Open RAN Showcase

FUJITSU

shaping tomorrow with you

Fujitsu Network Communications
Expertise that Drives Network Digital Transformation

July14, 2021

Agenda
- Fujitsu Introduction
- O-RAN Product and Service Overview

FUJITSU

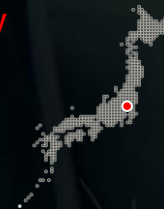## Using the Power of Technology to Shape the Future of Business and Society

Our purpose is to make the world more sustainable by building trust in society through innovation.

| Established in 1935 | Global Revenue $35B |

Included in the **Dow Jones Sustainability World Index (DJSI World)** and the world's leading **Socially Responsible Investment (SRI) Index**

21 times

Corporate Headquarters

Tokyo, Japan

Fujitsu Network Communications

Network Expertise for Digital Transformation

We Help Network Owners Break through Their Status Quo to Achieve Higher Performance

Wireless

Optical

Software

Services

40 Years in North America's Critical Network Infrastructure

Fujitsu Wireless History

Over 500K RRHs & 50K BBUs Shipped since 2014!

1995
Began supplying
RAN infrastructure

2004
First world shipment
of Fujitsu RRH

2014
Fujitsu begins
supplying dual and
triple band RUs

2019
World's first
commercial
O-RAN compliant
5G deployment

2020
O-RAN Trials
in Europe

2021
First O-RAN
compliant radios
delivered to
N. America

25 years of wireless expertise ● O-RAN commitment and leadership

Fujitsu's 5G Ecosystem Overview

Open 5G Infrastructure

Integrated 5G Infrastructure

Private 5G

Solution ecosystem, based on open technology, for public and private 5G use cases
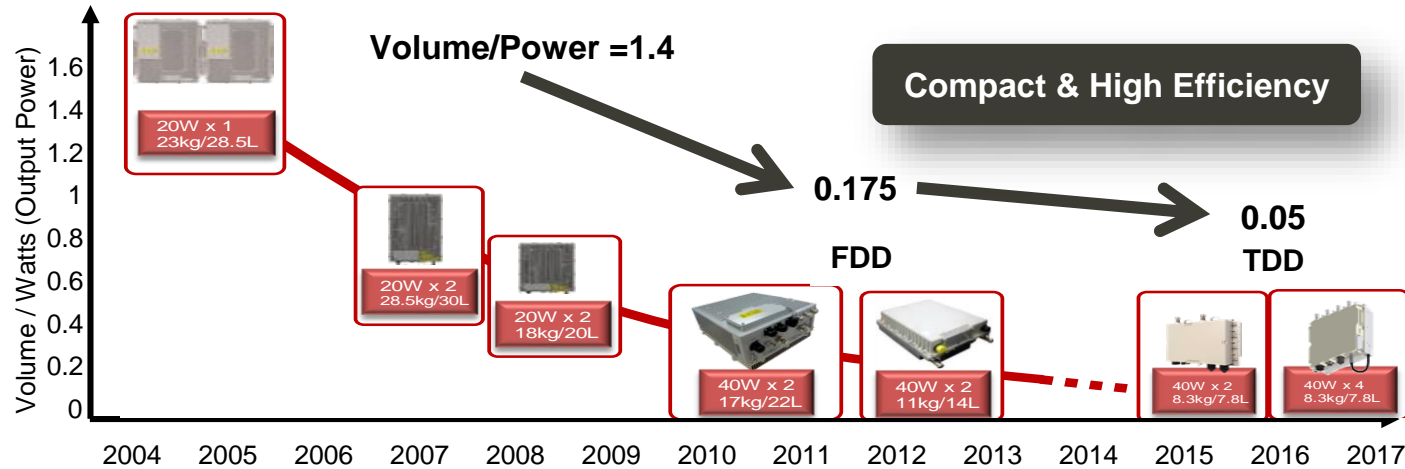
5G NR

5G Transport

Solution Integration and Maintenance

Network Modernization

O-RAN Compliant 5G NR

Compact, High Efficiency Radios with Proven High Reliability

Volume/Power = 1.4

Compact & High Efficiency

0.175

FDD

0.05

TDD

Volume / Watts (Output Power)

20W x 1
23kg/28.5L

20W x 2
28.5kg/30L

20W x 2
18kg/20L

40W x 2
17kg/22L

40W x 2
11kg/14L

40W x 2
8.3kg/7.8L

40W x 4
8.3kg/7.8L

2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

One Box Solution

Wide-band

(40+40)MHz → One box

Multi-band

Band28
Band18
Band1

Dual Band

Triple Band

Multi-sector

Sec3
Sec2
Sec1

Triple-Sector

EXTREMELY HIGH RELIABILITY

>25 YEAR MTBF

FAILURE RATE
73%
LOWER THAN INDUSTRY AVERAGE

Dual-band and Tri-band 5G O-RAN RU

	Dual-Band Macro RU	Tri-Band Macro RU
Frequency Bands	n70 + n60	n71 + n29 + n26
Configuration	4 TRx	4 TRx
Output Power	80W x4	30 +40 +10 = 80W x4
IBW	n70: 25 MHz n66: 90 MHz	n71: 35 MHz n29 11 MHz n26: 7 MHz
Dimensions	400x380x200 mm	400x380x230 mm
Weight	29 Kg	34 Kg
Cooling	Passive	Passive
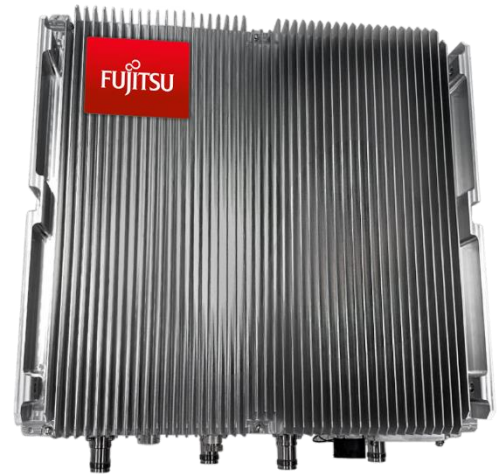
Generally Available 5G O-RAN Radios
Deployed Internationally

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Radio	Antenna Configuration	Antenna Gain	IBW
n77 Small Cell RU	4TRx	49 dBm EIRP	100 MHz
n77 Macro RU	4 TRx		100 MHz
n77 Macro AIR	8 TRx	69 dBm EIRP	100 MHz
n79 Small Cell RU	4TRx	51 dBm EIRP	100 MHz
N79 Macro RU	4 TRX		100 MHz
n79 Macro AIR	8 TRx	71 dBM EIRP	100 MHz
n257 Small Cell RU	2 TRx	42 dBm EIRP	40 MHz

5G Transport

- Fronthaul Solutions

flexiHaul xHaul Portfolio Summary

flexihaul 8000 Series

- First Gen Fronthaul technology
- C/DWDM circuit-based solution
- Backhaul / Shorthaul / Fronthaul
- Globally deployed
- Supports Pt to Pt and ring based topologies

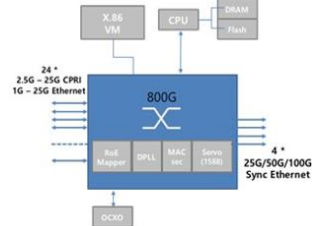
HSN8500 - Large Scale Chassis

HSN8300 - Mid Scale Chassis

HSN8100 - Small Scale Chassis

M6424 Ethernet FH

- 800G non-blocking / compact / hardened platform
- ROE CPRI (2,3,5,7,8,10) & eCPRI
- IPv4v6, EVPN, SR-MPLS
- IEEE 1914.3 ROE, 802.1CM TSN
- NETCONF/YANG, gRPC & SNMP

Smart Tunable SFP+

- Integrated with ORAN Radios + M6424
- 10G/25G options
- Fully integrated solution
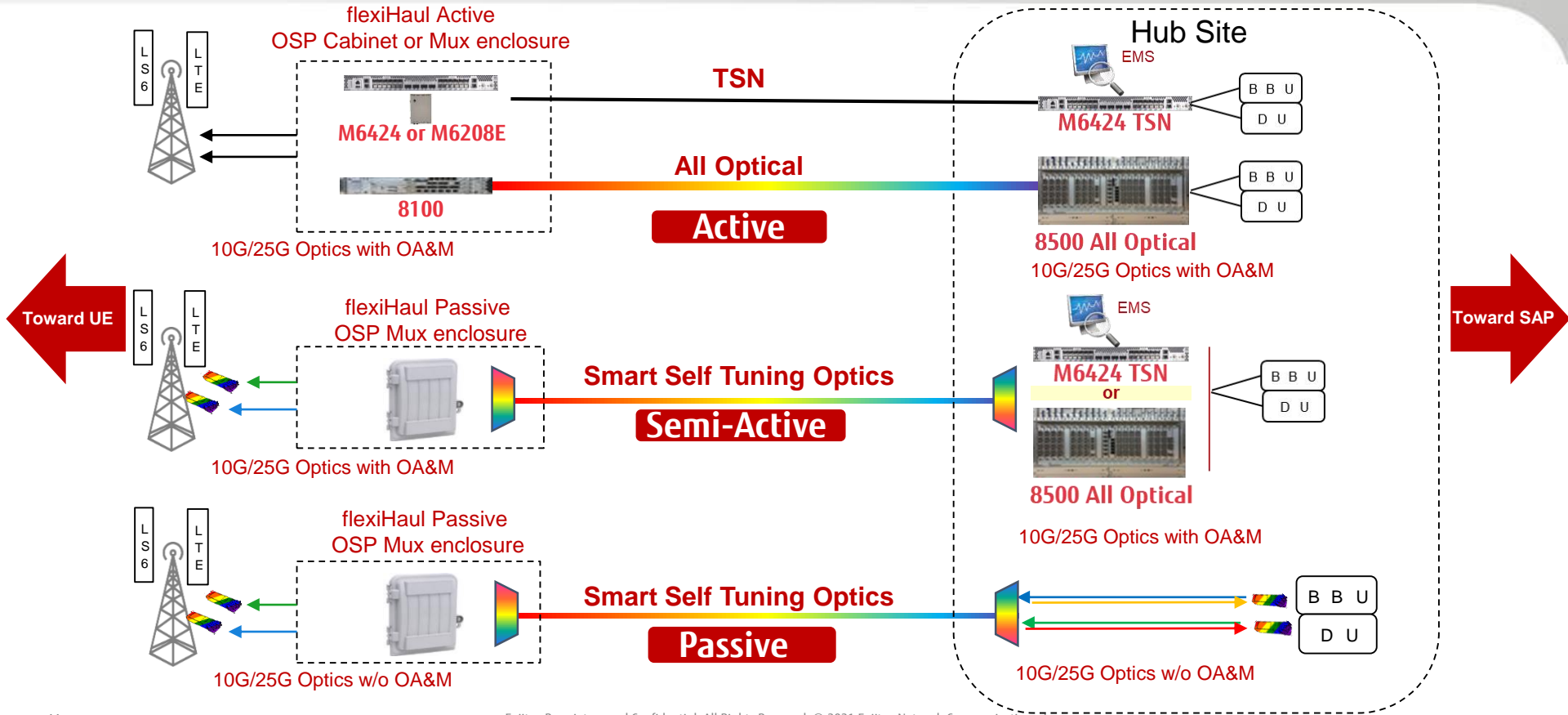- Self tuning with full management visibility

OSP Semi-Active

- Small footprint / passive
- Site flexibility / low costs
- Optimizes fibre assets (single fibre)
- Design options, inc. daisy chaining
- 10G/25G with service isolation
- Expandable to additional channels

Full optical and TSN portfolio meets any deployment

flexiHaul Fronthaul Use Cases

flexiHaul Active
OSP Cabinet or Mux enclosure

Hub Site

EMS

TSN

LS6 LTE

M6424 or M6208E

M6424 TSN

B B U

D U

All Optical

8100

Active

8500 All Optical

10G/25G Optics with OA&M

B B U

D U

10G/25G Optics with OA&M

Toward UE

flexiHaul Passive
OSP Mux enclosure

EMS

LS6 LTE

Smart Self Tuning Optics

Semi-Active

M6424 TSN

or

8500 All Optical

B B U

D U

Toward SAP

10G/25G Optics with OA&M

10G/25G Optics with OA&M

flexiHaul Passive
OSP Mux enclosure

LS6 LTE

Smart Self Tuning Optics

Passive

B B U

D U

10G/25G Optics w/o OA&M

10G/25G Optics w/o OA&M

5G Lifecycle Services

Network Services Menu
Multi-Vendor Services with Capabilities in 65+ OEM Systems

FUJITSU

Advisory Services

- SDN/NFV Consulting
- Edge Computing Consulting
- Network Resiliency

- OSS Strategy & Evolution
- Operations Assessments
- Cyber Security Assessments

Value Added Managed Services

- White Labeled Managed Network Services
- Managed Cyber Security
- SD-WANaaS
- SD-BranchaaS
- Fiber Assurance

Design | Build

- Multi-vendor Solution Architecture
- Master Network Integrator
- Wireless Solutions
- Inside Plant Design & Engineering

- Outside Plant Design & Engineering (TrueNet)
- Fiber Testing Suite
- Secure Supply Chain
- Edge to Core Enclosures
- ISP Installation, Test & Turn-up
- Program Management

Operate & Maintain

- Maintenance and Support
- Managed Network Services
- Software Upgrades
- Provisioning

- Certified Pre-Owned Equipment
- Asset Recovery Service
- Network Health Check-Ups
- QA / QC

Transform

- Network Modernization
- IPv4 to IPv6

Offers

- Private Broadband & 5G Networks
- Fronthaul & Backhaul Networks
- Utility Networks
- Transportation Networks

- Turnkey Solutions
- Turnkey Small Cell Deployment Services
- Systems Integration & MicroApplications

Service Providers

Local / State Governments

Utilities

Transportation

Research & Education

Public Safety

Highlighted Services

Network Modernization

Design | Build Services

Solution Integration and Maintenance

Operate and Maintain Services

Fujitsu Network Communications, Inc.

Richardson, TX
- Development.
- Services
- Manufacturing

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 w/ mirror configurations of supported customers
- Customer demonstrations

Secure and independent test facility

Automate testing

Lab facilities for multi vendors

Conclusion

Why Fujitsu?

"Fujitsu is a global leader in 5G radios, advocating for and advancing alternatives to the traditional hardware-based RAN. Their products and expertise are extremely valuable as we use O-RAN architecture to build our entire 5G network."

- Marc Rouanne, DISH Executive Vice President and Chief Network Officer

dish

"The deployment of O-RAN-compliant products will enable DOCOMO to flexibly build networks and provide 5G services that meet customer needs. Carrier aggregation furthering 5G high-speed data communication in a multi-vendor RAN developed jointly with Fujitsu and NEC is an important achievement. DOCOMO will continue to work with industry partners to promote open RAN and 5G services."

-Naoki Tani, Senior Vice President

NTT docomo

1.2M circuits migrated since 2014

500+ net mod projects completed

25+ years of RAN development

30+ vendor products supported

Commitment to Open

O-RAN ALLIANCE   Open ROADM   TELECOM INFRA PROJECT   IOWN GLOBAL FORUM   Open RAN POLICY COALITION

"With Japanese quality and a highly competitive cost structure as major differentiators, our joint efforts with Fujitsu are on track to bring significant incremental value to our customers and partners around the world."

-Tareq Amin, Representative Director, Executive Vice President and CTO

Rakuten Mobile

"KDDI aims to provide flexible end-to-end network slicing services with 5G network. We expect that Fujitsu's Radio Unit that is O-RAN (Open Interfaces) compliant will contribute significantly to the realization of this plan."

- Toshikazu Yokai, Executive Officer

KDDI

Open ROADM : Open Reconfigurable Optical Add/Drop Multiplexers
TIP : Telecom Infra Project
IOWN : Innovative Optical and Wireless Network

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