0, Minimum accepted score is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E./B.Tech/ BCA/B.SC	Science/Electronics/ Telecom/IT and other relevant fields	2	Tower Maintenance	0		Eligible for ToA Program

Assessor Certification	
Domain Certification	**Platform Certification**
Job Role: "**Field Management Engineer** Level 5" "TEL/Q6202 v2.0", Minimum accepted score is 80%	Job Role: "**Assessor**" "MEP/Q2701" v1.0, Minimum accepted score is 80%

Assessment Strategy

1. Assessment System Overview:

    - Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
    - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
    - Assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records

2. Testing Environment:

    - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
    - Check the duration of the training.
    - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
    - If the batch size is more than 30, then there should be 2 Assessors.
    - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
    - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
    - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
    - Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

    - Question papers created by the Subject Matter Experts (SME)
    - Question papers created by the SME verified by the other subject Matter Experts
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
    - Assessor must be ToA certified & trainer must be ToT Certified
    - Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Center photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SOP	Standard Operating Procedures
CRM	Customer Relationship Management
AT	Acceptance Test
DG	Diesel Generator
PIU	Power Interface Unit
SMPS	Switch Mode Power Supply
FTP	File Transfer Protocol
BSC	Base Station Controller
AMF	Auto Man Failure
PPE	Personal Protective Equipment
FM	Field Maintenance
PwD	Persons with Disabilities
EB	Electricity Board
MCB	Miniature Circuit Breaker
NOC	Network Operating Centre
SLA	Service Level Agreement
PM	Preventive Maintenance
CM	Corrective Maintenance
TRX	Transceiver
NMS	Network Monitoring System

MOP	Maintenance Operation Protocol