



CrowdCell

This Project Group Charter establishes the scope, intellectual property and copyright terms used to develop the materials identified in this Project Group. Only Participants that execute this Working Group Charter will be bound by its terms and be permitted to participate in this Project Group and shall be considered “Contributors” in the Project Group as defined in the **Telecom Infra Project IPR Policy document**.

TIP Board of Directors Approval Date: 02/21/2018

1. PROJECT GROUP NAME

CrowdCell – GPP, SDR and open source design-based RAN Relay small cell solution

2. PURPOSE

The CrowdCell is a 4G Relay concept, whereby an intermediate “Crowd” enable device relays traffic between a customer UE and the macro network. Its main benefit is to be a rapid and low cost small cell solution thanks to its Plug-And-Play (P&P) concept by means of using the available 4G coverage. This project will focus on creating a CrowdCell by leveraging General Purpose Processing (GPP) platforms, Software-Defined Radios (SDR) and Open Source designs for both hardware and software to minimize costs with a “one design” flexible platform.

3. PROJECT GROUP SCOPE

The project scope will be complementary with other projects already at play in TIP and will focus on creating a CrowdCell solution using GPP, platforms, SDR and Open Source designs:

- i. Develop a GPP, SDR and open source design-based CrowdCell applicable to multiple deployment scenarios: coverage extension and mobile hotspots, Enterprise and Retail small cells, low cost consumer small cells, moving small cells, data analytics solutions, etc.
- ii. Start with a 4G CrowdCell concept but looking forward also to 5G at a later phase (e.g. when 3GPP 5G NR specification is complete) or IoT
- iii. Define a reference hardware/software architecture which can be fully customizable to support different Operator requirements and customer demands

- iv. Manage a Plug and Play fast and easy deployment solution which can work across any Operator infra
- v. Create a solution which can act as a smart Gateway to manage a set of locally customizable services like local streaming or local content delivery, or managing local equipment based on customer requirements
- vi. Promote an 'open' community of application developers, and platforms driving innovation and differentiation applicable
- vii. Identify innovative 'security solutions' for small cell platforms (unhackable)
- viii. Articulate the "Moving Small Cell" concept allowing its deployment in moving vehicles (ferries, cars, etc.) or to control moving objects like drones
- ix. Identify minimum requirements for General Purpose Processing Platforms to ensure efficient performance
- x. Create prototypes that can be rolled into product design for scale deployments

4. PROJECT GROUP DELIVERABLES

- i. Key requirement list for 1st generation, CrowdCell evolution (size and form factor, bands, capabilities, 5G evolution, IoT Crowdcell, etc.) and compliancy benchmark
- ii. Reference framework/architecture for the implementation of eNB and relay stack on General Purpose Processing Platforms based on Software-Defined Radios (SDR) and Open Source designs within the Operator network
- iii. Recommendation for minimum set of platform requirements (both HW and OS Layers)
- iv. Define CrowdCell configuration, performance and fault management systems (CM/PM/FM) as part of the reference implementation in virtualized environments
- v. List of KPIs and data collection to analyses prototype performance
- vi. P&P Prototype available during 1H18
- vii. Lab proof-of-concept report
- viii. Field trials to commercial covering several use cases for a variable set of customers: static coverage extension, moving small cell, data analytics, closed user group and smart Gateways (local content delivery)
- ix. TCO analysis and evolution

5. PATENT LICENSING

The patent license for all Contributions, Draft Specifications and Final Specifications within this Project Group shall be:

[Check one box]

- RAND License Option**, as set forth in Section 5.2.1 of the Telecom Infra Project IPR Policy.
- Royalty-free License Option**, as set forth in Section 5.2.2 of the Telecom Infra Project IPR Policy.

6. FINAL DELIVERABLE COPYRIGHT LICENSING

Project Group agrees to grant the following copyright license for the Final Specification:

[Check one box]

- Creative Commons Copyright Attribution 4**, Each Project Group Contributor agrees that its Contributions are subject to the Creative Commons Attribution 4.0 International license - <http://creativecommons.org/licenses/by/4.0/legalcode>.
- Full Release of Copyright into the public domain**, Each Project Group Contributor agrees to release its Contributions to the public domain and waive all copyrights associated with them.

7. INITIAL PROJECT CHAMPIONS

Vodafone, BT and Intel

8. CHAIR AND(OR) CO-CHAIR OF PROJECT GROUP

Chair

Aitor Garcia, Vodafone

9. PARTICIPATION CRITERIA

- i. Fit of the proposed contributions to the project group scope
- ii. Technical fit of the proposed contributions to the architectural framework of the project group
- iii. Commitment to contribute a non-proprietary open solution or open extension / API
- iv. Productive interaction with a system integrator