QUALIFICATION FILE

Surface Mount Technology (SMT)- Telecom Technician

☐ Short Term Training (STT) ☐ Long Term Training (LTT) ☒ Apprenticeship

☒ Upskilling ☐ Dual/Flexi Qualification ☒ For ToT ☒ For ToA

☒General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF/NSQF Level: 4.0

Submitted By:

Telecom Sector Skill Council

3rd Floor, Plot No 126, Sector – 44 Gurgaon – 122003

Email: tssc@tsscindia.com

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Section 1: Basic Details

<table>
<tr><td>1.</td><td>Qualification Name</td><td colspan="2">Surface Mount Technology (SMT) - Telecom Technician</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">Telecom</td></tr>
<tr><td>3.</td><td>Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM</td><td>NQR Code & version of existing/previous qualification:
(2022/TEL/TSSC/07013, V4.0)</td><td>Qualification Name of existing/previous version:
Telecom Surface Mount Technology (SMT) Technician</td></tr>
<tr><td>4.</td><td>a. OEM Name
b. Qualification Name
(Wherever applicable)</td><td colspan="2"></td></tr>
<tr><td>5.</td><td>National Qualification Register (NQR) Code &Version
(Will be issued after NSQC approval)</td><td>QG-04-TL-04082-2025-V2-TSSC</td><td>6. NCrF/NSQF Level: 4.0</td></tr>
<tr><td>7.</td><td>Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)</td><td colspan="2">Certificate</td></tr>
<tr><td>8.</td><td>Brief Description of the Qualification</td><td colspan="2">A Surface Mount Technology (SMT)- Telecom Technician is responsible for executing the complete SMT assembly process, ensuring high-quality telecom Printed Circuit Board (PCB) production. Key responsibilities include screen printing, precise component placement, reflow soldering, cleaning, inspection, and segregation of functional and defective PCBs. The individual also performs repairs and corrections on defective PCBs. The role requires operating and maintaining advanced SMT equipment while optimizing production efficiency and adhering to industry standards for PCB assembly.</td></tr>
<tr><td>9.</td><td>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1.</td><td>12th Grade Pass</td><td></td></tr>
<tr><td>2.</td><td>Completed 2nd year of the 3-year diploma after 10th in Electronics and Communication Engineering/ Electrical and Electronics Engineering/ Instrumentation and Control Engineering</td><td></td></tr>
<tr><td>3.</td><td>10th Grade Pass</td><td>3 years of experience in handset assembly</td></tr>
<tr><td>4.</td><td>Previous relevant Qualification of NSQF Level 3.0</td><td>3 years of experience in handset assembly</td></tr>
<tr><td>5.</td><td>Previous relevant Qualification of NSQF Level 3.5</td><td>1.5 years of experience in handset assembly</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="2">b. Age: NA</td></tr>
<tr><td>10.</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>18</td><td>11. Common Cost Norm Category (I/II/III) (wherever applicable): I</td></tr>
<tr><td>12.</td><td>Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)</td><td colspan="2">NA</td></tr>
<tr><td>13.</td><td>Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</td><td colspan="2">☐Offline ☐Online ☒Blended
<table>
<tr><th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>OJT Mandatory (Hours)</th><th>OJT Recommended (Hours)</th><th>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>180</td><td>210</td><td>150</td><td></td><td rowspan="2">540</td></tr>
<tr><td>Online</td><td>180</td><td></td><td></td><td></td></tr>
</table>
(Refer Blended Learning Annexure for details)</td></tr>
<tr><td>14.</td><td>Aligned to NCO/ISCO Code/s (if no code is available mention the same)</td><td colspan="2">NCO-2015/3114.1402</td></tr>
<tr><td>15.</td><td>Progression path after attaining the qualification (Please show Professional and Academic progression)</td><td colspan="2">Surface Mount Technology (SMT)- Telecom Technician (NSQF Level 4) → Surface Mount Technology (SMT) Supervisor (NSQF Level 5)</td></tr>
<tr><td>16.</td><td>Other Indian languages in which the Qualification & Model Curriculum are being submitted</td><td colspan="2">Hindi</td></tr>
<tr><td>17.</td><td>Is similar Qualification(s) available on NQR-if yes, justification for this qualification</td><td colspan="2">☐ Yes ☒ No URLs of similar Qualifications:</td></tr>
<tr><td>18.</td><td>Is the Job Role Amenable to Persons with Disability</td><td colspan="2">☒ Yes ☐ No
If “Yes”, specify applicable type of Disability: Motor Impairment, Hearing Impairments, Speech and Language Disorders</td></tr>
<tr><td>19.</td><td>How Participation of Women will be Encouraged</td><td colspan="2">Encouraging the participation of women in the role of Surface Mount Technology (SMT)- Telecom Technician in the telecom sector can be achieved through strategies that foster diversity, inclusivity, and gender equality. This can include offering targeted training and skill development programs for female candidates interested in these roles. Additionally, creating a workplace culture that is safe, respectful, and inclusive, and free from harassment or discrimination, is crucial for ensuring equal opportunities for women in the telecom sector.</td></tr>
<tr><td>20.</td><td>Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)</td><td colspan="2">☒ Yes ☐ No
NOS: TEL/N9107</td></tr>
<tr><td>21.</td><td>Is Qualification Suitable to be Offered in Schools/Colleges</td><td colspan="2">Schools ☐ Yes ☐ No Colleges ☒ Yes ☐ No</td></tr>
</table>

22.	**Name and Contact Details of Submitting / Awarding Body SPOC** *(In case of CS or MS, provide details of both Lead AB & Supporting ABs)*	**Name: Mr. Praveen Sirohi** **Email: ceo@tsscindia.com** **Contact No.: 0124-4148029** **Website: www.tsscindia.com**	
23.	**Final Approval Date by NSQC:** *08-05-2025*	**24. Validity Duration: 3 years**	**25. Next Review Date:** *30-04-2028*

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

***Th.**-Theory **Pr.**-Practical **OJT**-On the Job Training **Man.**-Mandatory **Rec.**-Recommended **Proj.**-Project*

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.	Screen Printing of PCBs	TEL/N2503, v4.0	Core	4.0	5	60	60	30	-	150	30	50	-	20	100	20
2.	Component Placement on PCBs	TEL/N2504, v4.0	Core	4.0	5	30	60	60	-	150	30	50	-	20	100	20
3.	Re-flow soldering on PCBs	TEL/N2505, v4.0	Core	4.0	3	30	30	30	-	90	30	50	-	20	100	20
4.	Cleaning and Inspection of PCBs	TEL/N2502, v5.0	Core	4.0	3	20	40	30	-	90	30	50	-	20	100	15
5.	Follow sustainability practices in telecom production and assembly line processes	TEL/N9107, v1.0	Core	4.0	1	10	20	-	-	30	30	50	-	20	100	15
6.	Employability Skills (30 Hours)	DGT/VSQ/N0101, v1.0	Non-Core	2.0	1	30	-	-	-	30	20	30	-	-	50	10
Duration (in Hours) / Total Marks					18	180	210	150	-	540	170	280	-	100	550	100

Assessment - Minimum Qualifying Percentage

*Please specify **any one** of the following:*

Minimum Pass Percentage – Aggregate at qualification level: 70 % *(Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)*

Minimum Pass Percentage – NOS/Module-wise: - % *(Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification:** Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. **Industry & Training Experience:** Minimum 6 years of experience after Graduation in Handset Assembling. **Certification:** "Trainer" mapped to the Qualification Pack "MEP/Q2601, v3.0". Minimum accepted score is 80% aggregate.
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification:** Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. **Industry & Training Experience:** Minimum 8 years of experience after Graduation in Handset Assembling. **Certification:** "Master Trainer" mapped to the Qualification Pack "MEP/Q2602, v3.0". Minimum accepted score is 90% aggregate.
3.	**Tools and Equipment Required for Training**	☐Yes ☐No *(If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	NA

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification:** Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. **Industry & Training Experience:** Minimum 6 years of experience after Graduation in Handset Assembling. **Certification:** "Assessor" mapped to the Qualification Pack "MEP/Q2701, v3.0". Minimum accepted score is 80% aggregate.

2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification:** Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. **Industry & Training Experience:** Minimum 6 years of experience after Graduation in Handset Assembling. **Certification:** "Assessor" mapped to the Qualification Pack "MEP/Q2701, v3.0". Minimum accepted score is 80% aggregate.
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification** Graduate in any discipline, preferably Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields. **Industry & Training Experience:** Minimum 8 years of experience after Graduation in Handset Assembling. **Certification:** "Lead Assessor" mapped to the Qualification Pack "MEP/Q2702, v3.0" Minimum accepted score is 90% aggregate.
4.	**Assessment Mode** *(Specify the assessment mode)*	Offline/Online
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☐ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	**Latest Skill Gap Study (not older than 2 years) (Yes/No):** NA
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** NA
3.	**Government /Industry initiatives/ requirement (Yes/No):** NA
4.	**Number of Industry validation provided:** 21
5.	**Estimated nos. of persons to be trained and employed:** 1400
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** *Approved* If "No", why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	**Annexure:** NCrF/NSQF level justification based on NCrF level/NSQF descriptors *(Mandatory)*	*Annexure 1*

2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	*Annexure 2*
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	*Annexure 6*
4.	**Annexure:** Assessment Strategy *(Mandatory)*	*Annexure 7*
5.	**Annexure:** Blended Learning *(Mandatory, in case selected Mode of delivery is "Blended Learning")*	*NA*
6.	**Annexure:** Multiple Entry-Exit Details *(Mandatory, in case qualification has multiple Entry-Exit)*	*NA*
7.	**Annexure:** Acronym and Glossary *(Optional)*	*Annexure 8*
8.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	*Attached*
9.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	*Attached*
10.	**Supporting Document:** Occupational Map *(Mandatory)*	*Attached*
11.	**Supporting Document:** Assessment SOP *(Mandatory)*	*Attached*
12.	**Any other document you wish to submit:**	*N0*

Annexure 1: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	**The Professional Theoretical/Practical knowledge required for the job role are:** **Screen Printing of PCBs** • Preparation and baking of boards • Screen printing process • Quality checks and process optimization **Component Placement on PCBs** • Feed and verify placement data • Load chip component rolls • Load chip component trays • Operate chip shooter and fine pitch placer **Re-flow soldering on PCBs** • Preparation of the reflow machine • Re-flow operation on the PCB and QA checks **Cleaning and Inspection of PCBs**	A Surface Mount Technology (SMT)- Telecom Technician at NSQF Level 4 combines technical expertise with hands-on skills in PCB assembly. The role includes screen printing, component placement, reflow soldering, and quality assurance to ensure precision and reliability. Technicians prepare and bake boards, operate placement systems, conduct reflow soldering, and perform cleaning and inspection while following strict QA protocols. Sustainability is key, requiring waste segregation, recycling, and compliance with environmental regulations. With specialized skills in SMT processes, automation, and quality control, this role aligns with NSQF Level 4, ensuring efficiency, safety, and sustainability in telecom production.	4.0

	• Cleaning of PCBs • Quality checks and assurance **Follow sustainability practices in telecom production and assembly line processes** • Identify and segregate recyclable, refurbishable, and hazardous components • Follow green manufacturing and sustainable assembly practices • Dispose of and recycle waste • Comply with environmental and sustainability regulations		
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Know the process of preparing and baking boards before PCB assembly. • Understand the screen-printing process and its role in PCB production. • Know how to perform quality checks and optimize the screen-printing process. • Know the procedure for feeding and verifying placement data for PCB assembly. • Understand the process of loading chip components rolls into the placement system. • Know how to load chip component trays for precise PCB assembly. • Know the operation of chip shooter and fine pitch placer equipment. • Understand the setup and preparation of the reflow soldering machine. • Know how to execute reflow soldering on PCBs while ensuring QA compliance. • Know the importance of cleaning PCBs post-assembly. • Understand key quality checks and assurance measures for PCBs. • Know how to identify and segregate recyclable, refurbishable, and hazardous components.	A Surface Mount Technology (SMT)- Telecom Technician requires a blend of theoretical knowledge and hands-on expertise to assemble, test, and inspect PCBs. Responsibilities include preparing and baking boards, screen printing, component placement, reflow soldering, and quality assurance. The role involves operating advanced machinery such as chip shooters, fine pitch placers, and reflow soldering equipment while ensuring precision and efficiency in PCB assembly. Technicians must follow sustainability practices, including waste segregation, recycling, and compliance with environmental regulations. They play a critical role in process optimization, defect prevention, and adherence to green manufacturing standards. By ensuring quality control, regulatory compliance, and technical efficiency, this role aligns with NSQF Level 4, demonstrating specialized skill application.	4.0

	• Understand the principles of green manufacturing and sustainable assembly practices. • Know the correct procedures for waste disposal and recycling in telecom assembly. • Know how to comply with environmental and sustainability regulations in telecom manufacturing.		
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Select appropriate tools, materials, and techniques for screen printing, component placement, and reflow soldering. • Identify process inefficiencies, defects, and areas for quality improvement in PCB assembly. • Follow systematic approaches for optimizing production workflows and reducing errors in SMT processes. • Implement safety protocols, ESD protection measures, and sustainable manufacturing practices. • Evaluate PCB assembly quality against industry standards and performance benchmarks. • Follow defined troubleshooting techniques for identifying and resolving issues in SMT assembly. • Establish the best practices for waste management, recycling, and eco-friendly telecom production. • Apply automation and digital tools for production tracking, inventory control, and process monitoring. • Demonstrate problem-solving skills, adaptability, and decision-making in a fast-paced manufacturing environment. • Use time effectively, coordinate team efforts, and ensure compliance with industry regulations. • Identify opportunities for process innovation and business growth in telecom manufacturing.	Employment readiness and entrepreneurship skills for a Surface Mount Technology (SMT)- Telecom Technician focus on technical proficiency, process efficiency, and professional development. Technicians must select appropriate tools, identify quality improvements, and follow systematic approaches to optimize PCB assembly. They should follow safety measures, evaluate product quality, and design efficient workflows. Understanding compliance requirements, sustainability practices, and automation tools is crucial for maintaining industry standards. Therefore, this role is classified at Level 4.	4.0
Broad Learning Outcomes/Core Skill	The Broad Learning Outcomes/Core Skill are: • Demonstrate the preparation, baking, and screen printing process for PCB. • Apply quality assurance techniques to inspect and optimize PCB assembly.	The Surface Mount Technology (SMT)- Telecom Technician role at NSQF Level 4 requires a practical, hands-on approach with expertise in PCB assembly, quality inspection, and process optimization. Technicians must perform routine and non-routine tasks, including screen printing, component placement, reflow soldering, cleaning,	4.0

	• Perform chip component placement by feeding, verifying data, and operating placement systems. • Execute reflow soldering operations while ensuring adherence to quality standards. • Implement cleaning and inspection procedures to maintain PCB integrity. • Identify recyclable, refurbishable, and hazardous components for responsible disposal. • Follow green manufacturing practices and comply with environmental regulations. • Use automation tools and digital systems for process efficiency and inventory management. • Maintain compliance with safety standards, including ESD protocols and telecom assembly guidelines. • Learn problem-solving skills to troubleshoot issues in SMT processes. • Communicate effectively with team members to streamline production and ensure quality control.	and quality assurance while ensuring compliance with safety, ESD, and environmental regulations. They should demonstrate problem-solving skills, effective communication, and teamwork to enhance production efficiency. Additionally, their role involves selecting appropriate tools, implementing safety measures, and adhering to sustainability practices. Working under supervision, they contribute to structured processes, aligning with NSQF Level 4, which focuses on applying technical knowledge in familiar work environments while developing expertise in telecom assembly and production.	
Responsibility	**The responsibilities are:** • Screen Printing of PCBs • Preparation and baking of boards • Screen printing process • Quality checks and process optimization • Component Placement on PCBs • Feed and verify placement data • Load chip component rolls • Load chip component trays • Operate chip shooter and fine pitch placer • Re-flow soldering on PCBs • Preparation of the reflow machine • Re-flow operation on the PCB and QA checks • Cleaning and Inspection of PCBs • Cleaning of PCBs • Quality checks and assurance	A Surface Mount Technology (SMT)- Telecom Technician is responsible for executing the complete SMT assembly process, ensuring high-quality telecom Printed Circuit Board (PCB) production. Key responsibilities include screen printing, precise component placement, reflow soldering, cleaning, inspection, and segregation of functional and defective PCBs. The individual also performs repairs and corrections on defective PCBs. The role requires operating and maintaining advanced SMT equipment while optimizing production efficiency and adhering to industry standards for PCB assembly.	4.0

	• Follow sustainability practices in telecom production and assembly line processes • Identify and segregate recyclable, refurbishable, and hazardous components • Follow green manufacturing and sustainable assembly practices • Dispose of and recycle waste • Comply with environmental and sustainability regulations		

Annexure 2: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1.	Through-Hole Component Insertion Module	Pieces	2
2.	Testing Jigs	Pieces	2
3.	Wave Soldering Machines	Pieces	1
4.	Stencil Sets & Racks	Pieces	2
5.	Static Level Meter	Pieces	1
6.	Stencil Cleaning Machine	Pieces	1
7.	Soldering Tip Polisher	Pieces	2
8.	Specification Charts	Pieces	2
9.	Solder Mask (PPE)	Pieces	2
10.	SMT V-CUT PCB Separator / Cutting Machine	Pieces	1
11.	Schematics & Designs	Pieces	2
12.	RF Measurement System / Station	Pieces	1
13.	Preventive Do's & Don'ts Placards	Pieces	2
14.	Reflow Soldering Machine	Pieces	1
15.	PCB Cleaning Solution (IPA)	Pieces	2
16.	PCB Depanelizer Machines	Pieces	1
17.	PCB Cleaning Machine	Pieces	1
18.	PCB Assembly Conveyor System	Pieces	1
19.	OS & APP Flashing Station	Pieces	1
20.	Parallel Removers	Pieces	1
21.	Master Design File	Pieces	2
22.	Micro Clean Room	Pieces	1
23.	Liquid Dispensers (Liquid Flux, Epoxy)	Pieces	2

24.	Lead Trimming System	Pieces	1
25.	Lead-Free Solder Paste (With / Without Flux)	Pieces	2
26.	Laser Alignment & Vision System	Pieces	1
27.	Internal Quality Control (IQC) / QMS / TQM	Pieces	2
28.	IPC / IEC / CE Standard Documents	Pieces	2
29.	Humid/Moist Control Desiccant Dry Box (Adjustable / Auto)	Pieces	1
30.	In-Circuit Testing Machine	Pieces	1
31.	High Density Press Fit Connector Assembler/Tester	Pieces	1
32.	High Layer Count PCB Assembler/Tester	Pieces	1
33.	Foot Switch	Pieces	2
34.	Fine Pitch, BGA, & Micro BGA Placement	Pieces	1
35.	ESD Safe Smoke Absorbers	Pieces	1
36.	EMI / ROHS / WEEE Standard Documents	Pieces	2
37.	Embedded Computers	Pieces	1
38.	Electronic Components Storage Cabinet	Pieces	2
39.	Document Pads/Files	Pieces	2
40.	Digital CRO	Pieces	1
41.	Digital Soldering Station	Pieces	1
42.	Conveyor Lines Drive Assembly	Pieces	1
43.	Components Tray/Bins/Strips Bobbin	Pieces	2
44.	Charging Station	Pieces	1
45.	BGA Rework Station (Semi / Full Auto)	Pieces	1
46.	Battery Charging System	Pieces	1
47.	Bar Code Scanner	Pieces	1
48.	Assembly Line Protector	Pieces	2
49.	Apron (ESD Proof)	Pieces	2
50.	Anti-Electrostatic Floor	Pieces	3
51.	Adhesives and Cleaning Products	Pieces	2
52.	5S Items, Charts, Checklists	Pieces	2
53.	Automated Flip Chip Assembly	Pieces	2
54.	Finger Cuts (Full & Half)	Pieces	2

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Whiteboard
2. Projector
3. Computer/Laptop
4. Chairs
5. Tables
6. Whiteboard marker
7. Duster

Annexure 3: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1.	Ibus Network and infrastructure Pvt.Ltd.	TK Narayanan	Deputy General Manager Commercial	7th Floor Tower B, Vatika Towers Golf Crouse Road Sector 54 Gurugram ,Haryana India 122011		tk.narayanan@ibusnetworks.com	
2.	ICAII Computer & IT Skill Enhancement Institute (ICSE)	Er. Kamaljeet Kumar Sharma	Managing Director	#2266 (Site No. 24), Phase 7/Sector 61, S.A.S Nagar (Mohali) 160062, Punjab (India)		contact@icseinstitute.com kksmhl@gmail.com	
3.	JRS Global Networks Pvt.Ltd.	Arvind Yadav	Asst. Account Manager Telecom	A 22, Sector-65 Noida, UP-201307		account3@jrsgl.com	
4.	Expert Consultant & Coach for Telecom Fibre Optics, FTTx and Broadband	Dr. Anuj Shrivastava	Ex Executive Director Indian Telecom Services	Ghaziabad, UP		srianujkumar@gmail.com	
5.	Jio Platforms Limited (Jio)	Abhijay Singh Sisodia	Senior Manager	Office-101, Saffron, Nr.Centre Point, Panchwati 5 Rasta, Ambawadi, Ahmedabad-380006 Gujarat		abhijay.sisodia@ril.com	
6.	Vodafone India Shared Service Private Limited	Manmohan Sharma	Deputy General Manager	0-4th floor, Cluster D, Wing 3, EON Free Zone, Kharadi, Pune, Maharashtra 411014		manmohan.sharma@vodafone.com	
7.	Teoco	Naman Khosla Abhijay Singh Sisodia	Technical Consultant	Infotech Center -6th floor, 14/2 Old Delhi Gurgaon Road,		naman.khosla@teoco.com	

				Dundahera, Gurgaon – 122016, India			
8.	Global Logic	Rashid Muhammad	Associate Manager	Plot No.7, Oxygen Business Park SEZ, Tower, 3, Noida-Greater Noida Expy, Sector 144, Noida, Uttar Pradesh 201304		rashid.muhammad@globallogic.com	
9.	Mahendra Technical Institute	Mahendra Brmukh	Chairman and Managing Director	1st Floor, 3/B M B Classic, Telco Road, Near Kailash Dairy, Chinchwad Station, Pune – 411019 Maharashtra, India		info.mtipune@gmail.com	
10.	Amazon	Anshul Gupta	Program Manager	Bangalore		anshlgu@amazon.com	
11.	Stealth Mode Startup Company	Avadh Gupta	Founder, Co-Founder & Investor	Pune		avadhmac@gmail.com	
12.	Ranitronics	Yakama Vijayasree Kumar	Founder & Technical Consultant	Villa 302, Namaha Rhythm, Road No. 1, Kavya Avenue, Bachupally, Hyderabad – 500090, Telangana		info@ranitronics.com	
13	Eco Works	Deepali Sinha Khetriwal	Founder & CEO	C-601, Kalpataru Regency Phase 1, Kalyani Nagar, Pune 411006		deepali@ecowork.international	
14	Himachal Futuristic Communications Limited (HFCL)	Amit Agarwal	VP PLM	8, Commercial Complex, Masjid Moth, Greater Kailash - 11, New Delhi -110048, India		amit.agarwal@hfcl.com	
15	Tata Communication	Alka Asthana	Head of Regulatory Affairs	Next Gen Tower Outer Ring Road, GK-1, New Delhi – 110048		alka.asthanatelecom@gmail.com	
16	Reckitt Benckiser	Sachin Sharma	Demand Manager	Udyog Vihar, Phase V, Gurgaon, Haryana		sachin.sharma@rb.com	

17	Sycamore Informatics	Rahul Kumar Kaushik	Product Manager	No. 6, 2nd Floor, 2nd Main, Arekere, Off Bannerghatta Road, Bangalore 560076		rahul.kaushik@sycamoreinformatics.com	
18	Nokia	Saurabh Singh	Software Quality Engineer	L5 and L6 Building Manyata Embassy Business Park Outer Ring Road, Nagawara 560045		saurabh.9.singh@nokia.com	
19	Edge Telecom	Arun Singh	Senior Project Engineer	9th floor, ILD Trade Centre, 904, main, Badshahpur Sohna Rd Hwy, near Subhash Chowk, Gurugram, Haryana 122018		arun.singh@edgetelecom.org	
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21	Artificial Intelligence Technologies	Rohit Kumar Sharma	Manager – Development	A-21, sector 4, Block A, Kailash Colony, Greater Kailash, New Delhi,		rohit.sharma@aituniversal.com	
22	Ecom Express.in	Shekhar Poswal	Senior QA L1	10th Floor, Ambience Corporate Tower II, Ambience Island, Gurugram 122001		Shekhar.p@ecomexpress.in	
23	Paarminder Electronics Process Consultancy	Paarminder Singh	Consultant	New Delhi		singhpaarminder@gmail.com	
24	Senryaku Consulting	Udit Kaushik	Co-founder	Senryaku Management Private Limited Address: UTC031, DLF The Ultima, Sector 81, Gurugram, HR 122004		udit.kau@gmail.com	
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				Noida, Uttar Pradesh 201304			

Annexure 4: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2025	420	294	21	11	21	11
2026	420	294	21	11	21	11
2027	560	392	28	14	28	14

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
4.0	April 2023 to March 2024	1182	1107	1107									
4.0	April 2024 to March 2025	150	150	150									

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented:

1.
2.

Content availability for previous versions of qualifications:

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available:

Annexure 5: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	LMS Portal- TSSC Telco Learning Portal will be utilized with online content/virtual lectures (Telcolearning.com)	100:100
2	☒Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	LMS Portal- TSSC Telco Learning Portal will be utilized with online content/virtual lectures (Telcolearning.com)	100:100
3	☐Showing Practical Demonstrations to the learners		
4	☐Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☐Tutorials/ Assignments/ Drill/ Practice		
6	☐Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☐On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure 6: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
TEL/N2503: Screen Printing of PCBs	*Preparation and baking of boards*	*8*	*12*	*-*	*6*
	PC1. determine baking requirements based on customer specifications, material type, and process standards	2	3	-	1
	PC2. stack and place boards in the oven rack following specified alignment and spacing guidelines	2	3	-	1
	PC3. set and monitor temperature, timer, and humidity conditions in the oven as per process requirements	2	3	-	2

	PC4. inspect boards post-baking to check for moisture removal and surface readiness	2	3	-	2
	Screen printing process	*14*	*24*	*-*	*10*
	PC5. select appropriate tools and accessories, including stencil matching the PCB pattern, correct squeegee size, and specified solder paste formulation	2	3	-	2
	PC6. clean stencil before and after use with approved solvents and specified processes to prevent contamination	2	3	-	1
	PC7. apply solder paste evenly using controlled deposition techniques to achieve uniform thickness	2	3	-	2
	PC8. thaw solder paste to the recommended temperature and maintain viscosity consistency before application	1	3	-	1
	PC9. align stencil, PCB, and squeegee in the screen printer for accurate registration and positioning	1	3	-	1
	PC10. operate the screen printing machine, adjusting pressure, speed, and alignment settings for optimal performance	2	3	-	1
	PC11. measure and verify solder paste thickness post-printing, ensuring conformance to process specifications	2	3	-	1
	PC12. troubleshoot printing defects such as misalignment, insufficient paste deposition, or excessive bridging, making necessary adjustments	2	3	-	1
	Quality checks and process optimization	*8*	*14*	*-*	*4*
	PC13. conduct visual and automated inspection to detect defects such as smudging, misalignment, or improper paste application	2	4	-	1
	PC14. document and report deviations, corrective actions, and process improvements as per standard operating procedures	2	4	-	1
	PC15. ensure proper storage and handling of consumables, including solder paste and stencils, to maintain process consistency	2	3	-	1
	PC16. adhere to safety, health, and environmental guidelines while handling chemicals and operating equipment	2	3	-	1

	Total Marks	**30**	**50**	**-**	**20**
TEL/N2504: Component Placement on PCBs	*Feed and verify placement data*	*5*	*9*	*-*	*4*
	PC1. map board specifications to the correct software version of the chip shooter or fine pitch placer	2	3	-	1
	PC2. interpret Gerber and x-y coordinate data for component placement	1	2	-	1
	PC3. navigate and operate the machine software interface effectively	1	2	-	1
	PC4. input and verify component placement program data in the equipment	1	2	-	1
	Load chip component rolls	*9*	*14*	*-*	*5*
	PC5. check and confirm the operation of the roll feeder mechanism	2	3		1
	PC6. feed Gerber data and insert feeder rolls into the designated slots of the chip shooter	2	3		1
	PC7. verify component rolls against part numbers and work specifications	2	3		1
	PC8. load chip component rolls in the feeder accurately	1	2		1
	PC9. input x-y coordinate data for precise positioning of components	2	3		1
	Load chip component trays	*6*	*10*	*-*	*3*
	PC10. load components into the tray as per the placement program	2	4		1
	PC11. ensure correct orientation of components in the feeder tray	2	3	-	1
	PC12. check and calibrate the vision cameras for accurate placement	2	3	-	1
	Operate chip shooter and fine pitch placer	*10*	*17*	*-*	*8*
	PC13. verify the correct loading of boards, component placement program, and component rolls or trays	1	2	-	1
	PC14. check placement vacuum pressure to ensure proper suction	1	2	-	1
	PC15. inspect feeder mechanism functions for error-free operation	1	2	-	1

	PC16. operate the component placement equipment according to defined procedures	2	3	-	1
	PC17. apply the tape board technique to validate placement accuracy	1	2	-	1
	PC18. inspect the first sample PCB under a microscope to verify component correctness and placement	1	2	-	1
	PC19. identify and rectify common SMT defects such as tombstoning and solder shorts	2	2	-	1
	PC20. document and report any deviations or errors in placement accuracy	1	2	-	1
	Total Marks	**30**	**50**	**-**	**20**
TEL/N2505: Re-flow soldering on PCBs	*Preparation of the reflow machine*	*14*	*25*	*-*	*8*
	PC1. interpret solder paste characteristics, including viscosity, flux content, and recommended re-flow temperature profile from datasheets and machine guidelines	3	5	-	2
	PC2. set and load the required parameters in the re-flow machine, including temperature zones, conveyor speed, and cooling profile	3	5	-	2
	PC3. verify the functionality of thermal profiling equipment and perform a sample PCB run to measure real-time thermal response	3	5	-	2
	PC4. analyze thermal profiling data and make necessary adjustments to achieve optimal soldering results	3	5	-	1
	PC5. ensure the machine is calibrated and functional before commencing full-scale operations	2	5	-	1
	Re-flow operation on the PCB and QA checks	*16*	*25*	*-*	*12*
	PC6. ensure proper placement of components and even application of solder paste before passing the PCB through the re-flow machine	3	5	-	2
	PC7. monitor the re-flow process and check for deviations in temperature, conveyor movement, and gas flow inside the chamber	3	5	-	2
	PC8. safely retrieve the PCB post re-flow cycle and allow it to cool under controlled conditions	3	3	-	2

	PC9. inspect the PCB for defects such as dry solder joints, tombstoning, misalignment, delamination, and thermal stress-induced damage	2	2	-	2
	PC10. conduct additional QA tests such as X-ray analysis, optical inspection, or functional testing to confirm solder joint integrity	3	5	-	2
	PC11. record process parameters and defect data for continuous improvement and traceability	2	5	-	2
	Total Marks	**30**	**50**	**-**	**20**
TEL/N2502: Cleaning and Inspection of PCBs	*Cleaning of PCBs*	*10*	*20*	*-*	*6*
	PC1. clean PCBs to remove flux residues, white patches, and other contaminants using specified solvents and cleaning agents	2	5	-	2
	PC2. operate vapor de-greaser, ultrasonic cleaner, and other industry-recommended equipment for cleaning PCBs, ensuring effective removal of impurities	3	5	-	2
	PC3. dry PCBs using controlled methods to prevent damage and contamination	3	5	-	1
	PC4. package and store cleaned PCBs using electrostatic discharge (ESD)-safe materials and procedures to maintain integrity and prevent damage	2	5	-	1
	Quality checks and assurance	*20*	*30*	*-*	*14*
	PC5. check PCBs for missing, wrongly mounted, or misaligned components as per specifications and bill of materials (BOM)	3	4	-	2
	PC6. inspect soldering quality, including workmanship, joint integrity, and adherence to IPC standards	3	4	-	2
	PC7. verify placement of board identifiers, conformal coatings, and compliance with customer or regulatory requirements	3	4	-	2
	PC8. identify defects such as cold solder joints, bridging, and insufficient solder, and take corrective action	3	4	-	2
	PC9. identify and segregate functional and defective PCBs	2	4	-	2
	PC10. document findings and escalate non-conformities as per established reporting protocols	2	3	-	1

	PC11. carry out routine maintenance of the SMT equipment to ensure their optimal functioning	2	3	-	1
	PC12. conduct routine shop floor audits to ensure adherence to process parameters, including temperature and humidity control	2	4	-	2
	Total Marks	**30**	**50**	**-**	**20**
TEL/N9107: Follow sustainability practices in telecom production and assembly line processes	*Identify and segregate recyclable, refurbishable, and hazardous components*	*6*	*10*	*-*	*5*
	PC1. inspect incoming and outgoing materials to identify recyclable, refurbishable, and hazardous components	1	2	-	1
	PC2. categorize telecom components such as PCBs, cables, batteries, and plastic casings for appropriate processing	1	2	-	1
	PC3. maintain an inventory of recyclable and hazardous materials to track waste management	1	2	-	1
	PC4. store e-waste separately and label it in accordance with Extended Producer Responsibility (EPR) guidelines	1	2	-	1
	PC5. identify and report any improper disposal practices to the designated authority	2	2	-	1
	Follow green manufacturing and sustainable assembly practices	*10*	*15*	*-*	*5*
	PC6. use energy-efficient equipment, tools, and automated systems to reduce carbon footprint	**2**	**3**	-	**1**
	PC7. follow low-emission soldering and lead-free assembly processes to minimize pollution	**2**	**3**	-	**1**
	PC8. optimize the use of materials, water, and electricity during production	**2**	**3**	-	**1**
	PC9. conduct regular maintenance and calibration of energy-efficient machinery to ensure optimal performance	2	3	-	1
	PC10. adopt ISO 14001 (Environmental Management System) compliance in production workflows	2	3	-	1
	Dispose of and recycle waste	*10*	*15*	*-*	*6*
	PC11. dispose of hazardous waste (e.g., lithium batteries, chemical residues) in accordance with environmental safety protocols	**2**	**3**	-	**1**

	PC12. deposit non-hazardous, recyclable materials (e.g., plastics, aluminum, copper) in designated collection areas	**2**	**3**	-	**2**
	PC13. maintain documentation for waste disposal and recycling compliance audits	**2**	**3**	-	**1**
	PC14. conduct periodic waste audits to identify opportunities for further waste reduction	2	3	-	1
	PC15. coordinate with authorized e-waste recyclers to ensure proper processing and disposal	2	3	-	1
	Comply with environmental and sustainability regulations	*4*	*10*	-	*4*
	PC16.follow the applicable national and international environmental laws and regulations for telecom manufacturing	1	2	-	1
	PC17.participate in sustainability audits and assessments as per company policies	**1**	**3**	-	**1**
	PC18.check for adherence to sustainability guidelines and report deviations	1	3	-	1
	PC19.follow corrective actions based on environmental audits and assessments	1	2	-	1
	Total Marks	**30**	**50**	**-**	**20**
DGT/VSQ/N0101: Employability Skills (30 Hours)	*Introduction to Employability Skills*	*1*	*1*	-	-
	PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
	Constitutional values – Citizenship	*1*	*1*	-	-
	PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	*1*	*3*	-	-
	PC3. explain 21st Century Skills such as Self- Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
	Basic English Skills	*2*	*3*	-	-
	PC4. speak with others using some basic English phrases or sentences	-	-	-	-
	Communication Skills	*1*	*1*	-	-

	PC5. follow good manners while communicating with others	-	-	-	-
	PC6. work with others in a team	-	-	-	-
	Diversity & Inclusion	*1*	*1*	-	-
	PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC8. report any issues related to sexual harassment	-	-	-	-
	Financial and Legal Literacy	*3*	*4*	-	-
	PC9. use various financial products and services safely and securely	-	-	-	-
	PC10. calculate income, expenses, savings etc.	-	-	-	-
	PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
	Essential Digital Skills	*4*	*6*	-	-
	PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
	PC13. use internet and social media platforms securely and safely	-	-	-	-
	Entrepreneurship	*3*	*5*	-	-
	PC14. identify and assess opportunities for potential business	-	-	-	-
	PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
	Customer Service	*2*	*2*	-	-
	PC16. identify different types of customers	-	-	-	-
	PC17. identify customer needs and address them appropriately	-	-	-	-
	PC18. follow appropriate hygiene and grooming standards	-	-	-	-
	Getting ready for apprenticeship & Jobs	*1*	*3*	-	-
	PC19. create a basic biodata	-	-	-	-
	PC20. search for suitable jobs and apply	-	-	-	-
	PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-

	Total Marks	**20**	**30**	**-**	**-**
Grand Total		**170**	**280**	**-**	**100**

Annexure 7: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

Mention the detailed assessment strategy in the provided template.

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 levels 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

The trainee will be tested for the acquired skill, knowledge and attitude through formative/ summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

Annexure 8: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training
TSSC	Telecom Sector Skill Council
TRAI	Telecom Regulatory Authority of India
PCB	Printed Circuit Board
RPA	Robotic Process Automation
ERP	Enterprise Resource Planning

AR	Augmented Reality
IoT	Internet of Things
SMT	Surface Mount Technology
ESD	Electrostatic Discharge
EPR	Extended Producer Responsibility

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf