Japan TIC

SoftBank docomo NTT YRP R&D Promotion Committee Yokosuka Research Park KDDI Tomorrow, Together Rakuten Mobile

Picture provided by： Yokosuka Telecom Research Park, Inc.

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Japan ⊛TIC

<u>Japan OTIC opens in Yokosuka City as a testing</u>

<u>and certification center for O-RAN solutions</u>

<u>- The world's first centre jointly hosted by multiple mobile network operators - NTT DOCOMO, KDDI, SoftBank and Rakuten Mobile -</u>

- On December 20, 2022 (Tuesday), YRP R&D Promotion Committee, NTT DOCOMO, INC., KDDI CORPORATION, SoftBank Corp. and Rakuten Mobile, Inc. established Japan OTIC at Yokosuka Research Park (Yokosuka City, Kanagawa Prefecture) for testing and certification based on the international standards ensuring interoperability of O-RAN solutions stipulated by the O-RAN ALLIANCE.

- OTICs were established in Europe, North America and Asia by a single host. Japan OTIC is the world's first OTIC jointly established and operated by multiple mobile network operators.

The 5G Era and O-RAN ALLIANCE

- As global mobile communications enter the 5G era, there is a demand for more open, more reliable, and safer network infrastructure (Note 1)

- An international organization established in 2018 by NTT DOCOMO and other mobile network operators around the world with the aim of enhancing the functionality of base stations by flexibly combining equipment from multiple manufacturers, the O-RAN ALLIANCE is conducting activities such as establishing specifications for interoperable interfaces for radio access networks (Note 2).
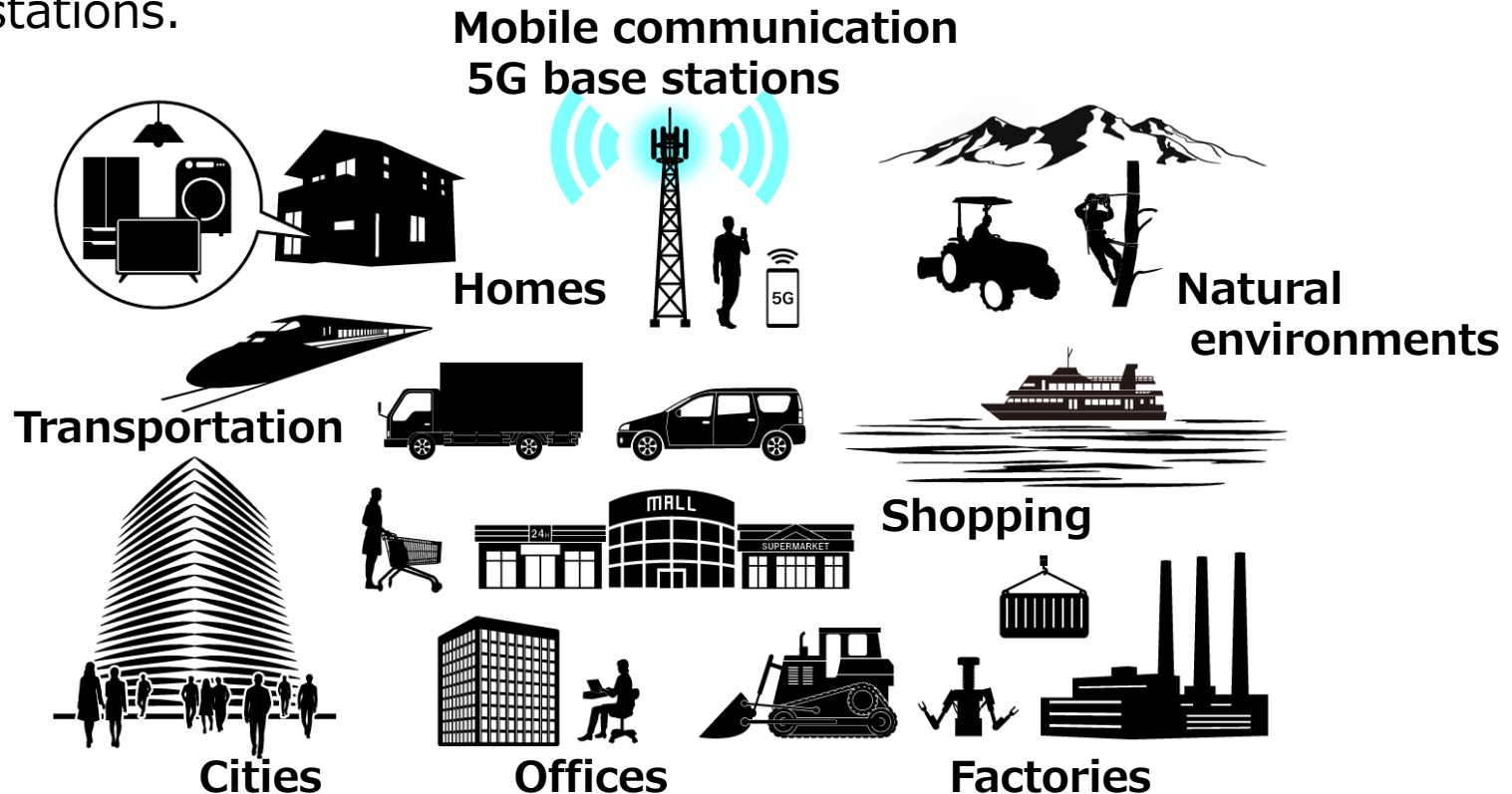
OTIC and Japan OTIC

- OTIC (Open Testing & Integration Centres) is an organization that tests and certifies various equipment based on the specifications published by the O-RAN ALLIANCE (O-RAN specifications). Japan OTIC was established in Japan, following on from establishment of OTICs in Europe, North America and Asia (Note 3).

- Japan OTIC is established and operated jointly by the YRP R&D Promotion Committee as the main representative and the four mobile network operators. This is the world's first OTIC jointly established and operated by multiple mobile network operators in a single country, and the domestic operators are committed to working together to promote openness in testing and verification (Note 4 and Note 5).

The Activities and Effects of Japan OTIC

- Utilizing the experience of the mobile network operators, Japan OTIC provides an independent environment based on O-RAN requirements to test and certify base station equipment (Note 6 and Note 7).

- Japan OTIC's activities will advance the open, revitalized and diversified supply chain of Japan's information and telecommunications industry and its overseas deployment, thereby contributing to the realization of a more open, more reliable, and more secure 5G mobile communication society in Japan and globally (Note 8).

- In establishing and operating Japan OTIC, knowledge from research and development and surveys* conducted by the Ministry of Internal Affairs and Communications is utilized.

  *FY2022 Technical Examination Service Concerning Frequency Crowding: "Technical study for improving interoperability of multi-vendor base stations using open standards", and others.

- The use of 5G mobile communications is expected to expand from person-to-person communication across borders to transportation, homes, shopping, offices and factories, as well as natural environments and cities.

- For this reason, there is a need for more open and more reliable networks and the infrastructure that support them, including more base stations.

Mobile communication 5G base stations

Homes

Natural environments

Transportation

Shopping

Cities

Offices

Factories

NOTE② O-RAN ALLIANCE

- The O-RAN ALLIANCE was established in 2018 in Bonn, Germany, with the aim of building next-generation open and advanced wireless access networks including 5G. AT&T, China Mobile, Deutsche Telekom, NTT DOCOMO and Orange are the five founding members of the O-RAN ALLIANCE.

- At present, 32* mobile network operators and 304* vendors and others around the world participate and contribute to develop interoperable specifications for the open, virtualized, and intelligent radio access networks.
  *Published on the O-RAN ALLIANCE website (as of December 20, 2022)

Website
https://www.o-ran.org

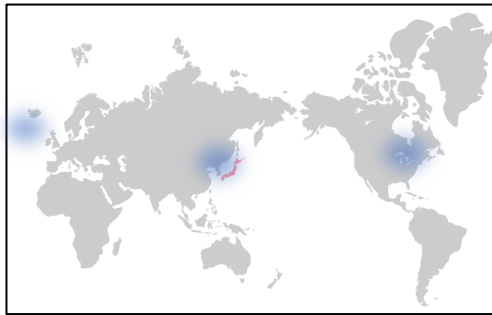# NOTE③ OTICs in the World (Open Testing & Integration Centres)

Europe
- European OTIC in Berlin（Deutsche Telekom AG）
- European OTIC in Torino（Telecom Italia S.p.A.）
- European OTIC in Madrid（Telefonica S.A.）
- European OTIC in Paris（Orange SA）

North America
- Kyrio O-RAN Test and Integration Lab（Cable Labs）
- North American OTIC in NYC Metro Area/East (COSMOS) (Rutgers University/WINLAB, AT&T)

Asia
- Auray OTIC and Security Lab（Auray Technology Corp.）
- Asia & Pacific OTIC in PRC（ZhongGuanCun Academy of Mobile Communication Innovation）
- Japan OTIC（YRP R&D Promotion Committee, NTT DOCOMO, KDDI, SoftBank, Rakuten Mobile）

OTIC in the world

NOTE④ Yokosuka Research Park(YRP) and YRP R&D Promotion Committee

- Japan OTIC in Japan was established at Yokosuka Research Park (YRP) with the YRP R&D Promotion Committee as its representative director.

- Yokosuka Research Park (YRP) is a research and development area in the field of communications that was established in October 1997 in Yokosuka City, Kanagawa Prefecture, with a total area of approximately 58.8 hectares. The area is home to many leading research institutes in the field of information and communications in Japan and overseas, including Nippon Telegraph and Telephone Corporation, NTT DOCOMO, the National Institute of Information and Communications Technology, as a place for demonstration experiments of next-generation communication technologies that use radio waves, taking advantage of the topography, which minimizes the risk of experimental radio waves leaking out of the area.

- The YRP R&D Promotion Committee, which became a general incorporated association in December 2020, promotes cooperation and joint research among information and communications-related companies and research institutes concentrated in the Yokosuka Research Park (YRP), and it is responsible for forming a base for research and development, leading comprehensive policies, and developing infrastructure in the field of information and communications.

YRP R&D Promotion Committee
Yokosuka Research Park

- Japan OTIC is jointly established and operated by the YRP R&D Promotion Committee as the main representative of the following four mobile network operators.

Representative Member:	YRP R&D Promotion Committee
Members:	NTT DOCOMO, INC.
	KDDI CORPORATION
	SoftBank Corp.
	Rakuten Mobile, Inc.

【The Purpose of Japan OTIC】
The purpose of Japan OTIC is to contribute to upgrade specifications established by O-RAN (Hereafter referred to as "O-RAN specifications") which leads to open, intelligent, virtualized, and highly secure radio access networks (Hereafter referred to as "RAN") used in telecommunications business, and others. It is also to demonstrate new technologies, support vendors and others, and promote their implementation regarding O-RAN specifications.

NOTE⑤ Establishment and Operating Organization of Japan OTIC (2)

【Board of Directors: A body that deliberates and decides on matters necessary for the operation of Japan OTIC 】

Representative Director & Chairman
　　WATANABE Katsuya,　President, of YRP R&D Promotion Committee

Directors
　　TANI Naoki,　Executive Vice President Chief Technology Officer, Executive and General Manager of R&D Innovation Division, of NTT DOCOMO, INC.

　　YOSHIMURA Kazuyuki,　Member of the Board, Chief Technology Officer Senior Managing Executive Officer, Director, of KDDI CORPORATION

　　TSUKUDA Hideyuki,　Executive Vice President & CTO, of SoftBank　Corp.

　　UCHIDA Nobuyuki,　Executive officer, of Rakuten Mobile, Inc.

【**Japan OTIC Representative Director**】

WATANABE Katsuya, President, of YRP R&D Promotion Committee

【**Division of duties in Japan OTIC operation**】

Duties	Responsible Organization Operators
Common Administrative and other Businesses Duties	YRP R&D Promotion Committee
Testing and other Businesses Duties	NTT DOCOMO, INC., KDDI CORPORATION, SoftBank Corp., Rakuten Mobile, Inc.

NOTE⑥ Activities of Japan OTIC (1)

- Japan OTIC provides an independent and open interconnectivity verification environment to test and certify hardware including base station equipment based on the O-RAN specifications.

- This will contribute to the dissemination of O-RAN specifications and the promotion of openness in testing and verification.

Activities of Japan OTIC

- Independent and open position
- Provision of an interconnectivity verification environment based on O-RAN specifications
- Testing hardware equipment such as base stations
  - Conformance test
  - Interoperability test
  - End-to-End test
- Certification of compliance with O-RAN specifications
- Support for testing and certification
- Dissemination of O-RAN specifications and promotion of openness
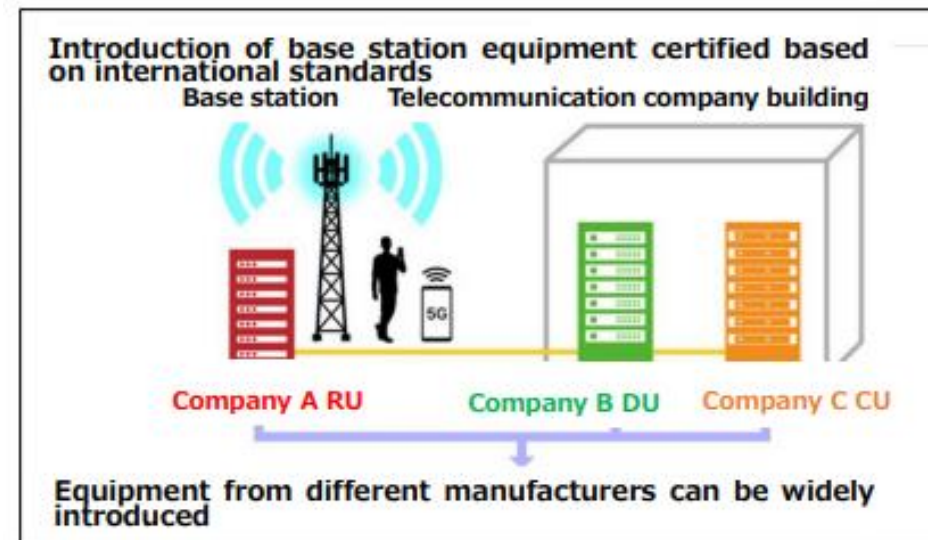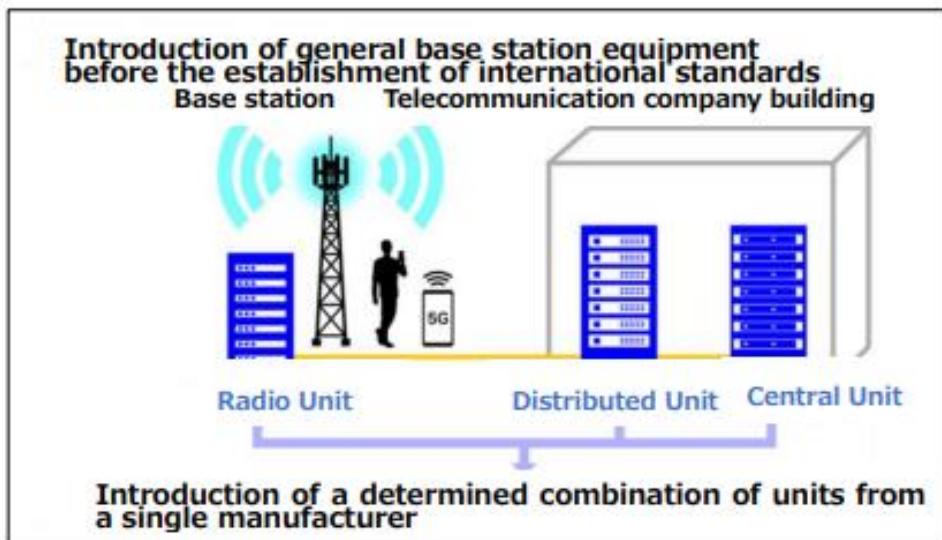
Laboratories and Equipment

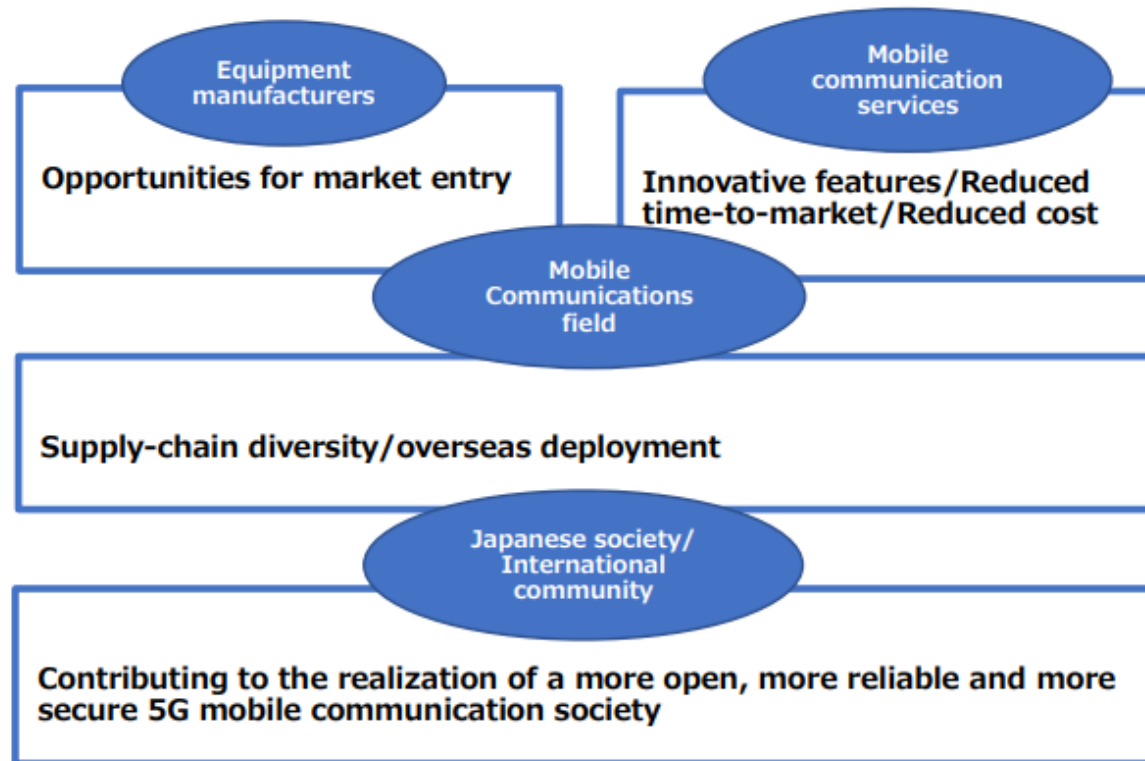# NOTE⑦ Effects of Certification Based on International Standards

- Before the establishment of international interoperable standards, base station equipment typically had a manufacturer-specific internal structure, and it was common to introduce a combination of equipment determined by a single manufacturer.

- Through interoperable interface specifications and certification to connect equipment from different manufacturers, it has become possible to widely introduce equipment from multiple manufacturers into base stations.

Introduction of general base station equipment before the establishment of international standards
Base station   Telecommunication company building

Radio Unit   Distributed Unit   Central Unit

Introduction of a determined combination of units from a single manufacturer

Introduction of base station equipment certified based on international standards
Base station   Telecommunication company building

Company A RU   Company B DU   Company C CU

Equipment from different manufacturers can be widely introduced

- Japan OTIC's activities will advance the open, revitalized and diversified supply chain of Japan's information and telecommunications industry and its overseas deployment, thereby contributing to the realization of a more open, more reliable, and more secure 5G mobile communication society in Japan and globally.

Equipment manufacturers

Mobile communication services

Opportunities for market entry

Innovative features/Reduced time-to-market/Reduced cost

Mobile Communications field

Supply-chain diversity/overseas deployment

Japanese society/ International community

Contributing to the realization of a more open, more reliable and more secure 5G mobile communication society

Testing services offered to clients (1) Japan ⊜TIC

- Japan OTIC plans to offer extensive and comprehensive testing services in a laboratory environment to our clients.

- Japan OTIC provides subsystem, interoperability and system testing in laboratory environment, and also O-RAN conformance certification, interoperability badging testing based on O-RAN tests specifications.
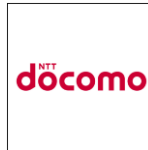
- Japan OTIC hosts O-RAN PlugFest.

- Testing services ----- O-RAN certification, O-RAN IOT Badging, O-RAN E2E Badging

- PlugFest willingness ----- Conformance Testing, IOT Testing, E2E System Testing in Lab

- Anechoic chamber ----- No (Anechoic shield box instead)

- RF shielded chamber/room ----- No (Shield box instead)

- Frequency band(s) and duplex mode(s) ----- NR FR1 TDD, NR FR2 TDD, LTE FDD

- Cell types ----- Indoor small cell, Outdoor small cell, Outdoor macro cell

- Architectures ----- NR SA (Option 2), NR NSA (Option 3x), LTE

- At the time of opening, we plan to conduct Fronthaul-related Certification/Badging and xHaul evaluations, and possible E2E tests.

Testing Service	Remarks
O-RU certification	Yes: Can cover mandatory test case current setup
O-DU certification	Partially Yes: Upgradation is ongoing at the moment
Fronthaul IOT	Partially Yes: Upgradation is ongoing at the moment
E2E (with multi vendors O-RU and O-DU)	Partially Yes: Upgradation is ongoing at the moment

O-RAN PlugFest Fall 2022 in Japan (1)

- PlugFest Fall 2022 in Japan was conducted by 13 interested participants nominated through O-RAN ALLIANCE

- 4 hosts carried out tests: NTT DOCOMO, Rakuten Mobile, KDDI, SoftBank

- 2 hosts acted as coordinators: YRP and YRPC

- Scope of PlugFest

Scope
a) SLA assurance PoC with RIC
b) Test verification and validation using O-RAN specifications
c) Verification on multi-vender vRAN

- Location of PlugFest venue: Multiple sites in large Metropolitan area

- **Collaboration of Hosts and Participants***
  （* Not all.）

Company	KDDI	Rakuten Mobile	NTT DOCOMO	SoftBank
ComWorth Co.,Ltd.		✓		
Keysight Technologies		✓	✓	
Anritsu Corporation		✓		
DZS Inc.		✓		
NEC		✓		
VIAVI Solutions		✓	✓	
KYOCERA Corporation				✓