Codeless Testing Automation Framework

1	**Problem Statement**	To develop **a Codeless Testing Automation Framework** to allow the testers to design, implement and modify automated tests of their manual testing procedures without having any expertise on programming. This framework is to integrate with C-DOT 4G/5G-IMS core. Use of this framework will fasten the development of automation and execution of test cases.
2	**Technology Area**	Codeless Testing Automation Framework
3	**Project Introduction**	All Software products developed at C-DOT undergoes through continuous validation testing cycle before deployment at production sites. To ensure successful and high-quality deployment, validation testing includes: • Functional and Integration Testing of delivered features • Maximum coverage of testing scenarios • Execution of regression test suites to validate unchanged part of software subsystems. • Simulating load on critical modules and verifying key KPIs and analysing traffic. Manual execution of above testing activities is a time consuming activity and sometimes limits the scope of testing based upon the urgency of delivery. Requirement of automation of these procedures is to accelerate the testing cycles and provide faster feedback for timely delivery of high-quality software releases.
4	**Problem Description**	Validation testing of C-DOT 4G/5G-IMS Project involves multiple interfaces like CLI, REST APIs, Web-based GUI and protocol messages of telecom 4G/5G-IMS core. Developing a **codeless automation framework** will enable testers to automate multiple interfaces in generalized way without dependency on programming teams. Testers can design and develop automation of manual procedures and will align the test scripts with their manual execution and verification methods.

		Project Scope: • Development of a codeless automation framework • Testing & Validation of proposed solution • Deployment of framework in C-DOT Lab environment and integrate with C-DOT 4G/5G-IMS core interfaces • Training & Documentation of proposed testing automation framework • Demonstrating capability for reusability across other C-DOT's related projects.
5	**Feature Sets and Capabilities**	The **"Codeless Testing Automation Framework"** will provide an end-to-end platform for testing of C-DOT key projects such as 4G/5G -IMS core. **Key Features and Capabilities:** 1. **Codeless Automation** – Enables testers to develop automation scripts of their manual methods using user-friendly workflow of proposed framework 2. **End-to-end functionality testing automation** – Supports automation of features involving multiple interfaces and subsystems 3. **CLI Interfaces** – Automates functional testing of devices on CLI Interfaces 4. **Web GUI** – Automates testing of Web based applications developed in any web-technology like Java, Python, React, JS etc. 5. **REST API -** Automates testing of APIs using HTTP or HTTPs protocols 6. **Complex Verification Criteria –** Allows dynamic PASS/FAIL criteria using logical operators (AND/OR/NOT) 7. **Regression Testing –** Supports execution of predefined automation test suites with multiple iterations 8. **Execution on multiple Lab environment –** Enable reuse of automated test scripts across multiple Labs 9. **Performance testing** – Supports traffic and load testing on diverse interfaces 10. **Traffic Reporting** – Measures and validates traffic statistics and KPIs 11. **Test Case Version Management** – Organizes, categorizes and version-controls test cases across product releases

		12. **User Management** – Secure and authorized access to system allowing multiple testers to develop and execute their automated test scripts in parallel
		13. **Testing Results and Dashboard** – Generates user friendly test reports and dashboards; providing easy access to test results, logs and analytics, helping in evaluating the quality and stability of product releases under testing.
		14. **North-bound Interface** – Provides North bound APIs for integration with third-party automation tools or CI-CD pipelines
		15. **Quick Failure debugging** – Provides quick root cause analysis for analysing test failures from the captured device logs and packets
		16. **Reusability in Future networks** – Provides capability to reuse the framework in testing of other Wi-Fi, MCX ,5G/IOT etc of telecom networks
6	**Role & Responsibilities of C-DOT**	C-DOT will provide technical development assistance, and financial support to the project partner(s) selected through a process of evaluation and due diligence conducted by a committee of subject experts.
		Development costs of the module, whether developed from scratch or derived from existing background technology of partner(s), shall be borne by C-DOT. C-DOT shall use the final solution for integration with production grade software. C-DOT reserves the right to modify and enhance the solution and provide it to C-DOT customers or another Partner(s).
		C-DOT shall engage with Partner(s) on a non-exclusive basis and shall retain its right to develop similar projects/products through other developmental programs.
7	**Role & Responsibilities of Partner**	The Partner(s) may build the required module afresh or by modifying pre-existing background technologies available with them. As per the project demand or project type, the Partner(s) may utilize the available test and infrastructure facilities offered by C-DOT with no/some financial implication for its usage.
		Any simulators or 3rd party software's required for proposed solution development will be provided by the Partner(s)
		Participation in the project shall be on a non-exclusive basis. All partner(s) shall be required to demonstrate commitment

		to the project by entering into a formal agreement with C-DOT as per the CCRP policy.
8	**Expected Deliverables**	Approved System Software Requirement Document Approved System Architecture Design Approved Functional Requirements Specification and detailed design of subsystems Approved Test Plan and Testing Reports System User Manual and Training documents for test case development, deployment and integration testing Source code handover and training for enhancements/customization in solution
9	**Timeline for Project**	6 Months for delivery and in functional use by C-DOT + 2 years support for enhancements and capacity building for acceptance by C-DOT team. + 1 year post deployment support
10	**Ownership of Background & Foreground IP**	All technologies created during the project shall be owned by the respective development partner(s), individually or collectively as the case may be. Any agreement required for collective ownership shall be settled directly by the concerned partners, but the ownership/IPR of the final solution shall rest with C-DOT only with all the deliverables including complete source code etc.
11	**Vendor Selection Criteria**	1. The vendor is Indian Domestic Company/MSME or start-up recognized by DPIIT with expertise of minimum 2 years in codeless testing automation of telecom based services in end-2-end way. 2. The vendor solution is developed on proven technology and is deployed at least at two customers location related to telecom network for automation testing. 3. The vendor has Industry Recognition and VRP Rankings acknowledged by leading service providers for testing their telecom product services using vendor codeless automation solution. 4. The vendor must have strong portfolio of customization in proprietary automation testing requirement with proven capabilities in designing and implementation of Voice and Data call scenarios testing.

		5. The vendor solution is successfully integrated with C-DOT 4G/5G-IMS core and has successfully proven the capability on listed requirements.