Call for Proposal

for collaborative development of disaggregated 5G Radio Access Network solution

1. Introduction

In line with its objectives of promoting indigenous development of 5G technologies under the Atmanirbhar Bharat program, the Centre for Development of Telematics (C-DOT) has launched a 5G India Alliance to provide a common platform to Indian industry members for individually / collectively developing 5G technologies in the country.

C-DOT intends to facilitate the Indian industry in collaboratively designing and developing 5G technologies.

Among other envisaged facilitation mechanisms, C-DOT is in the process of setting up a sharable captive campus wide private 5G network infrastructure for conducting research & development, testing, pilot production and deployment of innovative 5G products and services.

C-DOT invites participation from the Indian startups/ organizations/ research and academic Institutions in a collaborative project led by C-DOT for development of an O-RAN compliant disaggregated 5G RAN solution capable of operation in the FR1 and FR2 bands, capable of working in TDD/FDD mode and deployable in NSA & SA mode.

The potential participants should have demonstrable expertise in 5G related technologies in the form of fully or partially prototyped 5G technologies, including but not limited to, components / modules / hardware / software / subsystems or end products thereof.

The final outcome of the collaborative development project shall be commercially deployable 5G RAN product(s) which would meet requirements of public /or private 5G networks. The project outcomes shall be licensed back to interested participants or third parties having capable of its mass production, marketing and deployments for end users, directly or in association with system integrators.

Through a process of rigorous technical evaluation, C-DOT shall select participants holding the most promise of delivering commercial grade outcomes as its development partners ("Partner") in the project.

In order to achieve a truly open and interoperable end solution, C-DOT would prefer to select multiple Partners for the some work item wherever feasible.

2. Project Description

C-DOT will lead a collaborative Indian effort of building a disaggregated 5G RAN along with the selected Partners by utilizing their respective expertise, prior development effort and available deliverables to the maximum extent possible.

Keeping in mind the technologies available with the Indian industry, C-DOT shall then evolve a common product requirement specifications (PRS) in consultation with the partners.

C-DOT and the project Partners will work collectively in physically realizing the PRS in form of field deployable commercial product(s).

Figure 1 broadly illustrates the scope and expected final outcome of the collaborative project.

Figure 1 Disaggregated 5G Radio Access Network (RAN)
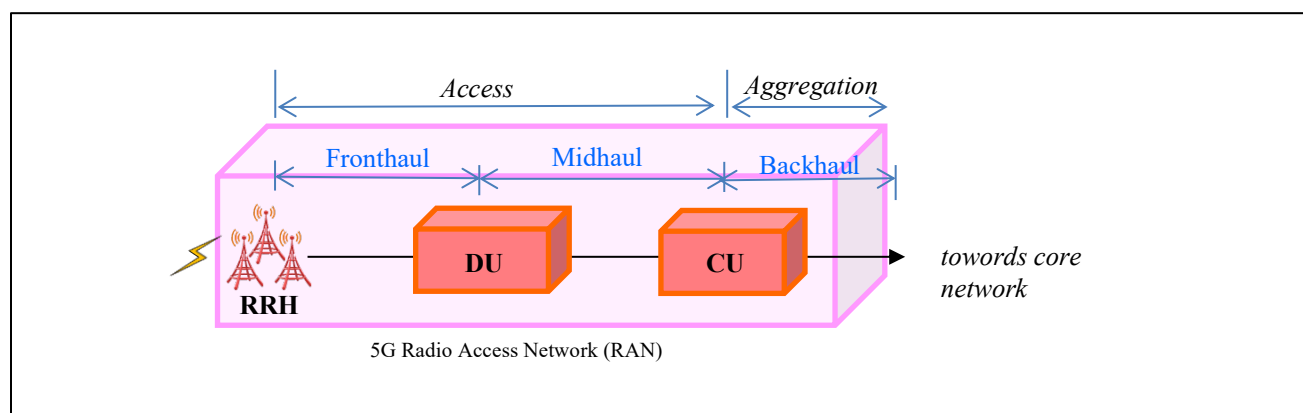
Depending on their respective expertise, participants in the project may contribute by helping in realizing one or more of modules or complete deliverables as listed in Table 1. During participation in the project, the Partners may use their respective pre-existing background technologies or undertake fresh development of new foreground technology or both.

SN	Sub-Deliverable	Contribution Areas
1.	Remote Radio Head (RRH)/RU	• Antenna module • Radio Front End • Digital Front End (including DPD &CFR) • Low L1 Stack (Low-PHY) • Filters • Hardware Subsystems

		• RRH/RUs for Various Transmit Power and frequency Bands • O-RAN interface support and compliance • Complete Product
2.	Distributed Unit (DU)	• High L1 Stack (High- PHY) • Lower L2 Stack (MAC & RLC) • Higher layers stack • Control software and Scheduling algorithms • Management Software • Remote Intelligent Controller (RIC) interface • Hardware platform • Hardware Acceleration modules • O-RAN interface support and compliance • Complete Product
3.	Central Unit (CU)	• Higher L2 (PDCP & SDAP protocols) • L3 (RRC protocol) functionality • Higher layers stack • Control software • Management Software • Remote Intelligent Controller (RIC) interface • Hardware platform • Hardware Acceleration modules • O-RAN interface support and compliance • Complete Product
4.	RAN Intelligent Controller (RIC) (Non Real-Time RIC & Near Real-Time RIC)	• Control Framework & Applications software • Hardware Platform • Complete Product
5.	Service Management and Orchestration (SMO)	• Control Framework & Applications software • FCAPS functions • Hardware Platform • O-RAN interface support and compliance • Complete Product
6.	Wireless Fronthaul, Midhaul and Backhaul Interfaces	• Point-to-Point FR1/FR2 radio units • Point-to-Multipoint FR1/FR2 Radio units • Hardware platforms • Software Defined Radios • Complete Product
7.	Other Related Areas	If any, determined during technical evaluation of responses

3. Roles & Responsibilities of C-DOT

C-DOT shall primarily lead integration of the final solution. It will provide technical development assistance, infrastructure, manpower and financial support to the project partners selected through a process of evaluation and due diligence conducted by a committee of subject experts.

Where ever deemed necessary, C-DOT may arrange skilled manpower and equipment resources, testing infrastructure, mandatory clearances, statutory permissions, technical consultancy and provide gap funding to the partners in realizing their respective target deliverables.

Development costs of all modules, whether developed from scratch or derived from existing background technology of partners shall be borne by C-DOT.

C-DOT shall license the final solution for mass production and deployment. Royalty proceeds received from licensing shall be distributed amongst all Partners in ratio of the assessed value of each partner's respective contribution determined through mutual discussions while finalizing at the product architecture.

C-DOT shall engage with Partners on a non-exclusive basis and shall retain its right to develop similar products / through other developmental programs.

4. Roles & Responsibilities of Participant(s)

Each Partner is expected to develop one or more constituent modules of the solution individually or collectively with the other Partners.

The Partners may build the required modules afresh or by modifying pre-existing background technologies available with them.

All concerned Partners shall own the foreground technologies developed by them individually or collectively as the case may be.

The Partners may utilize the available test and infrastructure facilities offered by C-DOT with no financial implication for its usage.

Participation in the project shall be on non-exclusive basis. All partners shall be required to demonstrate commitment to the project by entering into a formal agreements with C-DOT and other concerned Partners in the project.

5. Ownership of Outcomes

Background technologies used in the project shall continue to remain with their respective owners.

New foreground technologies created during the project shall be owned by the respective development Partners, individually or collectively as the case may be. Any agreement required for collective ownership shall be settled directly by the concerned Partners.

The ownership of the final solution shall rest collectively with C-DOT and all its Partners.

6. Format of Response

Companies / organizations / institutions / individuals developing enabling technologies / modules / components / subsystems / products in the 5G area are required to respond to this EOI in the format provided in Annexure-A.

7. Submission Procedure

A separate response for each intended area of participation (Table 1) shall be emailed to **EoI5gRan@cdot.in** , not later than three weeks from date of issue of this EoI.

8. The Next Steps

On receipt and evaluation of responses, C-DOT will make an assessment of indigenous technologies available for achieving objectives of the project.

C-DOT will internally conduct a build / buy analysis on the intended disaggregated 5G RAN solution.

A Product Requirement Specifications of the final product to be built collaboratively with Partners will be evolved through an open process of consultations with all concerned stake holders.

A formal Request For Proposal (RFP) shall be issued for selection of collaboration Partners for the project.

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Annexure-A : Format of Response

1.	Name of the Organization	
2.	Address and Contact Details	
3.	Type of participant (company, govt. institution, academic, other registered organization etc.)	
4.	Areas of interest in the project (from Table 1)	
5.	Details of prior experience, expertise and components/subsystems/products developed in selected area of interest	
6.	Background Intellectual Property available for contribution to the project	
6.1.	Nature of ownership of the Background Intellectual Property (e.g. exclusively owned, jointly owned, taken under license etc.)	
6.2.	Status of Background Intellectual Property (e.g. in planning, on roadmap, patented/copyrighted, under development, under field trails, mass deployed etc.) along with details of interoperability tests conducted other systems and patent/copyright details (if applicable).	
6.3.	Form in which the background intellectual property will be contributed to the project (binary, source code, implementation, finished product, modified product etc.)	
6.4.	Expected duration for availability of the background technology to the project (e.g. immediate, months, years, not-decided etc.)	
6.5.	Primary terms and conditions for licensing the background intellectual property to C-DOT and/or other participants in the project	
7.	Potential Foreground Intellectual Property that can be developed by the participant individually or collectively with other participants	

7.1.	Names of preferred partners / participants for collectively developed Foreground Intellectual Property	
7.2.	Primary terms and conditions expected to be met for licensing the potential Foreground intellectual property to C-DOT and/or other participants in the project	
8.	Any other details that need to be communicated to C-DOT	

Registration closes on 26th June 2022