MEMORANDUM OF UNDERSTANDING ON THE IMPLEMENTATION OF OPEN RAN BASED NETWORKS IN EUROPE

MEMORANDUM OF UNDERSTANDING BETWEEN THE SIGNATORIES COMMITTING THEMSELVES TO IMPLEMENTING OPEN RAN BASED NETWORKS IN EUROPE

The purpose of the Memorandum of Understanding is to provide a framework for a specific commitment to support the development of a non-fragmented global OPEN RAN (as defined in Annex II) ecosystem for deployment across the European network footprint of each of the signatories, and to start operation as soon as solutions become mature enough for a given targeted use case.

Deutsche Telekom AG, Orange S.A., Telefónica S.A., Vodafone Group Plc (the "Founding Members"), and any other signatories,

recognising:

- o that OPEN RAN will be a key technology for modern mobile networks and its success requires strong timely collaboration and support from both industry and policy makers in order to achieve early economies of scale.
- that usage of OPEN RAN technology will lead to a more competitive 5G environment enabling supplier diversification in Europe as per EU 5G Security Toolbox guidelines and more flexibility for industry to innovate and differentiate.
- o that promoting the development and recognition of OPEN RAN specifications and standards is necessary to accelerate the emergence and maturity of a single and consistent OPEN RAN ecosystem under common OPEN RAN architecture and requirements in order to enable a true multi-vendor environment in Europe.
- o that the development and implementation of OPEN RAN will have a positive impact on the European Telecommunication market with the transformation of existing vendors and the creation of new companies and start-ups towards a future-proof model.
- o that OPEN RAN technology is an opportunity to maintain and further develop the role of the European Telecommunication and the digital markets, while making European networks more resilient and flexible.
- o that all agreements taken in the subsequent Articles and all conduct of the signatories must be in compliance with anti-trust laws and regulations given in the countries of the signatories and in the European Union.

... agree to the following articles:

Article 1

The purpose of this MoU is to provide a framework for all the necessary measures by the signatories together to encourage the swift availability, commercial deployment and operation of OPEN RAN-based networks in accordance with the implementation phases defined in Annex I.

Article 2

The signatories individually commit that OPEN RAN will be the technology of choice for RAN.

The signatories commit to an early rollout of OPEN RAN technologies in individually relevant quantities to support the development of a healthy ecosystem.

The signatories will collaborate to support OPEN RAN reaching competitive parity with traditional RAN solutions as soon as possible.

Article 3. Scope of the Collaboration

The signatories agree to jointly work on the following OPEN RAN topics:

- 3.1 Support the continued development and recognition of OPEN RAN specification and standards through O-RAN Alliance and other standard setting organizations to enable a true multi-vendor environment.
- 3.2 Support standard setting organizations to resolve missing concepts and specifications in the area of management, orchestration and operation of OPEN RAN, as required, for example, to support the O-Cloud model.
- 3.3 Support the unification of the concept of OPEN RAN technology around the industry-approved O-RAN architecture to avoid ambiguity in the industry and to provide related guidance for rollout of OPEN RAN.
- 3.4 Encourage a competitive European OPEN RAN ecosystem of technology providers and System Integrators, thus strengthening the European RAN industry.
- 3.5 Promote to European policy makers and industry that adopting a competitive OPEN RAN ecosystem will place Europe and European industry at the front in the race of technological leadership.
- 3.6 Inform national authorities and Governments on the OPEN RAN ecosystem, benefits, progress and timelines (e.g. on standardization, R&D development) and seek Policy support.
- 3.7 Seek funding from European Governments; to support and develop the OPEN RAN ecosystem, early deployments, R&D activities and test labs, and European suppliers and startups.
- 3.8 Prioritize individually implementing OPEN RAN technology, as well as securing resources for lab testing and field trials.
- 3.9 Exchange testing best practices and lessons learnt after tests or deployments.

Article 4. Activities.

The following activities shall be secured by the signatories to realise the scope of this collaboration. For the avoidance of doubt, this MoU will not provide for cooperation on commercial levels or any other matter which may be regarded as unrelated, anti-competitive or more than is necessary to the purposes established in this MoU. The signatories will implement necessary compliance measures.

- 4.1 As part of industry efforts to achieve quicker time to market, and as set out in the timeline in Annex I, the signatories agree to deliver a "Technical Priority Document" within three (3) months of execution of this MoU, with a joint understanding of the priorities for OPEN RAN architecture and models, including non-commercial use cases, technical requirements, technologies, prioritized interfaces (non-proprietary), protocols and deployment scenarios.
- 4.2 The signatories shall prepare, within 6 months of the MoU coming into force, an Action Plan of additional activities necessary to support the continued development of OPEN RAN ecosystem and individual operational deployment of OPEN RAN. The signatories shall provide the necessary resources to support the Action Plan.
- 4.3 The signatories will actively support the O-RAN Alliance, prioritizing technical resources to enable all necessary O-RAN Alliance specifications to be established in a timely manner. The signatories shall also support other industry initiatives, such as the Telecom Infra Project (TIP), that contribute to the development of OPEN RAN and that aim to create a healthy and competitive OPEN RAN ecosystem and advance R&D efforts.
- 4.4 The signatories will seek political support from European Governments in terms of regulatory conditions and public funding to create a new and healthy OPEN RAN ecosystem across Europe, such as, funding for OPEN RAN ecosystem early deployments, R&D activities and test labs and European suppliers and start-ups.
- 4.5 The signatories agree to provide, within 6 months of the MoU coming into force, a joint "European Ecosystem Document" outlining proposals on how to set up a healthy European OPEN RAN ecosystem and to act as the basis for funding with national and European levels. This should by no means stop or delay ongoing individual efforts that help to accelerate the development of OPEN RAN technology, including a sustainable ecosystem and early deployment.

Article 5: Procurement Policies

- 5.1 The signatories are already individually promoting a strong competitive European industrial & manufacturing base for OPEN RAN. Competition shall continue to be encouraged in each of the OPEN RAN related components: O-RU, O-DU, O-CU, O-Cloud, RAN Intelligent Controller, Service Management and Orchestration, including related SW and HW and chipsets and system integration.
- 5.2 The signatories shall support the inclusion of common OPEN RAN architecture, requirements and specifications in their respective procurement processes for commercial deployment of OPEN RAN.

Article 6: Signatories

This MoU is open to be signed by any network operator with network operation at least in one European country.

Article 7: Governance

Meetings of the signatories shall be convened at regular intervals and with legal oversight under the following governance structure:

- 1 CTO Committee aims to drive strategic direction of the activities under the MOU and MoU implementation.
- 2 Policy Working Group aims to drive common policy related actions with governments and policy makers.
- 3 Technical Working Group aims to drive technology action plan with all industry players in order to achieve the objectives set by this MoU.

Article 8

The collective initiatives foreseen in this MoU do not preclude the signatories from pursuing their individual initiatives to extend the reach of OPEN RAN deployments as widely as possible in Europe and beyond.

Article 9

This MoU shall come into operation as soon as signed by the authorized representatives of the Founding Members. A new version of the MoU will be generated and come into operation whenever a new signatory joins.

Article 10

This MOU will commence on the "Effective Date" and will continue until 31st December 2024 ("Term"), when it shall terminate automatically without notice. This Term can be extended by mutual agreement of the signatories of this MoU.

Any signatory may withdraw from the MoU at any time for convenience with fourteen (14) business days prior written notice, without having to give any reasons for doing so or incurring any liability to any other signatory.

The terms of this MoU are not legally binding on or otherwise enforceable by or against the signatories.

Article 11

The signatories will carry out all activities pursuant to this MoU in accordance with competition law. In particular, the signatories do not intend to and will not:

- Define any OPEN RAN standards. Standardization will be subject to the established standard setting bodies such as the O-RAN Alliance.
- Exclude any entity from the participation in the development, implementation and promotion of OPEN RAN.
- Coordinate on network deployment or any commercial procurement terms for OPEN RAN equipment.

ANNEX I

NETWORK IMPLEMENTATION PHASES AND RELEASES

The signatories expect readiness and maturity of OPEN RAN for deployment in accordance with following definition of implementation phases. More detailed definition of phases, milestones and dates will be derived from the agreed activities listed in Article 4.

	Phase	Time Horizon
P0	Creation of the "Technical Priority Document"	Within three (3) months of execution of this MoU
P1	Readiness for Pre-Commercial PoC (related to release R1)	Now (ongoing)
P2	Readiness for Initial Commercial Deployment in limited areas or for specific use cases such as rural, indoor or highway coverage (R1 release)	From 2021
P3	Readiness for Network Wide Rollout (R1 release)	From 2022

DEFINITION OF RELEASES AND CONTENT

The following releases for O-RAN deployment and related contents are currently envisaged. A more detailed release plan will be derived from the agreed activities listed in Article 4.

	Release	Major Characteristics
R1	First Release – initial interoperability	1st level disaggregation approach: - Adoption of Open FH interface defined by O-RAN Alliance with full interoperability between O-RU and O-DU/O-CU; - Single vendor O-CU/O-DU - Proprietary cloud (no compliance with O-Cloud specs)
R2	Second Release – interoperability with open FH interface & HW/SW separation	Open FH interface as defined in O-RAN Alliance (multivendor, full interoperability) & virtualized O-DU, O-CU using O-Cloud infrastructure
R3	Third Release – full intelligence and automation	RIC based operation as defined in O-RAN Alliance, more open interfaces, open APIs

ANNEX II

DEFINITIONS

The MoU distinguishes the terms OPEN RAN and O-RAN. OPEN RAN is understood as a more general term which denotes a disaggregated RAN, which is subdivided into several independent systems by using open and interoperable protocols and interfaces. Whereas O-RAN refers to the OPEN RAN architecture defined by the O-RAN Alliance. O-RAN is regarded as an important subset of OPEN RAN, and OPEN RAN related agreements should build on O-RAN specifications.

O-Clouds are important constituents of an O-RAN architecture and regarded to be a specific type of Cloud Systems specially designed for O-RAN purposes. They are distinct from Edge-Clouds. Still Edge-Cloud and O-Clouds may sometimes have similar characteristics. Edge-Clouds are outside the scope of this MoU.

signatories:	
For	
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	Dr. Abdurazak Mudesir
	SVP, Services and Platforms
For	
Orange S.A.	
	Michaël Trabbia
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	Attorney at Law
For	
Vodafone Group Plc	
	Johan Wibergh
	Group CTO

This Memorandum of Understanding was signed on 18th of January, 2021 by the following