The Geopolitics of ICT standardization: The Case of Open RAN

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Outline

1. Research Background & Motivations
2. Open RAN
3. Standard’s Upgrade to the Geopolitics
4. Concluding Remarks

Kim, M. J., Eom, D., & Lee, H. (2023). The geopolitics of next generation mobile communication standardization: The case of Open RAN. *Telecommunications Policy*, 102625.

1. Research Background & Motivations

The emergence of Open RAN

- **Korea-U.S. Summit (May 2021)**
  - "Recognizing the importance of telecommunications security and vendor diversity, …. **commit to work together to develop open, transparent, and efficient 5G and 6G network architectures using Open-RAN technology**."
- **Korea-U.S. Summit (May 2022)**
  - "Recognizing the importance of telecommunications security and vendor diversity, … **commit to work together to develop open, transparent, and secure 5G and 6G network devices and architectures using Open-RAN approaches**, both at home and abroad."

Research questions

- **What's the meaning of inclusion of "standardization cooperation" and "Open RAN" in such summit outcomes?**

2. Open RAN

China's Rise in 5G

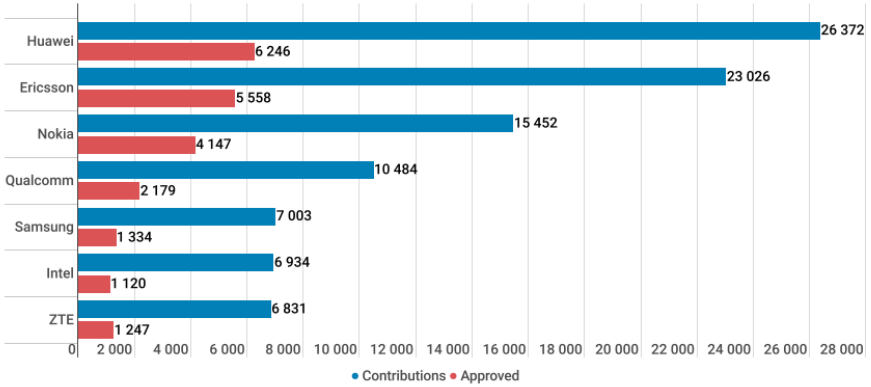


Figure 23. 5G standard contributions at 3GPP | Key contributors.

Source: Pohlmann and Blind, 2020 (data relevant for January 2020)

Sorina Teleanu. 2021. The geopolitics of digital standards: China's role in standard-setting organisations. DiploFoundation/Geneva Internet Platform and Multilateral Dialogue Konrad Adenauer Foundation Geneva.

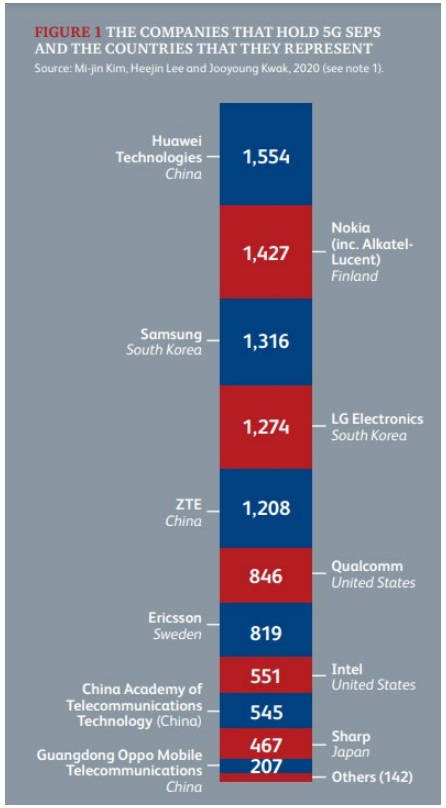


Table 1: Global Mobile Communication Base Station Market Share, 2021~2022

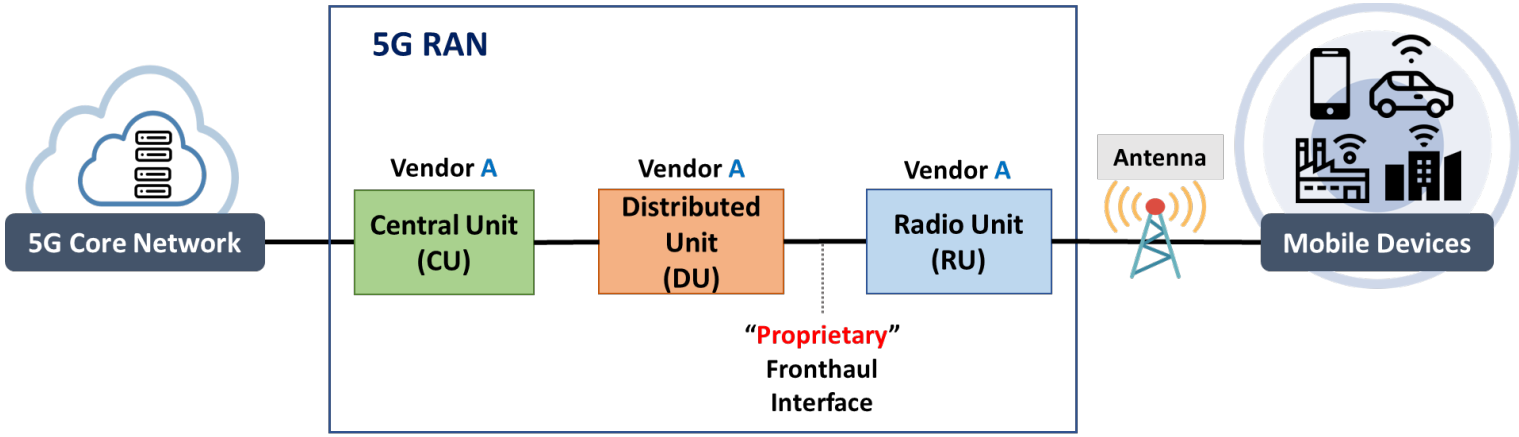
Company	2021	2022(E)
Huawei	30.0%	29.0%
Ericsson	23.5%	24.0%
Nokia	20.0%	21.5%
Samsung	12.5%	12.0%
ZTE	3.5%	2.5%
Others	10.5%	11.0%

Source: TrendForce, Aug. 2022

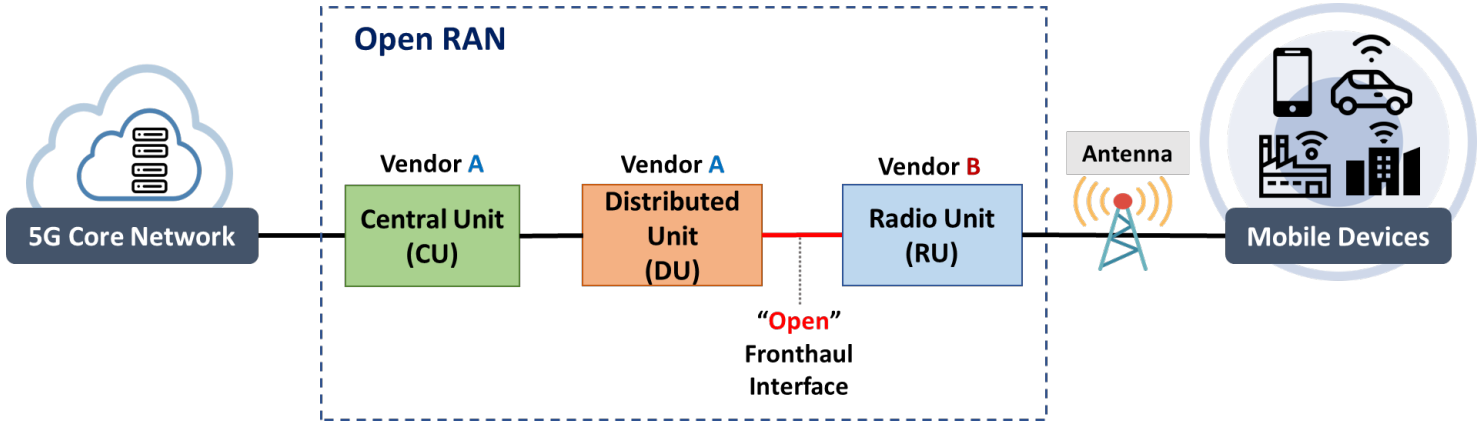
Base station market share of Huawei, Ericsson and Nokia: TrendForce
https://www.telecomlead.com/telecom-statistics/base-station-market-share-of-huawei-ericsson-and-nokia-trendforce-105929

What is Open RAN?

5G RAN



Open RAN



What is Open RAN?

5G RAN vs. Open RAN

	5G RAN	Open RAN
Solution	closed and proprietary	open and interoperable
Interface	proprietary and vendor-specific	standardized and vendor-neutral → **Mix & Match**

Who supports it and why

U.S. push for Open RAN

Alternatives to China-led 5G	**Closed and proprietary 5G equipment supply chain issues** with focus on specific equipment vendors **Security concerns** about **using equipment and technology from Chinese venders**
Commercial opportunities for U.S. companies	Closely aligned with **commercial opportunities in cloud, software, and generic hardware components led by U.S. companies**

Comprehensive support from the U.S. government to accelerate Open RAN adoption

- **Inter-agency cooperation**: National Telecommunications and Information Administration (NTIA), the Department of Defense (DoD), the National Institute of Standards and Technology (NIST), and the National Science Foundation (NSF)
- **Allocate funding for Open RAN through legislation**: Utilizing Strategic Allied (USA) Telecommunications Act ($750 million), CHIPS and Science Act of 2022 – Public Wireless Supply Chain Innovation Fund ($1.5 billion)

Advocacy for Open RAN

O-RAN Alliance

- **Formed by the merger of XRAN Forum** (US-European dominated) **and C-RAN Alliance** (Chinese dominated) **in 2018**
- **Founding members:** AT&T (U.S.), China Mobile (China), Deutsche Telekom (Germany), NTT Docomo (Japan), Orange (France)
- **Objectives:**
  - Reshape the radio access network (RAN) industry towards more intelligent, open and fully interoperable mobile network by standardizing and disseminating Open RAN
- **Members (operators):**
  - Major mobile network operators from the U.S., Europe, South Korea, China and Japan
  - Chinese mobile operators are included: China Mobile, China Telecom, China Unicom

Advocacy for Open RAN

Open RAN POLICY COALITION

Open RAN Policy Coalition

- **Established in 2020**
- **Objective**
  - Introduce policies that **promote the adoption of open and interoperable solutions in radio access networks (RANs)** for advanced wireless communication technologies (including 5G)
- **Key Roles**
  - Work with policymakers around the world to promote Open RAN deployment
  - Engage in lobbying efforts to **encourage the adoption of standards established by the O-RAN Alliance as national standards** in the U.S. and other countries

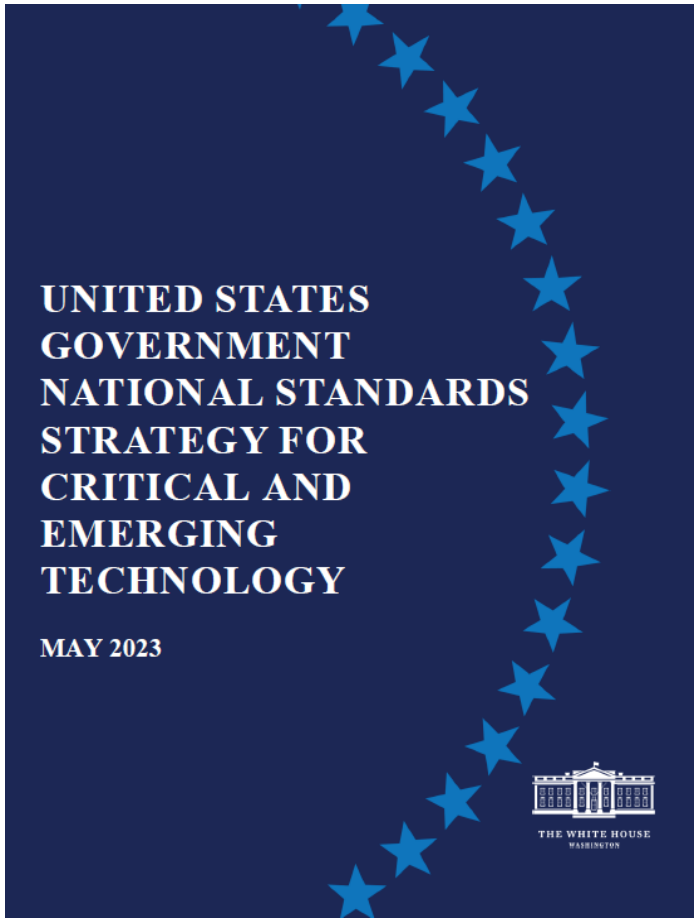
Country	Members
Canada	Ciena
Finland	Nokia
Germany	Deutsche Telekom
India	Bharti Airtel, Reliance Jio, Sterlite Technologies Limited (STL Tech)
Israel	Amdocs
Japan	Fujitsu, NEC Corporation, NTT, Rakuten Mobile
Singapore	Broadcom
South Korea	Samsung Electronics
Taiwan	Quanta Cloud Technology (QCT)
United Kingdom	Vodafone
United States	Airspan, Advanced Micro Devices (AMD), American Tower, Analog Devices, AT&T, Amazon Web Services (AWS), Cohere Technologies, DeepSig, Dell Technologies, DISH Network, Google, Hewlett Packard Enterprise (HPE), IBM, Inseego, Intel, JMA Wireless, Juniper Networks, Kyrio, Ligado Networks, Marvell, Mavenir, Meta, Microsoft, Nvidia, Pivotal Commware, Qualcomm, Radisys, Red Hat, Texas Instruments, U.S. Cellular, US Ignite, Verizon, VMware, Wind River, XCOM-Labs

Advocacy for Open RAN

Open RAN Industry Alliance (Korea)

- Launched in **August 2023**
- Consist of various experts from domestic **mobile operators**, manufacturers, software companies, as well as research institutes and universities
- **SKT, KT, LG U+**, Samsung Electronics, LG Electronics, Electronics and Telecommunications Research Institute (ETRI), National Information Society Agency (NIA), and Telecommunications Technology Association (TTA), etc.

3. Standard's Upgrade to the Geopolitics



- To strengthen
  - U.S. leadership and competitiveness in international standards development
- U.S. must renew our commitment to the rules-based and private sector-led approach to standards development
- Four lines of action: Investment, participation, workforce and Integrity & Inclusivity

STRATEGY
FOR A FREE, PEACEFUL, AND PROSPEROUS
INDO-PACIFIC REGION

National Security Strategy 7 June 2023

- **Ⅶ Establishing a Response System for Global Economic Security**
  - **1. Proactively Advancing Economic Security Diplomacy**
    - "we plan to actively participate in discussions on **international digital norms** to establish a new economic and social order for the digital era. We will also work toward developing advanced systems for personal data protection. Furthermore, we will proactively engage in establishing a digital economic order in the international community by expanding cooperation on **technical standards**.
  - **3. Enhancing Protection and Cooperation for Critical/Emerging Technologies**
    - "Moving forward, the government aims to promote friendshoring with partner countries and actively participate in **international technical standard-setting** to build stable and resilient global supply chains as well as contribute to the development of global innovation ecosystems."
    - **Driving the formation of international rules and standards for critical and emerging technologies**

Korea's Indo-Pacific Strategy Dec. 2022

- **6. STRENGTHEN COOPERATION IN CRITICAL DOMAINS OF SCIENCE AND TECHNOLOGY AND CLOSE DIGITAL GAP**
  - We will bolster international cooperation in relation to **critical and emerging technologies**, including research and development, **standardization, technology norms**, and fostering and protection of technology and human resources.
  - We will engage in collaborative networks with the U.S. and other technology leaders, while expanding technology cooperation with Europe, Canada, and Australia.
  - We will also help shape **international standardization and international norms** in an open and inclusive fashion, including by carrying out joint development of and research in **technology standards with digitally-advanced nations**.
  - We will also remain engaged in international efforts for open and transparent communications networks, such as … cooperation in 5G Open-RAN technology …

Quad Principles on Critical and Emerging Technology Standards

- Standards Sub-Group of the Critical and Emerging Technology Working Group (20 May 2023)

Strategic and geopolitical value of Standards

- Technical standards, particularly those of digital, critical and emerging technologies, have become a geopolitical and strategic theme.
  - Used to be the domain of engineering and industry/business

- Even Securitized
  - Economic security and standards

4. Concluding Remarks

Questions/challenges to be addressed

- **The prospect of Open RAN**
  - How much and when can it be accepted in the market?
- **What will happen or is happening in standardization and rule-settings of CET?**
  - AI, Quantum, mobility, digital trade, etc.
- **Techno-nationalism**
  - Its impacts on international standardization systems
- **What should other standards-leading countries do?**
  - Like-minded countries?

Kevin Rudd (2022) "The Avoidable War"

- Xi Jinping's Worldview: Ten concentric circles of interest
  - The politics of staying in power
  - Securing national unity
  - Ensuring economic prosperity
  - Making economic development environmentally sustainable
  - Modernizing the military
  - Managing China's neighborhood
  - Securing China's maritime periphery
  - Going West – the Belt and Road Initiative
  - Increasing Chinese leverage across Europe, Africa and Latin America; Gaining an Arctic foothold
  - **Changing the global rules-based order**
    - **'Determining the global technology standards of the future'**
- "The behind-the-scenes clash over standards is therefore likely to continue as a key battleground for US-China strategic competition over the global order for the foreseeable future."