Network Services Business/
Global 5G Business

September 16, 2021
Atsuo Kawamura, Executive Vice President
Orchestrating a brighter world

NEC creates the social values of safety, security, fairness and efficiency to promote a more sustainable world where everyone has the chance to reach their full potential.
1. Global 5G Business
2. Network Services Business
1. Global 5G Business
Many telecom operators are aggressively engaging in Open RAN initiatives, as its market is expected to grow at CAGR of 35% from 2021 to 2025.

This survey sheds light on how major telecom operators perceive the feasibility of the O-RAN concept.
NEC’s Vision: Global 5G Business Model

Provide Open RAN ecosystem assembled with NEC and partners’ products
Commercialize global 5G business through market selection and concentration

Commercialization through Market Selection and Concentration

Differentiating Factors

Global Assets (including strategic partnerships)
Ecosystem-type Systems Integration
Leverage Owned Technology

NEC Products
Partner Products

Provide best-of-breed components from global assets suited to customers’ requirement
Guarantee mission criticalness

Wireless Technology
Virtualization Technology

Strengthen Management Resources

Product Development
Solution Development
Operating Framework
To Achieve Mid-term Management Plan

FY2025 Numerical Targets

- Revenue: ¥190.0 bn (including domestic)
- Revenue CAGR (FY20-25): 35%
- Adjusted Operating Margin: 10%

Strategy to Achieve Targets

- Market expansion by focusing on the leading operators for Open RAN adoption
- Portfolio expansion from hardware to software
- Develop a recurring business model
- Establish a global business framework starting from Europe, United States and India

Coordinate with leading Open RAN project and focus on operators planning aggressive investments in Open RAN to build a solid track record.

Strengthen business infrastructure for rapid response to customers.

- Major global telecom operators participate in multiple active industry groups.
- Trend towards retaining trusted vendors to ensure a secure telecom infrastructure.

### Activities of telecom operators who are global Open RAN pioneers

<table>
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<tr>
<th>O-RAN Alliance</th>
<th>Telecom Infra Project</th>
<th>Open RAN Policy Coalition</th>
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</table>

- **Business development in existing customers who are aggressively utilizing Open RAN**

- **Various approach to customers leveraging strategic partnerships**

- **Strengthen customer engagement such as PoC*1 and respond quickly through global support scheme**

*1: Proof of Concept
Global Customer Engagements

- Leveraging track record with domestic large-scale network deployments to obtain sales leads mainly in Europe and North America
- NEC being selected by global Tier 1 operators not only for trials/PoCs, but also commercial projects

### Commercial Customers
- **Japan**: 3
- **Europe**: 12

### Trials
- **Europe**
  - US
  - Middle and Near East

### Prospects
- **Japan**
  - Europe
  - India
  - **20+**

### Track Records for Major Massive Commercial Network Deployments
- **Secured network implementation**
  - 7/2019 – NTT DOCOMO
    - Base station conforms to O-RAN specification (commercial)
  - 3/2020 – Rakuten Mobile
  - 6/2020 – Rakuten Mobile
  - 10/2020 – NTT DOCOMO
    - Selected as SA-type mobile core
Telefónica and NEC to build Open RAN live pilots in 4 global markets as a key milestone toward mass deployment

Pre-commercial trials in Telefónica’s four core global markets: Spain, Germany, the UK and Brazil

NEC as the prime system integrator of multi-vendor-based Open RAN including NEC’s 5G massive MIMO RU and RAN DO*1

Joint validation of AI-driven RIC*2 and SMO*3 for RAN optimization and automation at Telefónica’s newly established lab in Madrid

Live pilots aimed at scaling up to a total 800 sites for commercial deployment starting in 2022 across four countries

*1: RAN Domain Orchestrator      *2: RAN Intelligent Controller      *3: Service Management and Orchestration
Voice from Telefonica (Video Message)

Short version of video message from “Telefónica and NEC to build Open RAN live pilots in 4 global markets as a key milestone toward mass deployment” press release issued on 14th Sep, 2021

Progress in Strategic Partnerships

Accelerating co-development and customer engagements aimed at global 5G business expansion

**NTT**

**Aims**
- Market formation of open networks
- Create global competitive advantages

**Progress**
- Started co-development of **RAN Intelligence Controller (RIC)** with NTT DOCOMO
- Global co-creation activities for enterprises by utilizing 5G with NTT Data

**Rakuten Mobile**

**Aims**
- Establish fully virtualized cloud-native network platform and expand globally

**Progress**
- Achieved world’s highest UPF\(^1\) performance in **5G core (5GC)**
- Promote business development for RCP\(^2\)

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\(^1\): User Plane Function
\(^2\): Rakuten Communications Platform (Completely Virtualized Cloud Native Mobile Network Platform)
Strategy 2. Product Strategy: Portfolio Expansion

- Expand business volume by adding software business to the O-RU hardware business
- Leverage partner ecosystem to provide best-of-breed solutions suited to customers’ needs

**NEC 5G Portfolio**

- **SMO** (Service Management and Orchestration)
- **5GC** (5th Generation Core network)
- **RAN SI** (Radio Access Network System Integration)
- **CU/DU** (Central Unit. Distributed Unit)
- **O-RU** (Open Radio Unit)

**Initiatives for Portfolio Expansion**

- **Mobile network operational support system**
- **Streamlined and automated operations**
- **Open, virtualized mobile core software for provision of flexible services**
- **Open RAN ecosystem assembled with NEC and partners’ products**
- **Safe and secure mission critical systems**
- **Open, virtualized radio intelligent control software**
- **Support for various RUs by combining NEC and partners’ products**
- **M-MIMO* O-RU to realize 5G features**
- **Leverage partners to expand portfolio**

*1: Massive Multiple Input Multiple Output

Expand from hardware business to software licensing and system integration services to achieve high profitability

<table>
<thead>
<tr>
<th>2021</th>
<th>2022</th>
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<tbody>
<tr>
<td><strong>Market environment: Introducing Open RAN and deploying the network</strong></td>
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<tr>
<td>- Market entry and customer base expansion with hardware business focusing on O-RU</td>
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<tr>
<td>- Introduce software products to the market</td>
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<table>
<thead>
<tr>
<th>2023</th>
<th>2025</th>
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<tr>
<td><strong>Market environment: Heightened importance of enhanced operational efficiency and automation as Open RAN deployment expands</strong></td>
<td></td>
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<tr>
<td>- Add software (CU/DU, 5GC, SMO) and services (systems integration) to hardware business (O-RU)</td>
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<tr>
<td>- Increase profit through high value-added solutions such as automation, efficient operation, and network resource optimization</td>
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<tr>
<td>- Expand software licensing and recurring businesses</td>
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- Development and production are mainly conducted in Japan and India. In addition, establish business implementation framework in collaboration with partners
- Focus on Europe/US where Open RAN market will be actively revitalized, while establishing and enhancing a global support scheme
Summary

Steady progress in orders due to the increased recognition of NEC’s strengths

• Highly appealing products supported by strong domestic track record
• Ecosystem which leverages the strengths of its own core products and combines them with partners’ products

Roadmap to achieve targeted profitability

• **Continue aggressive investments through 2022**
  Expand the high-margin software portfolio and strengthen the sales force

• **Shift focus to investment recovery from 2023; pursue profit growth**
  Capture the market trend for 5G full-scale rollout and grow software business
2. Network Services Business
FY2018-FY2021 Results

- Revenue and profit margin improved steadily mainly in mobile/fixed networks
- Strategic investment for overseas business in FY2021

Revenue (Billions of Yen)

- FY2018: 440.7
- FY2019: 482.7
- FY2020: 538.8
- FY2021 (Planned): 555.0

Adjusted OP Margin

- FY2018: 3%
- FY2019: 6%
- FY2020: 8%
- FY2021 (Planned): 6%

CAGR: 8%

Excluding strategic investment: 9%
FY2020 Results

- Both top line and profitability increased through expanded demand in communication infrastructure
- Shipments of base station equipment getting full-scale, and continuously invest focusing on development

Revenue (YoY) 482.7

FY19 Adjusted OP 30.6

5G business investment expansion
  - Enhanced development of 5G products for the domestic market, and functional upgrades
  - Initiation of up-front investment for overseas market

Acquisition of one-time large-scale projects

FY20 Adjusted OP 41.2

5G and the domestic carrier business expansion
  - In the domestic market, 5G products shipments getting full-scale, etc.

(Billions of Yen)
# FY2020 Summary

In Carrier business in Japan, supporting existing customers business and expanded our business through introducing DX
In the Global 5G and NEC Smart Connectivity businesses, set the groundwork for market expansion

<table>
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<th>Achievements</th>
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<td><strong>Global 5G Business</strong></td>
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<tr>
<td>• Commercial shipments of domestic 5G base stations getting full-scale, and selected as SA-type 5G mobile core vendor</td>
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<td>• Implemented joint demonstration test of Open RAN with overseas clients and the UK Government</td>
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<td>• Established “Center of Excellence” to accelerate global adaption of 5G Open RAN</td>
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<tr>
<td><strong>Carrier Business in Japan</strong></td>
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<tr>
<td>• Captured demand for expanding backbone networks</td>
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<td>• Received orders for large-scale operational platform</td>
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<td>• Promote business process optimization through DX</td>
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<tr>
<td><strong>NEC Smart Connectivity Business</strong></td>
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<tr>
<td>• Achieved Local5G certification, expanded practical experiments</td>
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<tr>
<td>• Launched project of installing personal data distribution service</td>
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<td>• Expanded network solutions for enterprise &amp; public sector, which support DX</td>
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<th>Challenges</th>
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<td>Expanding market track record to lead the open market</td>
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<tr>
<td>Establishing strong position for solving clients’ management issues as an important partner</td>
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<tr>
<td>Leading the market by providing E2E vertical solutions in order to realize DX</td>
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*E2E solution business utilizing connectivity for enterprise and public sector*
Top line increase through the Global 5G/NEC Smart Connectivity businesses expansion
Full-scale investment into strategic expenses for global expansion

- 5G and domestic carrier business expansion
  - 5G business expansion mainly in domestic market
- Strategic expenses
  - Full-scale investment for overseas markets in the 5G business
- NEC Smart Connectivity business expansion
  - Leading the local 5G and data distribution markets
- Rebound from one-time large-scale projects in previous FY

FY2020 Adjusted OP
41

FY2021 Adjusted OP (planned)
35

Revenue (YoY)
538.8

-14
+1
+11

555 (+3%) (planned)
## FY2021 Business Strategy

Lead the Open RAN market by expanding global track record
Expand our business with combining existing business + modernization know how, and network + data usage expertise

<table>
<thead>
<tr>
<th>Business Strategy</th>
<th>Key Initiatives</th>
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<tr>
<td><strong>Global 5G Business</strong></td>
<td>• Acquire position as Open RAN vendor in global market</td>
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<td></td>
<td>• Expand commercial projects in leading Open RAN clients</td>
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<tr>
<td></td>
<td>• Expand portfolio including use of partners, and strengthen our business structure for supporting Europe/US market</td>
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<td></td>
<td>• Enhance and expand collaboration with partners to extend global market reach and lead the open market</td>
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<tr>
<td><strong>Carrier Business in Japan</strong></td>
<td>• Expand business through solving clients’ management issues by enhancing client engagement</td>
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<td></td>
<td>• Enlarge business domains through DX and modernization of clients’ core infrastructure</td>
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<td></td>
<td>• Realize advanced management optimization using automation and packaged solutions</td>
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<tr>
<td><strong>NEC Smart Connectivity Business</strong></td>
<td>• Bring new value for industries utilizing networks</td>
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<tr>
<td></td>
<td>• Expand provision of comfortable, efficient and secure network services</td>
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<td></td>
<td>• Expand local 5G commercial projects using video analysis and automation</td>
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<td></td>
<td>• Establish data distribution business and expand market in Smart City and healthcare</td>
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To Achieve Mid-term Management Plan

FY2025 Numerical Targets

- **Revenue CAGR (FY20-FY25)**
  - 3~8% level

- **Adjusted Operating Margin**
  - 10% level

Basic policies for achieving numerical targets

- **Market Development** -
  - Lead the Open RAN market and expand market globally
  - Implement expansion of business domains and value, using expertise of existing businesses

- **Solutions/Differentiation** -
  - Expand world-class solutions to solve clients’ issues utilizing existing strengths

- **Business Model** -
  - Expand value as a solutions provider
Network Services Business 2025 Mid-term Management Plan

Aim at increasing revenue by about 1.3 times through realizing domestic clients’ DX, expanding the value of telecommunications, and expanding overseas market.
In addition, aim for an operating margin of 10% by expanding high-value-added businesses and increasing profitability of global 5G business.

Global 5G Business
- Global expansion of 5G business focused on “Open” technology, which is different competitive edge from mega-vendors.
- Bring about transformation in the industrial structure and become the leading vendor in the open market.

Carrier Business in Japan
- Enhance client engagement with expertise from existing business and develop a sustainable business.
- Contribute to clients’ modernization and streamlined management through dependable execution and innovation.

NEC Smart Connectivity Business
- Provide E2E Connectivity for enterprise & public sector clients while capturing societal change through network and IT skill.
- Expand the business utilizing the capabilities of NEC as a whole based on private networks and data distribution.
Enhance client engagement by dependable execution of business which meets client needs and realizing DX through innovation
Establish overwhelming market advantage through expertise of NW and IT infrastructure for domestic carriers

Integrate networks and IT infrastructure innovatively by leveraging expertise from clients business and implement modernization for the future DX business platform

Using full knowledge of clients’ businesses and the ability to provide E2E solutions, bring management optimization and co-create value with clients

Provide a highly reliable and high-efficiency network infrastructure using optical and wireless technologies to support the shift to high volume data transmission due to DX
Achieve Management Optimization by Utilizing Full Knowledge of Clients Businesses and E2E Solution Capabilities

With E2E capabilities in NEC, implement clients’ operation/maintenance work shift to IT and use of AI, achieve increased efficiency and upgrading while optimizing overall maintenance and operation, and realize clients’ management efficiency.

Clients’ Issues

- Manual network operation and maintenance

Current Efforts

- Shift to IT, use of AI
- Optimization of overall operation and improved efficiency through semi-automation
- Automatic linkage among AIs

Final Objective

- Advanced management optimization through complete automation and upgrading

NEC’s providing value

- Streamlined operation and maintenance
  - Routine task automation
  - Unified management of maintenance equipment
  - Shift to shared operation

- Stabilized service
  - Disaster countermeasures
  - Security threat countermeasures
  - Detection of signs

NEC’s strengths

- E2E capabilities in One NEC
  - Proposal capabilities for solving clients’ issues (including cooperation with ABeam Consulting)
  - Technologies and expertise in all telecommunications infrastructure domains
  - High-quality system which supports building system, operation and maintenance
Being the connectivity service provider with “NEC Smart Connectivity” as a leader in industrial/societal DX and the IoT era, that creates new value by connecting everything intelligently.

Providing entire industries/in-house solutions from network to applications by combining assets within and outside NEC.

### NEC Smart Connectivity Business

#### Value creation / DX realization

<table>
<thead>
<tr>
<th>Industry specific service</th>
<th>OX</th>
<th>Remote construction</th>
<th>AGV controls</th>
<th>ID Integration</th>
<th>CX</th>
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<tbody>
<tr>
<td>Data analytics</td>
<td>IoT Platform</td>
<td>AI / Biometric Authentication</td>
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<tr>
<td>Network Services</td>
<td>5G</td>
<td>Wi-Fi</td>
<td>LPWA</td>
<td>sXGP</td>
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<tr>
<td>Devices</td>
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**Collaboration**

**End to End**

**Vertical Solutions**
Data Distribution Service

**Connecting “Individuals”**
- FY2019 (Start of the service)
- ID integration and Management
- **Enhanced brand/loyalty**
- **Individual optimization service**

**Connecting “Information”**
- FY2021 (Ongoing)
- Data distribution
- **Improvement of value provided**
- **Expansion of revenue and streamlined business**

**Connecting “Various Industries”**
- FY2025 (Goal)
- Cross-industry
- **Development of new services and profits**

- **Healthcare**
  - Integrated ID service for GP (General Practitioner)
  - Enhanced healthcare service through collaboration among hospitals, pharmacies and health checkup

- **Smart City**
  - Connecting physical stores and online shops
  - Linking services in buildings/cities

- **Various Industries**
  - Collaboration among local governments and various industries for better community development

Realization of well-being by connecting insurance, education and retail
Examples of Realization of New Value in NEC Smart Connectivity Business

Grand Front Osaka
Practical experiment for use of ICT/IoT in smart cities

Major telecommunication company A
IOT Smart Life Platform

Le Sport
SSMR
Voicne WALK
Hana no Keiji

Mori Building Co.
Platform to enhance value of neighbourhood experience through data application based on ID

Major electric power company C
Healthcare data platform

Tokyo Metropolitan Government
Practical experiment for wellness in collaboration with public and private sector

Toyama City
Implementation Platform for smart cities Monitoring services

Major railway company D
IOT Machinery surveillance

Rakuten Mobile, Inc.
eKYC (Online ID verification utilizing AI)

NTT DOCOMO
Online ID verification for payment using d point

Major telecommunication company E
Online ID verification for financial services

Major department store F
Online shop member ID integration

Obayashi Corp.
Taiyu Co.
Autonomous operation system for construction machinery

Kumagai Gumi Co.
Practical test for unmanned operation of construction machinery

Ricoh Company
Acceleration of manufacturing industry DX through local 5G

Konika Minolta, KDDI
Enhancement of DX implementation through hybrid 5G open lab

SMBC Group
Demonstration test for next generation XR store

Ishizaka Sangyo, Intel Corporation
Digitalization of resource recycling and implementation of SDGs
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