The Fifth Generation Mobile Communications Promotion Forum

Overview of 5GMF Recent Activities

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5G Workshop between Thailand and Japan
The Berkeley Hotel Pratunam, Bangkok, Thailand, 20 February 2018

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Contents

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1. 5GMF White Paper

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5GMF White Paper Version 1.1

- **Version 1.01 was published in July, 2016**
  - è **Updated to Version 1.1 in September, 2017** http://5gmf.jp/en/whitepaper/

- **Contents**

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Key Concepts of 5G

n Two Key Concepts of 5G

1. Satisfaction of End-to-End Quality

- 5G shall provide **satisfactory "End-to-End Quality"** required by any kind of application anytime, anywhere and any use scenes.
- This conceptualization of **"Satisfaction of End-to-End Quality"** is **very different from previous generations** of mobile communication systems, for which best effort delivery was seen as sufficient.

2. Extreme Flexibility

- 5G networks will be **required to provide "Extreme Flexibility"** In order **to produce this level of End-to-End Quality** for the many services 5G systems will be expected to support.

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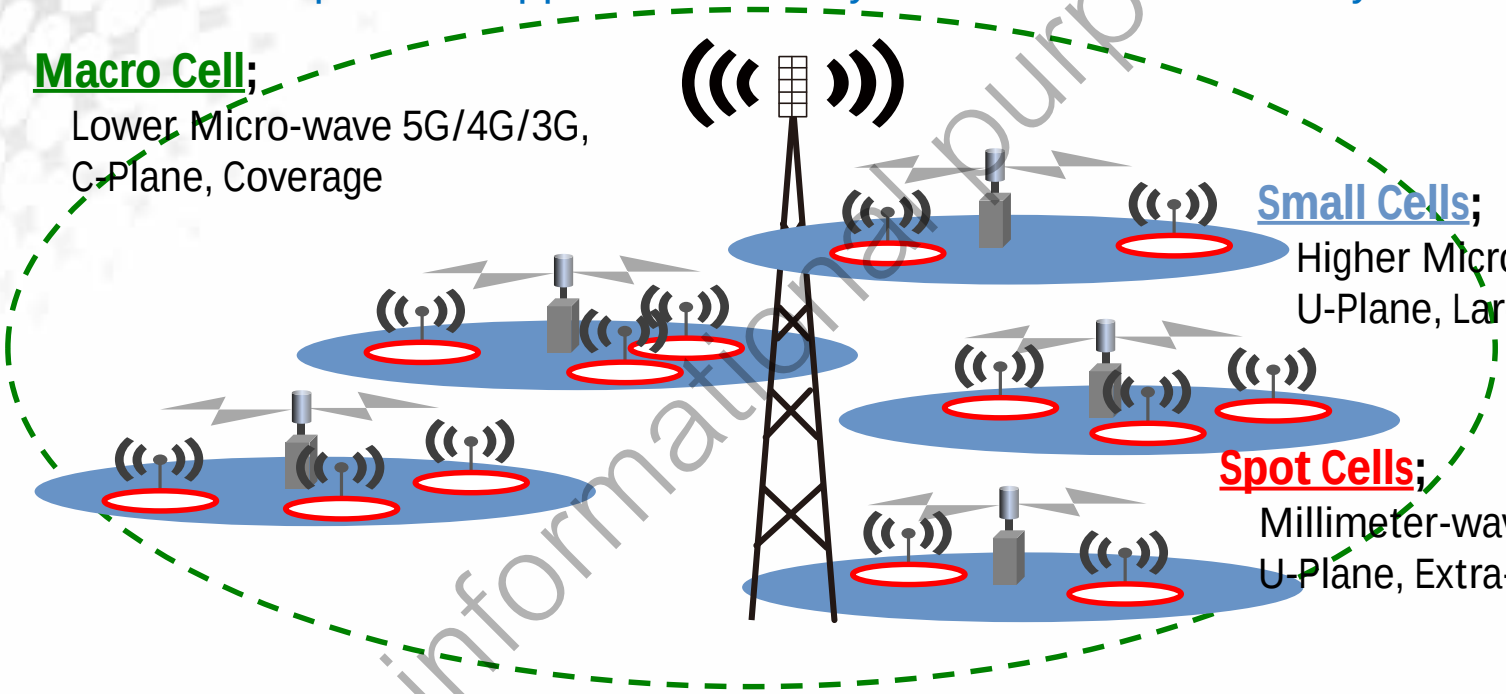
Key Technologies for Key Concepts (1)

Advanced Heterogeneous Networks

In addition to 5G Radio Access Technologies (5G RAT), 5G will continue to use already existing 2G, 3G, LTE, WLAN to create an integrated system that can provide support for a variety of services with flexibility.



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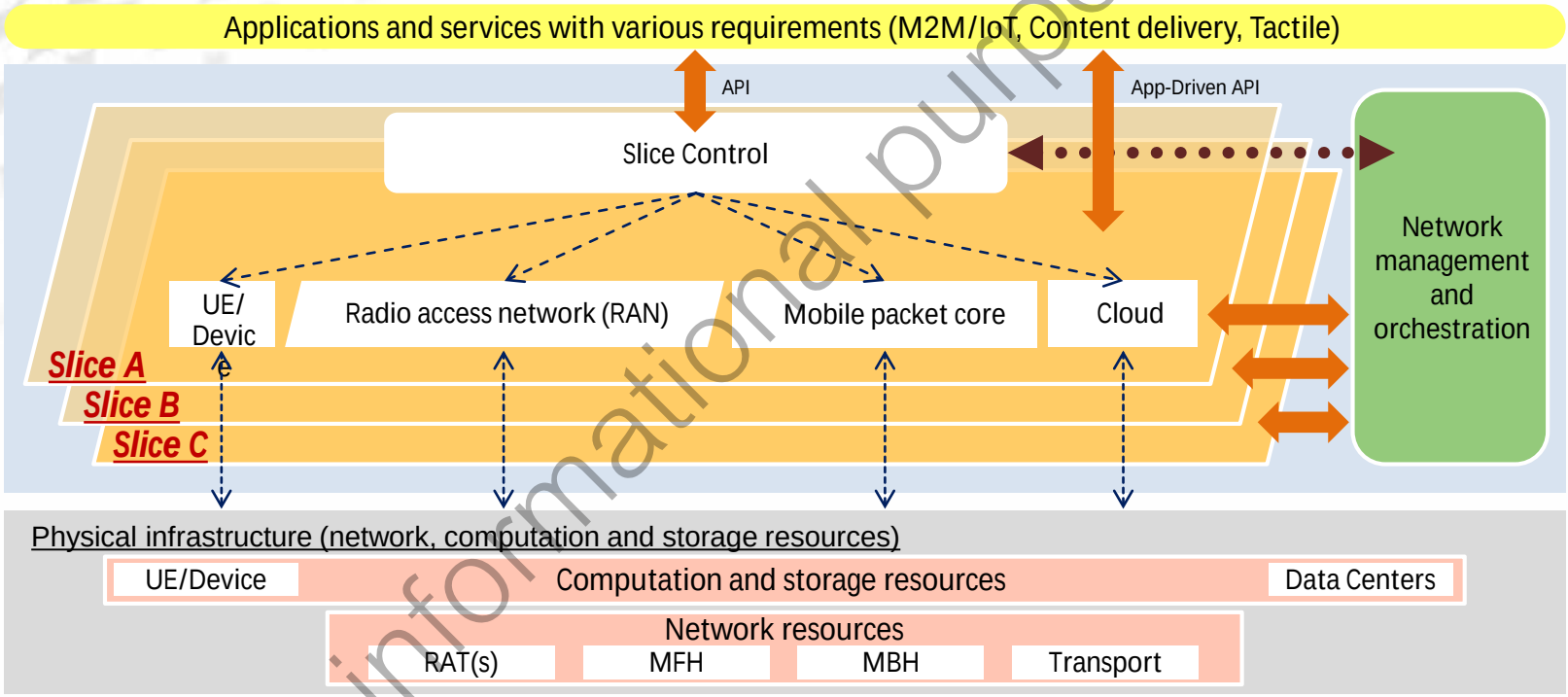
Key Technologies for Key Concepts (2)

Network Softwarizasion and Slicing

Network softwarization and slicing will allow network devices and components to support a variety of services in a extremely flexible manner.



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Spectrum Implications (1)

Frequency bands below 6GHz

The bands below 6GHz will play important roles for 5G as providing;

- Wide and contiguous coverage (e.g. below 2GHz) for;
  - IoT/M2M service with low bit rate and low power consumption,
  - conventional services, and
  - reliable C-plane in a C/U-split heterogeneous network
- Relatively large bandwidth for higher capacity (e.g. above 3GHz) for advanced mobile broadband services.

New candidate bands in Japan are 4GHz band (3.6 – 4.2GHz) and 4.5GHz band (4.4 – 4.9GHz). In these frequency ranges

- Global or regional harmonized frequency arrangement, and
- Sharing and compatibility with the incumbent radio systems should be considered.

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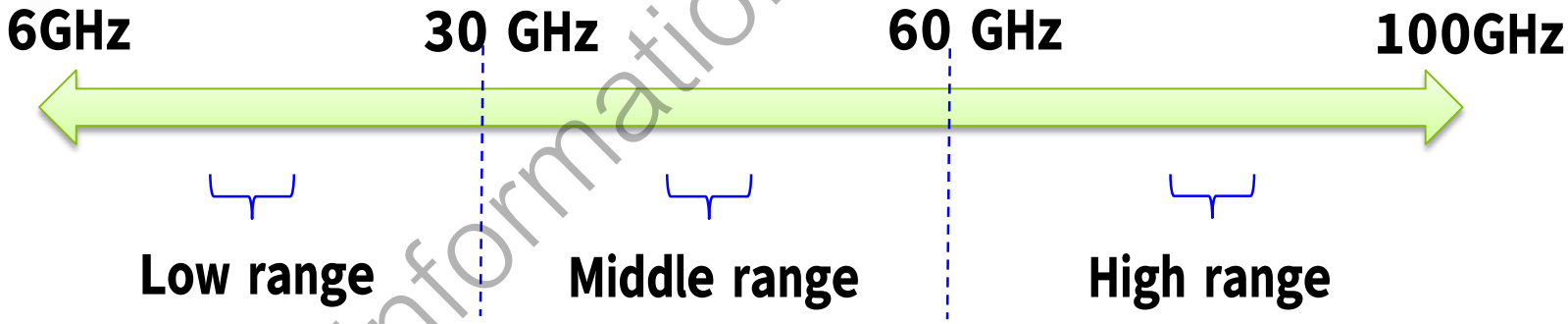
Spectrum Implications (2-1)

Evaluation of spectrum ranges above 6GHz

- Evaluate frequency bands from 6GHz to 100GHz from the following viewpoints;

Stage1 : Use cases and technology
Stage2 : Sharing or interacting with other systems
Stage3 : International cooperation

Classification of Spectrum Ranges above 6GHz in Stage 1



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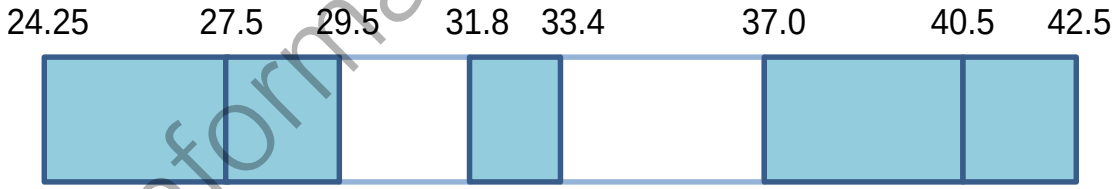
Spectrum Implications (2-2)

Stage 3: Results

- Considering the information obtained at this point of time, a part of or whole of the following bands are preferred for initial use, from the view point of global/regional harmonization.
  - 24.25 – 27.5 GHz
  - 27.5 – 29.5 GHz
  - 31.8 – 33.4 GHz
  - 37.0 – 40.5 GHz
  - 40.5 – 42.5 GHz



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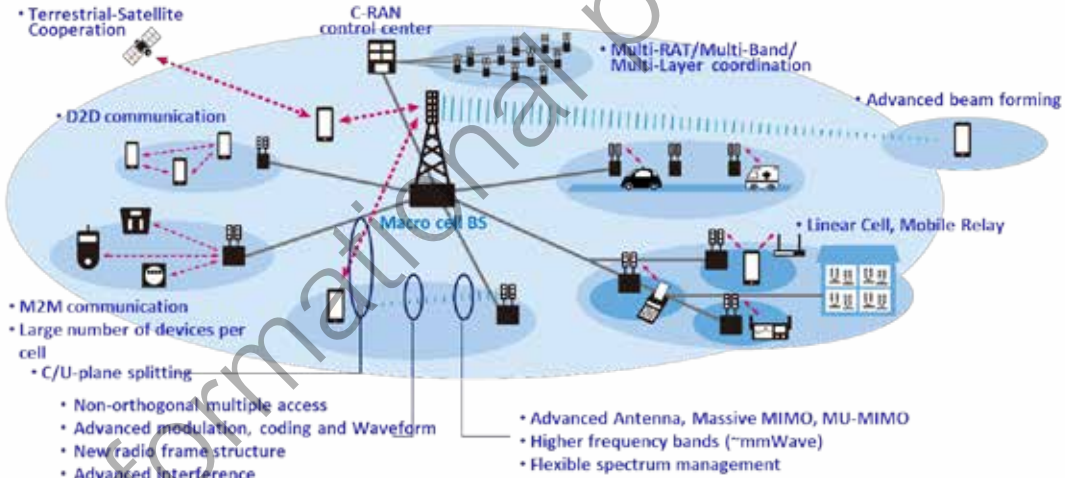
5G Radio Technologies

- Based also on the contents of the ARIB 2020 and Beyond AdHoc White Paper, new research shows **there are many promising new radio technologies that can be used realize a working 5G network.**
- These new technologies have been sorted and organized in order to understand how they will be used to support the necessary requirements of 5G, including high speed, high capacity, massive numbers of devices with simultaneous connections, and high reliability and efficiency.



"Mobile Communications Systems for 2020 and beyond", ARIB 2020 and Beyond Ad Hoc Group White Paper, October 2014.

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Network Technologies for 5G

Requirements

End-to-end Quality of 5G Applications

Extreme Flexibility | Latency | Data rate | Number of Devices

Technology Focus Area

Network Softwarization

- Deep Programmability
- Application Driven
- Information Centric Networks
- Ultra Low Latency
- Multi-Tenancy
- Data Isolation

Fronthaul / Backhaul

Management / Orchestration

- Automation
- Intelligence
- Autonomy
- Analytics
- Knowledge

Mobile Edge Computing

- Edge Security

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2. Activities of 5G Trial Promotion Group (5G-TPG)

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5G-TPG Activities in 2016-2017

- Active discussion on possible **5G Utilization Projects** was made within 5G-TPG for the future system trials.
- **More than 40** 5G Utilization Projects was proposed 5G-TPG members and each project includes trial concepts, contents, and plans.
- 5G-TPG summarized the 5G Utilization Projects by dividing them into **6 Major Use Cases**, and complied them as **a public Report of 5G-TPG**.

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5G-TPG Report v.1.0

- Published in **March 2017** (***Japanese version***)
- This report describes **proposed 5G Utilization Projects** with 【Technological Support】, 【Evaluation Model】, 【Trial Environment】 and 【Relevant Industries】 in addition to 【Use case】.

English version was published in **Oct. 2017**

http://5gmf.jp/en/news/20171003183547/

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Contents of 5G-TPG Report v.1.0

5G System Integrated Verification Trial Report -5G Utilization Project Plan -

Chapter 1	Introduction
Chapter 2	5G Utilization Projects
2.1	Entertainment
2.2	Safe and Secure Society Prevented from Crime and Natural Disasters (Security and Disaster Defense)
2.3	Logistics, Agricultural and Fisheries, Offices, Factories
2.4	Remote Controlled and Managed Devices Such as Robots and Drones
2.5	Connected Cars, Autonomous and Remote Driving
2.6	High Data-Rate and Reliable Communication for High-Speed Moving Vehicles

6 Major Use Cases

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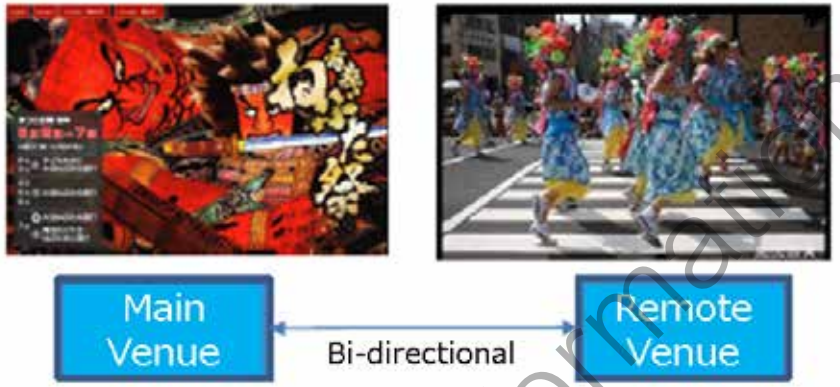
5G Utilization Projects

n Entertainment

Festival cars are rotating and illuminations are being controlled according to volume of voices and claps of people attending at a remote venue



n Security and Disaster Defense

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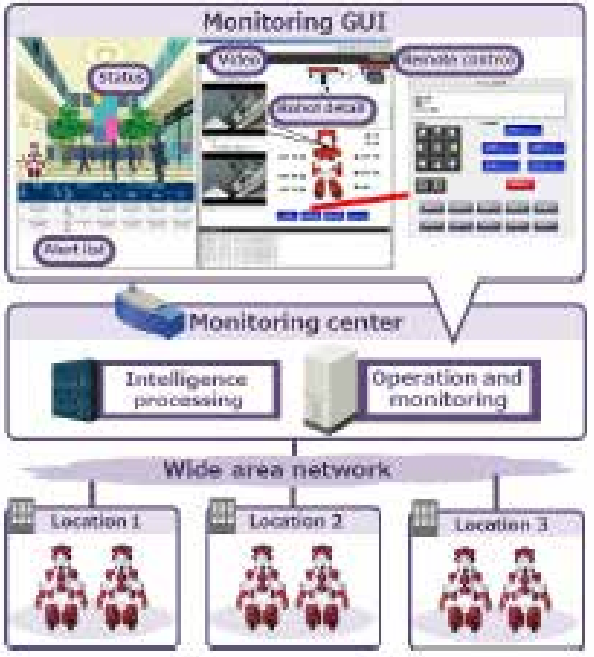
5G Utilization Projects

n Logistics, Agricultural, Offices, Factories



n Remote Controlled and Managed Robots and Drones

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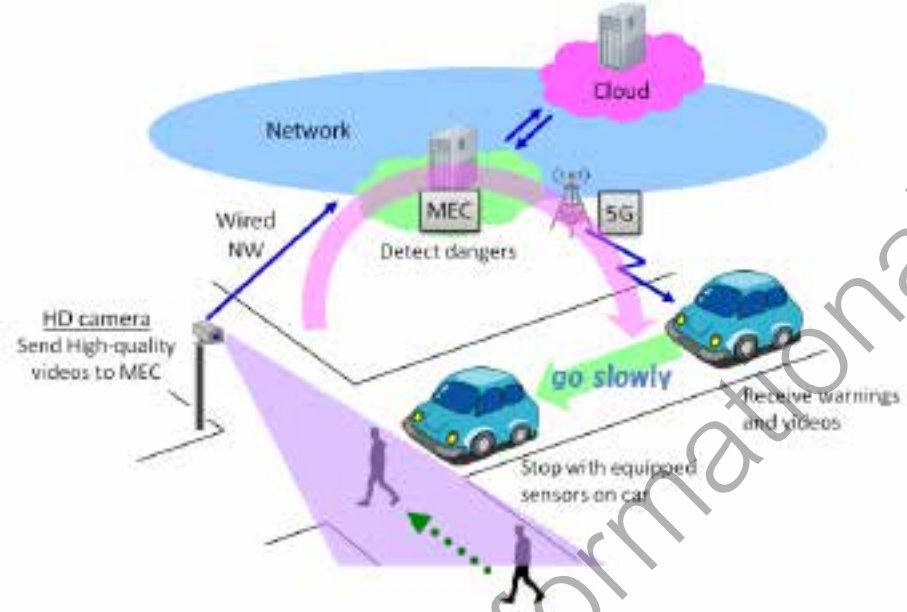
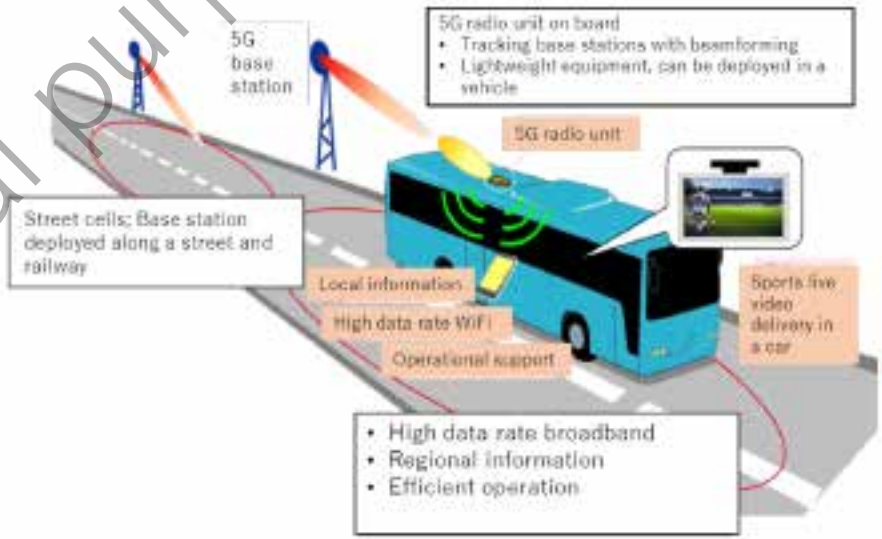
5G Utilization Projects

n Connected Cars, Autonomous and Remote Driving



n High-Speed Moving Vehicles



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5G System Trials

- MIC (Ministry of Internal Affairs and Communications) has started 5G Field Trial Projects referring 5G-TPG Report in Tokyo and rural areas in Japan from 2017.

- To support Japanese 5G System Trials including MIC 5G Field Trials and promote the results in the world, 5GMF has re-established 5G-TPG in operational stage.

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http://5gmf.jp/en/

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