Fujitsu
O-RAN Integration

Fujitsu Limited

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MITC
(Mobile Integration & Testing Center)

Issues for O-RAN market expansion

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O-RAN market is coming, more multi-vendor interoperability is needed

- The limited vendors are locked in the market with proprietary specifications
- The multi-vendor verification and certification schemes are not established

Issues of MNO

Multi-vendor operation assurance

Issues of vendors

verification as a system

A multi-vendor verification lab is required for system operation

Mobile Integration and Testing Center (MITC)

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Mission

- Interoperability of O-RAN profiles and vRAN operations
- Encourage operators to break out of vendor lock-in and develop the market

Goals

- O-RAN verification, certification and interoperability to blueprint configuration
- 5G maintenance support lab with mirror configurations of supported customers
- Customer demonstrations

Concept and features of MITC

Interoperability test in Basic System Configuration

- End to End system confirmation by real devices and simulators
- Verification of the ORAN specification operation with the original fronthaul analyzer
- Parameter test (Fronthaul Profile, frequency support, etc.)

Improving quality from a system perspective

- Optimizing profile and parameters for operations
- System quality analysis and improvement proposals with various system tests
- Pre-verification with systems nearly commercial configurations

Verification of integration with vendor products

- Interoperability test with existing reference equipment
- Reduce lead time to product deployment
- Comparison and verification of vendor specifications and performance

Fujitsu Network Communications, Inc.

Texas, USA
- Development.
- Services
- Manufacturing
etc

secure and independent test facility

Automate testing

lab facilities for multi vendors

Test Summary (E2E evaluation test)

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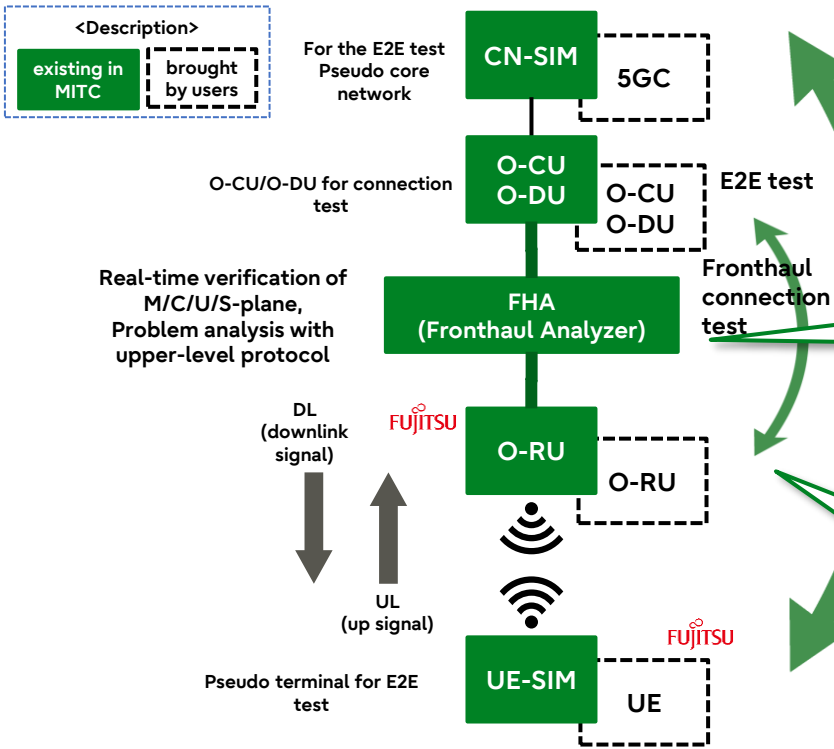
- **O-RAN pre-integrated system can be evaluated E2E operation in MITC**



Outstanding feature 1

MITC can perform the high traffic system test by using simulators (These test items can evaluate various traffic model such as packet division, sequence switching, and burst traffic etc.)

Outstanding feature 2

FHA is used to verify and analyze the performance of the O-RAN specification at the same time as connection test to improve the system quality.

Outstanding feature 3

Usually, it's difficult for product vendors to disclose their specifications related to performance and functions. Fujitsu can point out the improvement points by analyzing the captured log based of Fujitsu experiences(Perform the system test with multi-vendor for commercial network in Japan).

Test Summary (Unit evaluation test)

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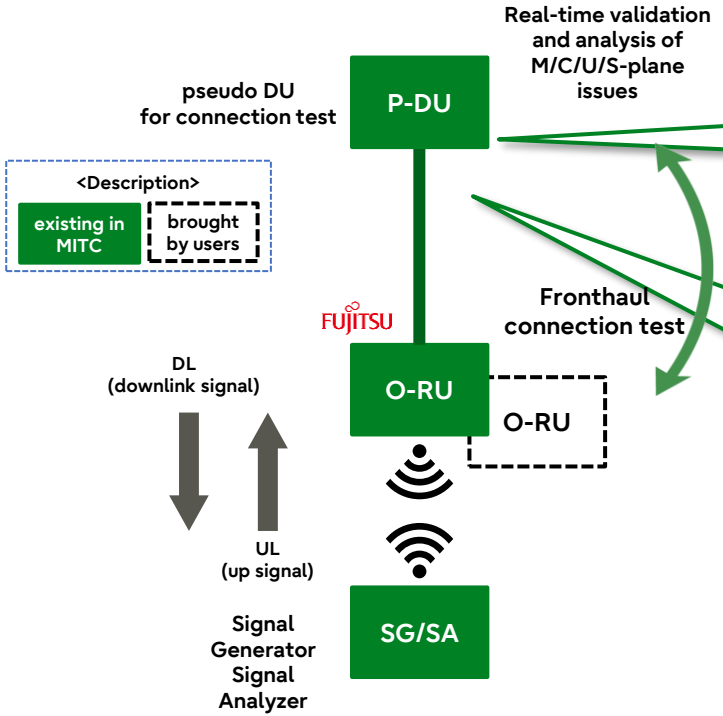
- **The fronthaul connection test with O-RU can be performed in terms of functional features**



Outstanding feature 1

In addition to the basic conformance test, MITC can perform higher quality test by loading abnormal conditions and signals

Outstanding feature 2

The fronthaul connection test can be verified the O-RAN standard by analyzing the log.

Fujitsu and NEC to develop technologies for interoperability testing between 5G base station equipment in laboratories in the U.S. and the U.K.

- Contributing to the stimulation and growth of the open 5G market through NEDO -

Technologies for 5G interoperability testing

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Summary

- Fujitsu Limited and NEC Corporation are developing technologies for interoperability testing between 5G base station equipment conforming to O-RAN specifications at Fujitsu's U.S. laboratories and NEC's U.K. laboratories. This initiative is implemented as part of the “Research and Development Project of the Enhanced Infrastructures for Post-5G Information and Communication Systems” under the New Energy and Industrial Technology Development Organization (NEDO) of Japan. In August 2021, the two companies established a verification environment using these technologies at their respective laboratories, and started interoperability testing. Leveraging this verification environment offers the potential to significantly streamline interoperability verification between base station equipment from different vendors.
- Through this initiative, Fujitsu, NEC, and NEDO will accelerate the global reach of base station equipment that conforms to O-RAN specifications and contribute to stimulating growth and innovation in the open 5G market.

Technologies for 5G interoperability testing

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Characteristics

1) Significantly improve the efficiency of interoperability verification

- Fujitsu and NEC combined their many years of experience and know-how in developing base station equipment compliant with O-RAN fronthaul interface specifications. The two companies developed technologies to verify the interoperability of various vendors' equipment for O-RAN fronthaul. The technologies include FHA, P-DU, test scenario extraction tools, test parameter change tools, and validation result determination tools. Introducing these technologies into the verification environments of both companies' laboratories, will make it possible to significantly improve the efficiency of interoperability verification for different vendors' equipment.

2) Verification under conditions close to commercial environments

- In this project, Fujitsu's lab in the U.S. and NEC's lab in the U.K. have made it possible to implement a Conformance Test System that can perform standard tests in accordance with O-RAN specifications and to implement an End-to-End (E2E) Test System that can verify the connection from the core network to the terminal. In addition, by incorporating the newly developed technologies into the interoperability test systems, it will be possible to efficiently conduct system-wide normality verification and performance verification under conditions that are close to the commercial environments of each country and business.

Technologies for 5G interoperability testing

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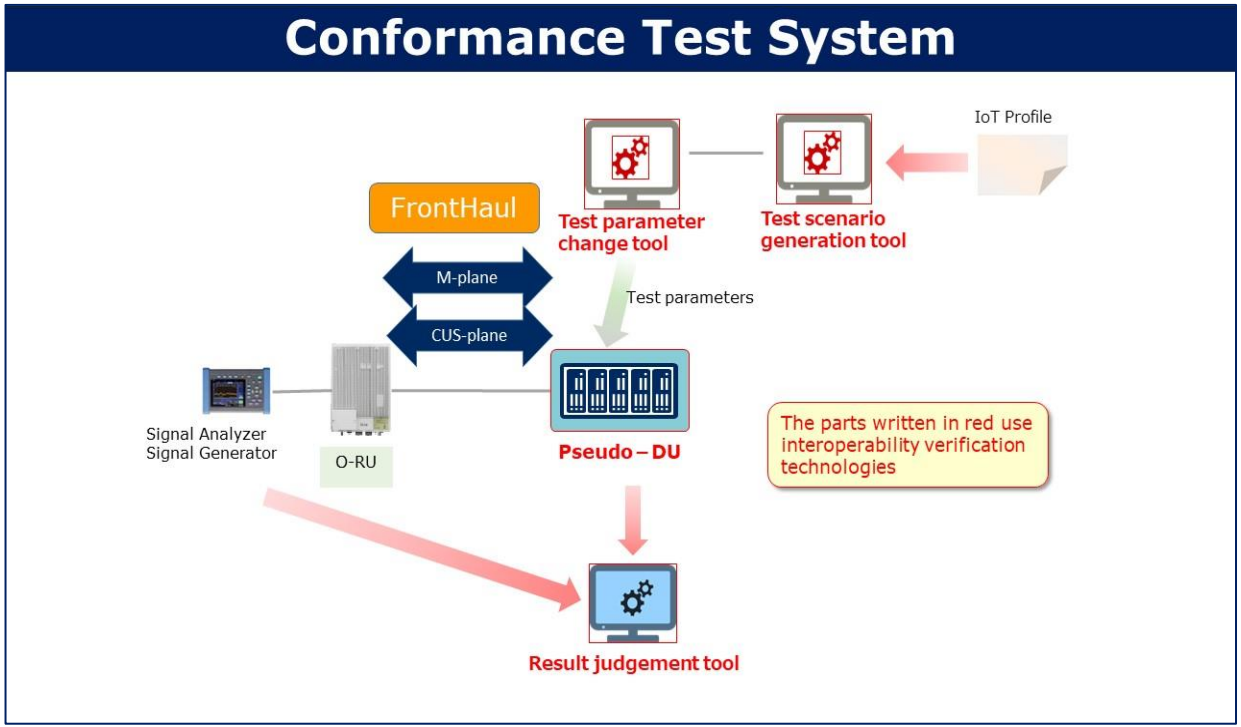
- **Conformance Test System incorporating interoperability verification technologies**



Technologies for 5G interoperability testing

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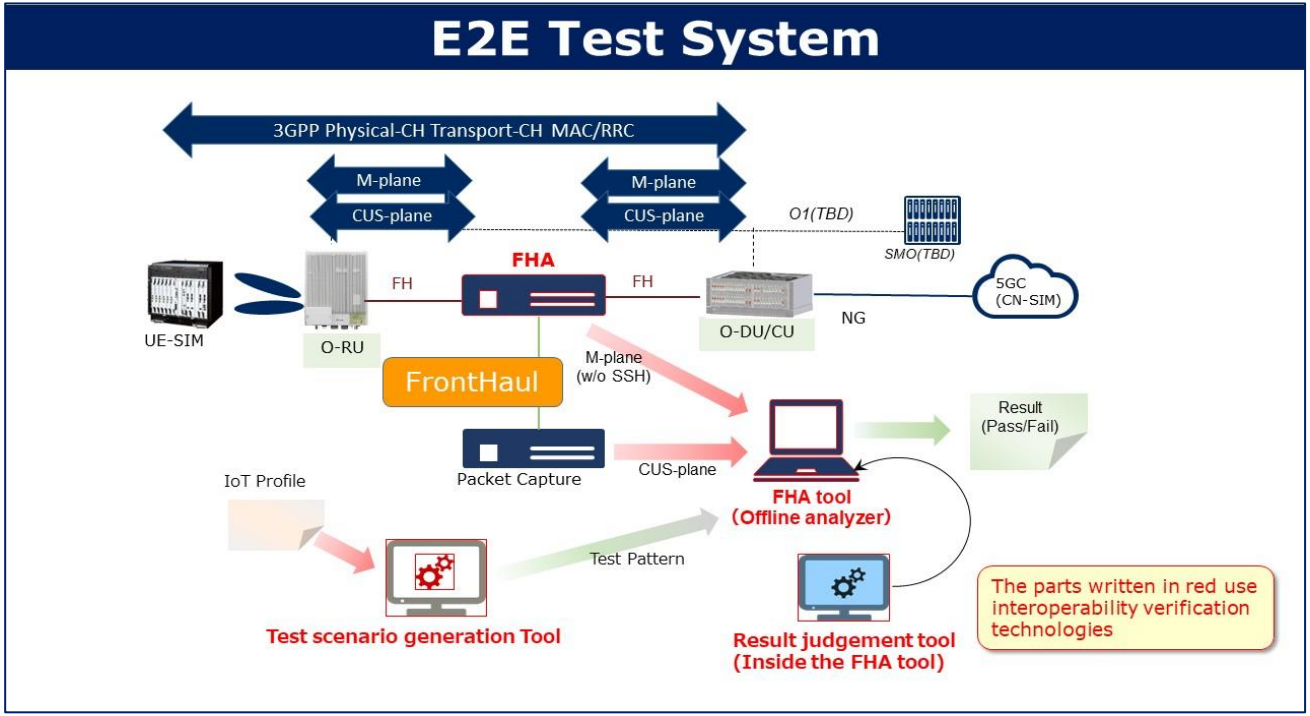
- **E2E Test System incorporating interoperability verification technologies**



Technologies for 5G interoperability testing

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- **Future plans**
  - In August 2021, Fujitsu and NEC began testing interoperability by setting up verification environments using new technologies in their respective laboratories. The two companies will collaborate with carriers, equipment vendors, and governments in various countries and regions, aiming to significantly reduce the time required to conduct interoperability testing for base station equipment. The companies will also work with NEDO to support the global adoption and development of equipment that conforms to O-RAN specifications through this project, thereby contributing to the stimulation and growth of the open 5G market.

Visit Hall 2, stand 2F10 for NEC Corporation details

Thank you