# XGMF ODAIBA IX Core Project

## -- mmW Activities --

Masakazu Shirota
Co-Sub-Leader of XGMF ODAIBA IX Core Project
Qualcomm Japan

# XGMF Projects

Currently 20 projects on 6G, mmWave, Local 5G, NTN, verticals, …

**NTN Promotion Project**
Leader: TOYOSHIMA, Morio NICT

**6G Promotion PJ**
Leader: NAKAMURA, Takehiro NTT DoCoMo

**Planning for a city-sized large-scale living laboratory**
Leader: NISHIMURA, Hiroki , NEC

**Creation of 5G×OT business use cases for industry**
Leader: ISHII, Takanori SOFTBANK Corp.

**6G Network Architecture Project**
Leader: ISOBE, Shinichi, NTT DoCoMo

**6G Radio Technology Project**
Leader: OHTSUKI, Tomoaki Keio University

**Terahertz Wave Wireless Technology Project**
Leader: HOSAKO, Iwao NICT

**XG-Supply Chain Management Project**
Leader: NATSUME, Shinobu Gems Co.,Ltd.

**StarNet Earth**
Leader: TAKAHASHI, Madoka NTT, Inc.

**Agriculture × XG Project**
Leader: KANO, Kayo ON BOARD Co., Ltd.

**Local 5G Licensing Process Shortening Project**
Leader: MASHIYAMA, Daishi NTT EAST, Inc

**Space-Time Synchronization Project**
Leader: IDO, Tetsuya NICT

**ODAIBA IX Core**
Leader: IWANAMI, Gota INFOCITY, Inc., NAKAMURA, Takehiro NTT DOCOMO

**The Social Infrastructure in the Decreasing Population Era**
Co-leader: NAGATA, Satoshi NTT DOCOMO, IIZUKA, Rumi Multimedia Promotion Center, HATAKAWA, Yasuyuki Deloitte Tohmatsu Consulting LLC

**Project for realization of cross-industry orchestration**
Leader: ISHIZU, Kentaro NICT

**Project on creation of mechanisms for linking technology with social and economic value**
Leader: HASEGAWA, Fumiki Mitsubishi Electric Corporation

**Space × Ground Use Case Study Project**
Leader: FUJIMOTO, Koichirou NEC

**Local 5G testbed for smart manufacturing**
Leader: SAKAMOTO, Yosuke NEC

**OSHIKATSU x 5G (millimeter wave and local 5G)**
Leader: YOSHII, Daijiro Murata Manufacturing Co., Ltd.

**Next generation telecom issues × Material project**
Leader: MIMURA, Kenichi National Institute of Advanced Industrial Science and Technology (AIST)

# ODAIBA IX Core Project

The purpose of this project is to understand the current user awareness of 5G, and to promote use cases that utilize the potential of 5G at a higher level, with a focus on millimeter wave and local 5G, which are expected to see increased use in the future, and practical business initiatives that expand from these use cases, including demonstrations, in order to contribute to industry efficiency, increased profits, and solutions to social issues.

**project leader**

NTT DOCOMO, INC.

NAKAMURA,Takehiro

**project leader**

Infocity Corporation

IWANAMI, Gota

**subleader**

Qualcomm Japan G.K.

SHIROTA, Masakazu

**subleader**

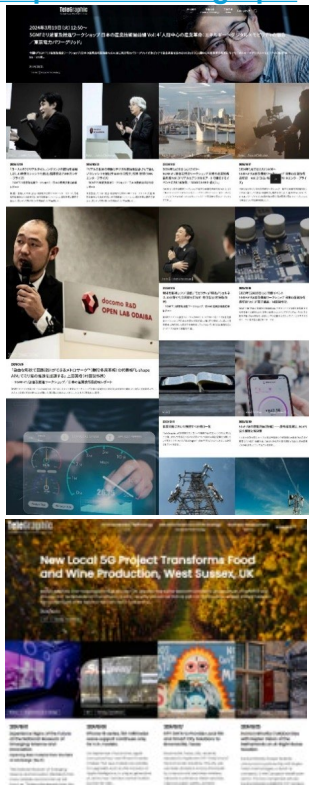
bitmedia Inc.

TAKANO, Masaharu

TeleGraphic

the Light Beyond the World of Chaos

https://www.telegraphi

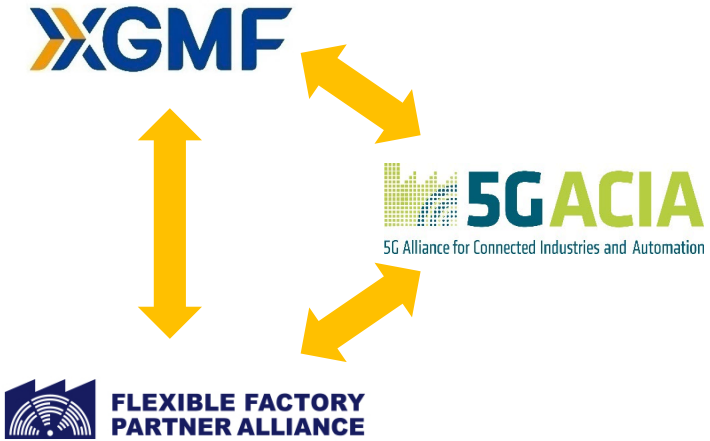


# Collaboration between the ICT industry and Manufacturing Industry

XG Mobile Promotion Forum
Flexible Factory Partner Alliance
October 9, 2024

## XG Mobile Promotion Forum and FFPA Sign MOU on Industrial Wireless Communications
## ~Promoting the establishment of a global ecosystem for industrial 5G~.

The XG Mobile Forum (XGMF), which promotes the deployment of mobile services/mobile business, and the Flexible Factory Partner Alliance (FFPA), which promotes the deployment of wireless communications in factories, have signed a Memorandum of Understanding (MoU) to cooperate toward building a global ecosystem for industrial wireless communications, especially industrial 5G. The FFPA has signed a Memorandum of Understanding (MoU) to collaborate toward building a global ecosystem for industrial wireless communications, especially for industrial 5G. This new partnership will promote the use of wireless communications in smart factories and other applications.



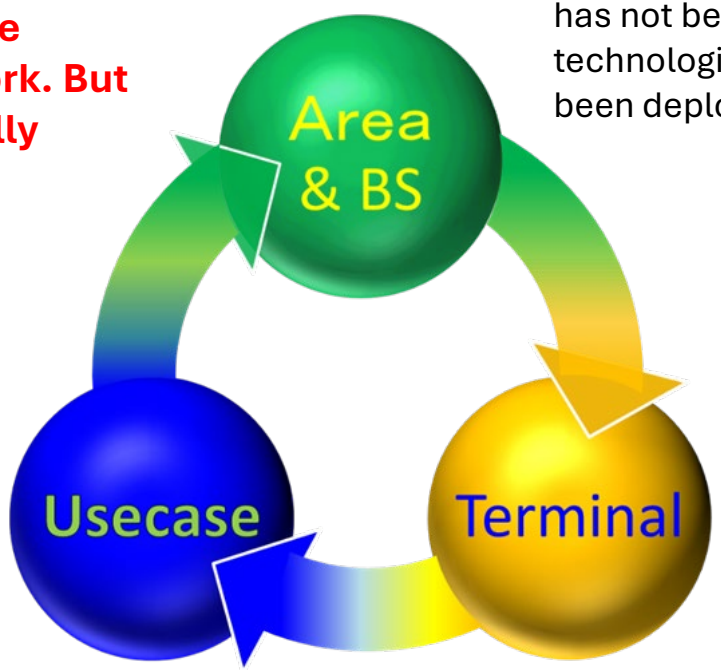
# Whitepaper ‘5G Enhancement with Millimeter Wave Deployment’ Ver 4.0 published on January 28, 2025


## Sections (Total 128 pages)

| # | Content |
|---|---|
| | Introduction |
| 1 | Clarifying the need for millimeter wave |
| 2 | Trends in Japan and overseas |
| 3 | Challenges for widespread use of millimeter wave |
| 4 | Millimeter wave technology overview |
| 5 | Performance evaluation |
| 6 | Millimeter wave introduction scenario |
| 7 | Affinity with local 5G |
| 8 | mm Wave use case |
| 9 | Existing Solutions for Millimeter Wave Dissemination |
| 10 | Millimeter wave business outlook |
| - | Conclusion |

# Challenges for widespread use of millimeter wave

**mmW technology is mature and provides clear performance improvements in 5G network. But the challenges have not fully resolved.**




While the number of mmW base stations has not been drastically increased, some technologies for area improvement have been deployed.

XGMF demonstrated the value of mmW in congested area for better user experience.

The lack of mmW supporting terminals is still an issue.

# Millimeter wave technology overview

**Beamforming technology**

Large propagation loss, low amplifier output and efficiency

**Millimeter wave device technology**

Higher the frequency, lower the amplifier output and efficiency

**sub6 + millimeter wave dual connectivity (DC)**

Unstable communication, non continuous coverage

**High-speed train (HST)**

Enables 5G NR communication while moving at high speeds exceeding 300 km/h with mmW

**MIMO technology**

Spatial multiplexing in propagation condition such as directivity and shadowing/blocking

**Infrastructure sharing**

Equipment and installation cost of base station due to the smaller coverage

**High-Power UE**

Unbalanced downlink and uplink coverage

**AI/ML beam prediction**

For reducing overhead for beam measurement and reporting

**Topology improvement technology**

Coverage/connectivity reduction in NLOS area

**Millimeter wave carrier aggregation (CA)**

Power consumption of mobile terminal handling broadband signals

**Sub-band full-duplex (SBFD)**

Divide the TDD frequency band into subbands and perform UL and DL communications in different subbands

# Millimeter wave business outlook

- **Transform negative cycle to positive growth**: Accelerate network deployment, terminal adoption, and service development.
- **Area development**: Advance equipment (beamforming, efficiency, low power, repeater, DAS), promote infrastructure sharing, and support disadvantaged areas.
- **Regulatory support**: Enable high-power terminals, and simplify licensing for faster rollout.
- **Cross-industry collaboration**: Raise awareness, provide system introduction support, and leverage platforms like "Telegraphic" for knowledge sharing.
- **Demonstration environments**: Establish labs and testbeds for consumer and developer use cases to drive innovation.
- **Human resource development**: Foster 5G/millimeter wave expertise across providers, users, and academia.

# ODAIBA IX Core Workshop

| # | Date | Event Title | Speakers |
|---|---|---|---|
| 1 | 2023/12/19 | Electronic Components | Murata Manufacturing |
| 2 | 2024/1/23 | Broadcasting and Video Production | NHK Enterprises |
| 3 | 2024/2/20 | Frontiers of Industrial Technology in Japan | IMAGICA EEX, Mori Building |
| … | … | … | … |
| 7 | 2024/6/20 | Experience cutting-edge local 5G at NTTe-City Labo / NTT East | NTT East , Partners of NTT East |
| 8 | 2024/8/22 | Reports from the field of industrial technology and state-of-the-art telecommunications technology | Fujikura, SONY, Fujitsu, Keysight Technologies, Hanshin Electric Railway |
| 9 | 2024/9/19 | Kyocera's Industrial Technology and R&D Structure / 5G Business Initiatives | Kyocera |
| 10 | 2024/11/21 | Millimeter wave implementation as a milestone for factory 5G sites and 6G | Sharp, JFE Engineering, Tokyo University of Science, NTT Communications |
| … | … | … | … |
| 14 | 2025/4/10 | FFPA, 5G-ACIA, XGMF (ODAIBA IX Core) Joint Workshop (Vol. 6)<br>Challenges and measures to promote the widespread use of 5G/L5G wireless in factories | Sanritz Automation |
| * | 2025/4/25 | XGMF mmW Special Event | KDDI, XGMF, Qualcomm |
| 15 | 2025/6/19 | Let's develop even cheaper and more democratic ways to use local 5G with more stable functionality and lower prices! | Communication Engineering, Structural Planning Institute, Kyoto University, The University of Tokyo, Sekisui Chemical |
| 16 | 2025/8/21 | Local 5G Accelerating Sophistication and Local 6G Seen Beyond | Sony, Qualcomm, Bitmedia, Ericsson, Nokia, NICT |
| 17 | 2025/9/18 | Experience millimeter wave and APN and discuss how these two work together! | IOWN GF, XGMF, Sony, Keysight |
| 18 | 2025/11/13 | Millimeter Wave Live Experience Workshop (Tentative title) | Sumitomo Electric Industries |

Thank you for your attention