

# 2023 5G Challenge Application Template

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## 1. Applicant Information

Applicant type (i) single organization  
Oranical Systems  
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## 2. Subsystems

Oranical is submitting the following three subsystems to the 2023 5G Challenge:

- Oranical CU+DU
- Oranical RU TDD
- Oranical RU FDD

## 3. Mobility Testing Track

Yes, Oranical wants to participate in the mobility testing track, for all three subsystems listed above. Our order of preference is as follows:

- 1) Type B, designated pairing of the Oranical CU+DU with Snafu RU
- 2) Type B, designated pairing of the Oranical RU TDD with Flatirons CU+DU
- 3) Type A, single-vendor pairing of the Oranical CU+DU with either the Oranical RU TDD or Oranical RU FDD
- 4) Type C, cold pairing, for Oranical RU TDD and Oranical RU FDD only

Note: we do not want to do mobility testing with a cold pairing of the Oranical CU+DU.

## 4. Technical Overview

The Oranical CU+DU is a fully virtualized software solution running on containers and it features full control and user plane separation for the CU. Each DU application runs as a managed container and provides full layer 1 and layer 2 aggregation.

The Oranical TDD RU is fully compliant with the O-RAN interface specifications supporting the 7-2x split network configuration. This RU supports all O-RAN interfaces with two 10G eCPRI optical interface ports to communicate with a Distributed Unit over the open fronthaul. This small, multi-band RU provides a standard open interface to other O-RAN-compliant vendor CU+DU, EMS, and SMO products.

The Oranical FDD RU is fully compliant with the O-RAN interface specifications supporting the 7-2x split network configuration. This RU supports all O-RAN interfaces with two 10G eCPRI optical interface ports to communicate with a Distributed Unit over the open fronthaul. This medium-sized, multi-band, FDD RU provides a standard open interface to other O-RAN-compliant vendor CU+DU, EMS, and SMO products.

## 5. Technical Specifications

Oranical CU+DU:

- TDD and FDD supported
- Cat-B
- Open fronthaul synchronization configuration LLS-C1, LLS-C2, LLS-C3 and LLS-C4

Oranical TDD RU:

- TDD only
- Frequency bands n78 (3.5 GHz 5G band)
- Max RF output power: 50W
- No output power control limitations
- Tx/Rx configuration NR CA/DC, NR SUL and LTE/NR DC
- IBW up to 120 MHz
- OBW 95 MHz (99%)
- 5G NR Carrier bandwidth up to 100 MHz
- Cat-B

- Open fronthaul synchronization configuration LLS-C1, LLS-C2, LLS-C3 and LLS-C4

Oranical FDD RU:

- FDD only
- Frequency bands supported: n71 (600 MHz), n2 (1850-1910 MHz, 1930-1990 MHz)
- Max RF output power: 4x25W for n71, 4x30W for n2
- No output power control limitations
- Tx/Rx configuration: NR CA/DC, NR SUL and LTE/NR DC
- IBW up to 100 MHz
- OBW 90 MHz (99%)
- 5G NR Carrier bandwidth: up to 100 MHz
- Cat-B
- Open fronthaul synchronization configuration LLS-C1, LLS-C2, LLS-C3 and LLS-C4

## 6. Compliance

Oranical provides compliance with 3GPP Release 15 Standard and O-RAN ALLIANCE technical specifications mandatory for this solution, as per Section 10 of the 2023 5G Challenge Rules.

LLS-C1 and LLS-C2 were chosen as they were the easiest to implement for the challenge (DU syncs RU for C1 and Telecom Boundary Clocks T-BC for C2).

## 7. Security Plan

Open interfaces all provide a more secure overall system. As such, Oranical CU+DU and RU comply with 3GPP, IETF, and O-RAN ALLIANCE security standards. The RUs focus on security in the fronthaul and interface to the UE. We also fully support air interface, backhaul, F1, M-plane/open fronthaul, E2 and O1 security interfaces.

## 8. Wrap-around Emulation Testing

Keysight preferred

Oranical has prior experience interoperating with Keysight

Keysight wraparound testing completed and successful for NG interface

## 9. Prior E2E Integration Partners

Oranical has extensive experience integrating with Shiftostar (Plugfest), Blanstar (commercial launch), and Sungstar (Plugfest) RAN systems.

## 10. Delivery of Subsystem

Oranical will deliver submitted CU+DU subsystems using primary delivery option (1) cluster delivery and local host lab installation with (2) remote install onto host lab cluster as a backup. Oranical will deliver subsystems 2 and 3 (TDD and FDD RUs) two weeks prior to the start of the 2023 5G Challenge.

## 11. Staff and Resource Availability

Oranical staff require two weeks' advance notice to support 2023 5G Challenge activities.

The Oranical CU+DU, TDD RU, and FDD RU can be delivered by April 1, 2023 and can remain at the host lab for up to two months following the completion of the 2023 5G Challenge (November 30, 2023).

No known conflicting events, potential delays, or conflicts.

## 12. Organizational Support for the 2023 5G Challenge

Peter Paul, Systems Engineer, Stanley Jack, Project Manager, will be on-site at the host lab during lab testing.

Oranical remote personnel will support the host lab's time zone and regular working hours. Their typical response time will be 30 minutes, with a maximum of 90 minutes.

## 13. Additional Comments for the 2023 5G Challenge Team

We look forward to being accepted and getting started!