ORCA

Orchestration and Reconfiguration Control Architecture

Open Call 1

First ORCA Competitive Call for Extensions

Detect and avOid Lbt Prototyping using Hardware generIc desigN DOLPHIN	
Call - Identifier	ORCA-OC1-EXT2
Organisation name:	CEA-Leti

Section A   Project Summary

The proposed extension consists in designing a generic and configurable multi-channel LBT processor able to monitor a number of radio channels and trigger the emission of data streams over-the-air. This beyond-state-of-the-art module targets the 5GHz band regulation and the 3GPP LAA (Licence Assisted Access) framework, as a baseline. It will be able to simultaneously monitor up to 8 channels of 20 MHz bandwidth in the 5GHz band and will implement the channel access adopted by 3GPP for PDSCH access on unlicensed spectrum. Moreover, the genericity of the design allows to use it under diverse frequency bands, assuming different channel bandwidths.

Following the terms of the ORCA open call EXT2, the proposed extension will be integrated both on the RFNoC framework for an X310 USRP platform and on Xillinx Zynq platform (ZC706) in combination with an AD FMCOMM radio front-end. These SDR HW platforms will be used from the w.iLab.t testbed, in order to demonstrate a high degree of platform independence. The extension will be also integrated within the FleX platform. This latter platform has been designed in CEA and it combines a Xilinx Zynq chip (7045) and an AD9361 RF front end.

Three phases are envisaged in this work: a specification phase where the SW/HW architecture is defined, a development phase dedicated to HW/SW design where the core parts are the real-time spectrum sensing module and the LBT controller, and eventually a test and integration phase where the IP performance will be assessed according to the spirit of 3GPP conformance testing.

A showcase of dynamic spectrum access in the 5GHz band will be built. The proposed testbed, which is part of the dissemination, has the ambition to demonstrate the ability of a device with LBT feature to offload the data plane on the 5GHz band in presence of WiFi devices.