

Panasonic view of 5th Generation mobile network(5G) For Aerotropolis

APEN Silk road conference, BANDUNG INDONESIA
November 11, 2015

Panasonic Corporation
AVC Networks Company
Technology Development Laboratory

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1. Introduce Panasonic Corporation
2. Aspects of aerotropolis
3. Aspects of 5th generation mobile technology

Panasonic Corporation

Business Segments

Wonders!
by Panasonic

APPLIANCES

ECO
SOLUTIONS

AVC
NETWORKS

AUTOMOTIVE &
INDUSTRIAL
SYSTEMS





Eco solutions company
SUSTAINABLE TOWN SOLUTIONS



Food Plants



LED Solutions for Railway Station



ECO
SOLUTIONS

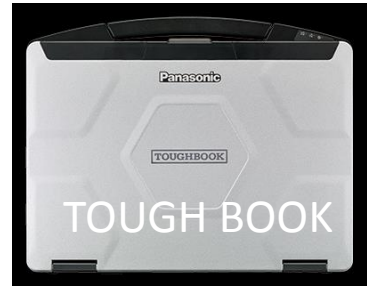


AIRPORT

Mega Solar power plant for Airport



AUTOMOTIVE &
INDUSTRIAL
SYSTEMS



Panasonic Manufacturing History in ASIA and AFRICA



1894 Established in JAPAN

1939 CHINA

1961 THAILAND

1962 TAIWAN

1965 MALAYSIA

1965 TANZANIA

1967 PHILPIN

1968 AUSTRALIA

1970 INDONESIA

1972 SINGAPORE

1972 INDIA

1973 ISRAMIC REPUBLIC OF IRAN

1976 VIETNAM

1983 IVORY COAST

Panasonic aspects of AEROTROPOLIS

Mega Aerotropolis stands for industry



Mega Aerotropolis stands for industry



Frankfurt Int'l Airport



Dallas Fort Worth Int'l Airport

OFFICE

INDUSTRIAL

MICE

<http://www.thesquaire.com/>

<http://googleearthclub.seesaa.net/article/28511792.html>



LOGISTICS

TRANSIT

HOTEL

SHOPPING

RESTRANT

ENTERTAINMENT

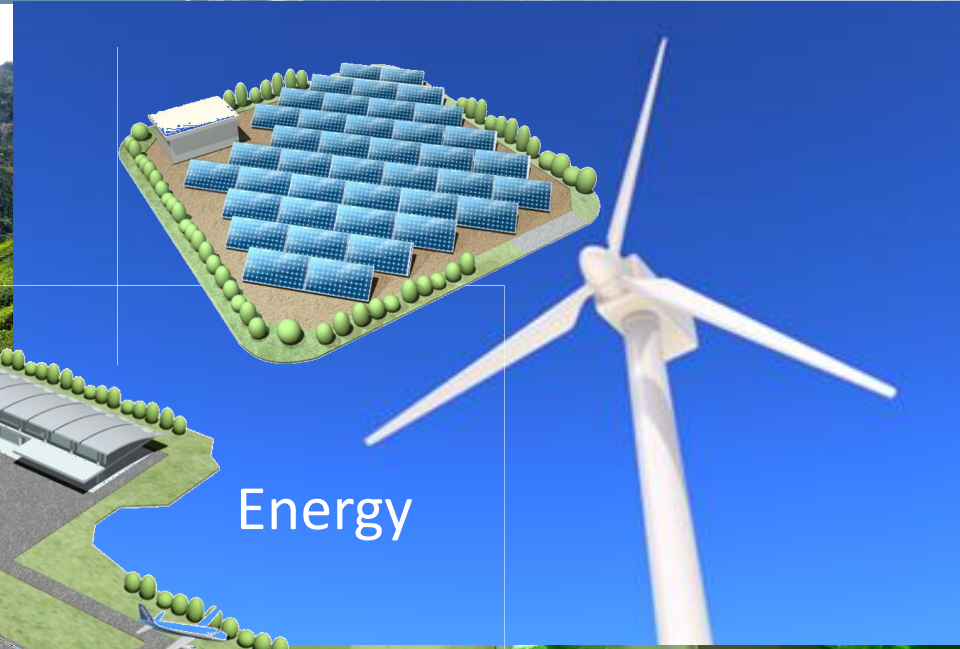
<http://www.businesskorea.co.kr/sites/default/files/field/image/incheon%20airport.jpg>

<https://ja.wikipedia.org/wiki>

Compact Aerotropolis stands for more human



Industry



Energy



Residential area



Local food

Compact Aerotropolis stands for more human

COMMUNICATION

DISASTER
PROOF SITE

FOOD

ENERGY SUPPLY

RESIDENCE

MANUFACTURING

HOME OFFICE

EDUCATION



AUTOMONOUS AEROTROPOLIS

Supply education, energy, communication
and job to local community



Release digital divide/ disparity of life
opportunity

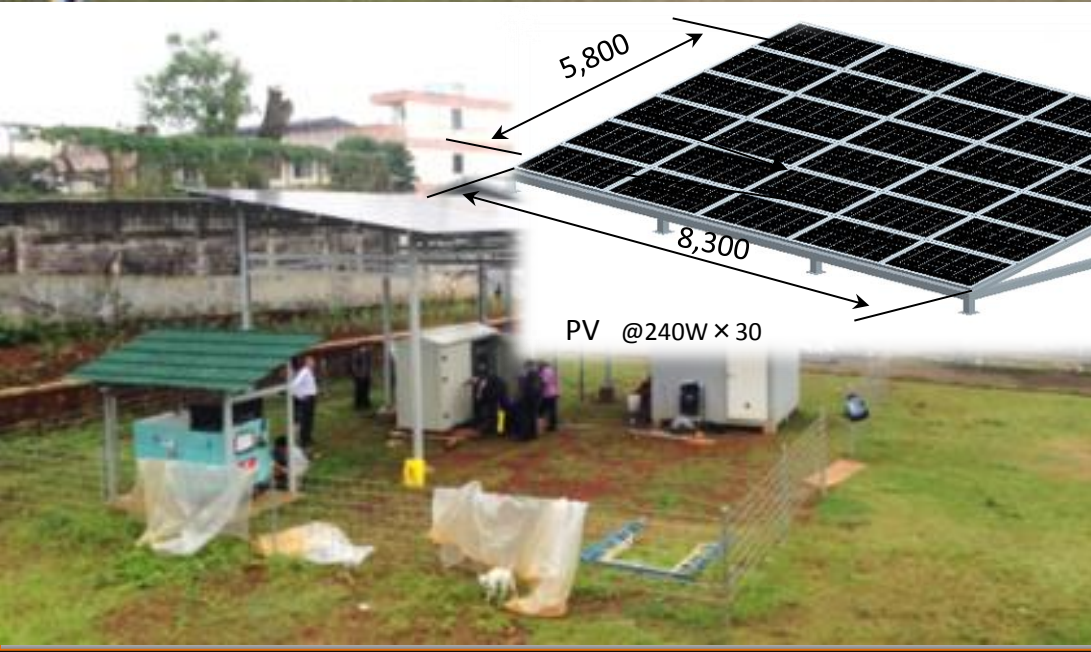
Some technology is ready for compact aerotropolis



Power generate and storage container (Indonesia)



Autonomous WiFi

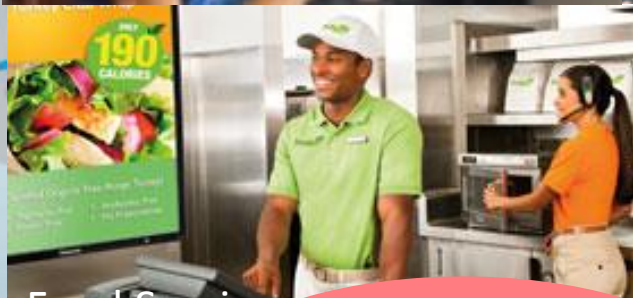


PV @240W x 30



Green power LTE base station

Evolved IoT technology drives smart aerotropolis



IoT and Wireless



5G and R&D activity

2G



GPRS, EDGE

GSM
GMSK

Data(several kbps)

Key application

- Voice phone
- SMS (short message)

3G



HSDP

UTMS
CDMA

Data(several Mbps)

Key application

- Voice phone
- SMS(short message)
- e-mail
- WEB service

4G



LTE-Advanced

LTE
OFDM

Data(several 10Mbps)

Key application

- VoLTE
- Smart phone (full-ledged internet)

5G

OFDM + New RAT
Heterogeneous

Data(several 100Mbps)

Key application

- Massive IoT
- Massive multi media

- 5G is the new technology that brings more user value and harmonize with existing mobile network.

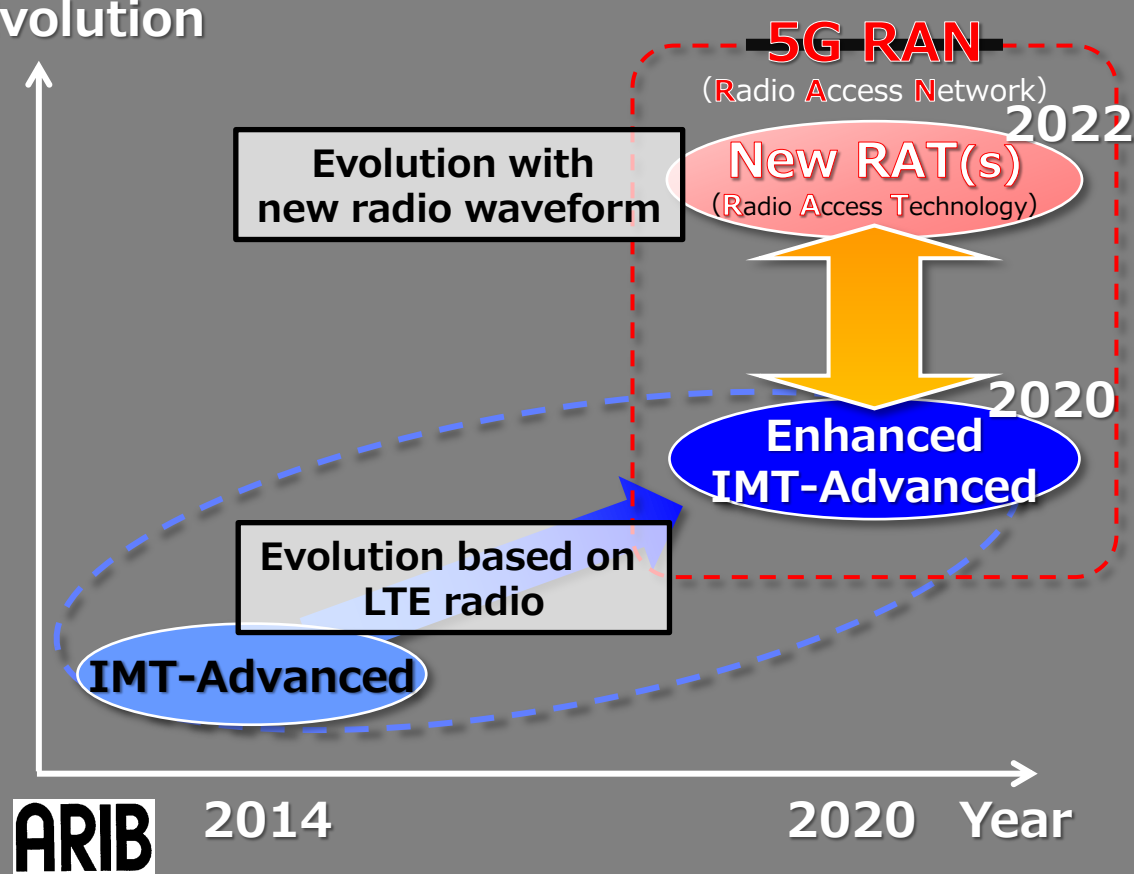
2020

start to launch with part of ITU-R requirements.

2022

start to launch with full ITU-R requirements.

Evolution



REF : Interim version of ARIB White Paper「Mobile Communications Systems for 2020 and Beyond」Sept.2014

- 5G require high performance but may not satisfy all requirement from the beginning.

High speed

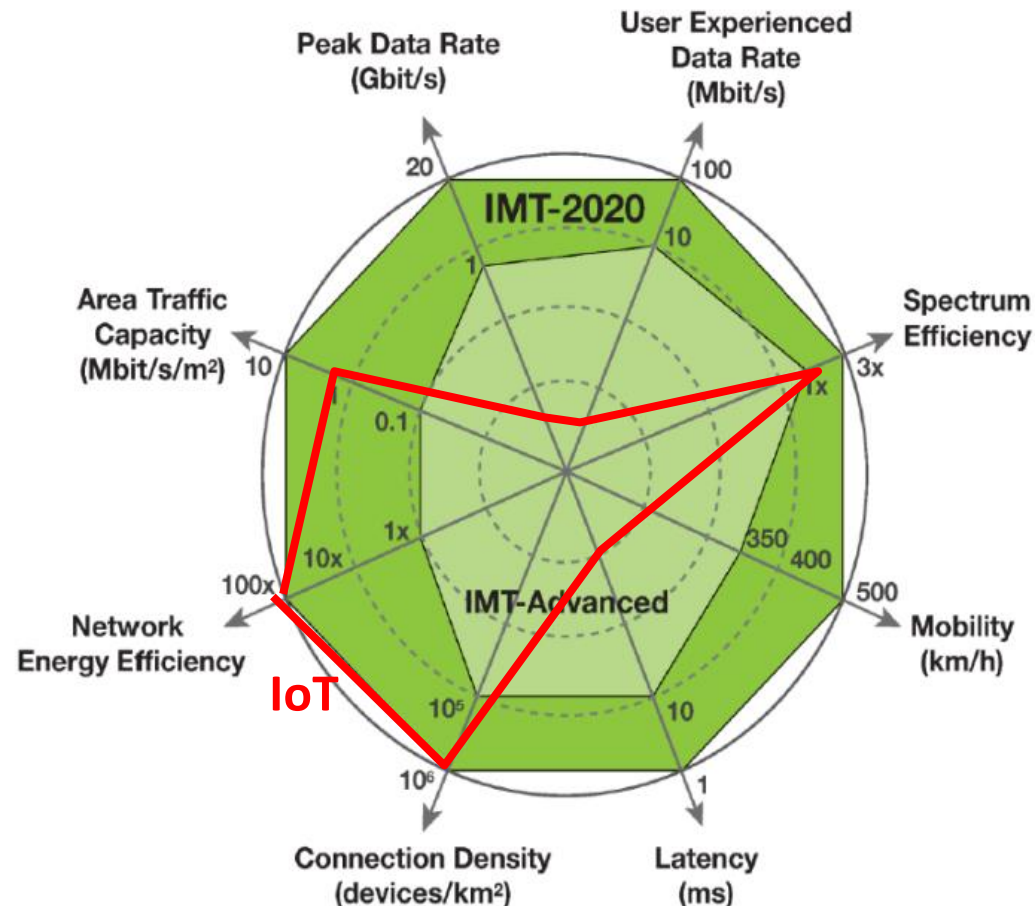
peak data rate: 100Gbit/s
mobility speed: 500km/h
latency: 1ms

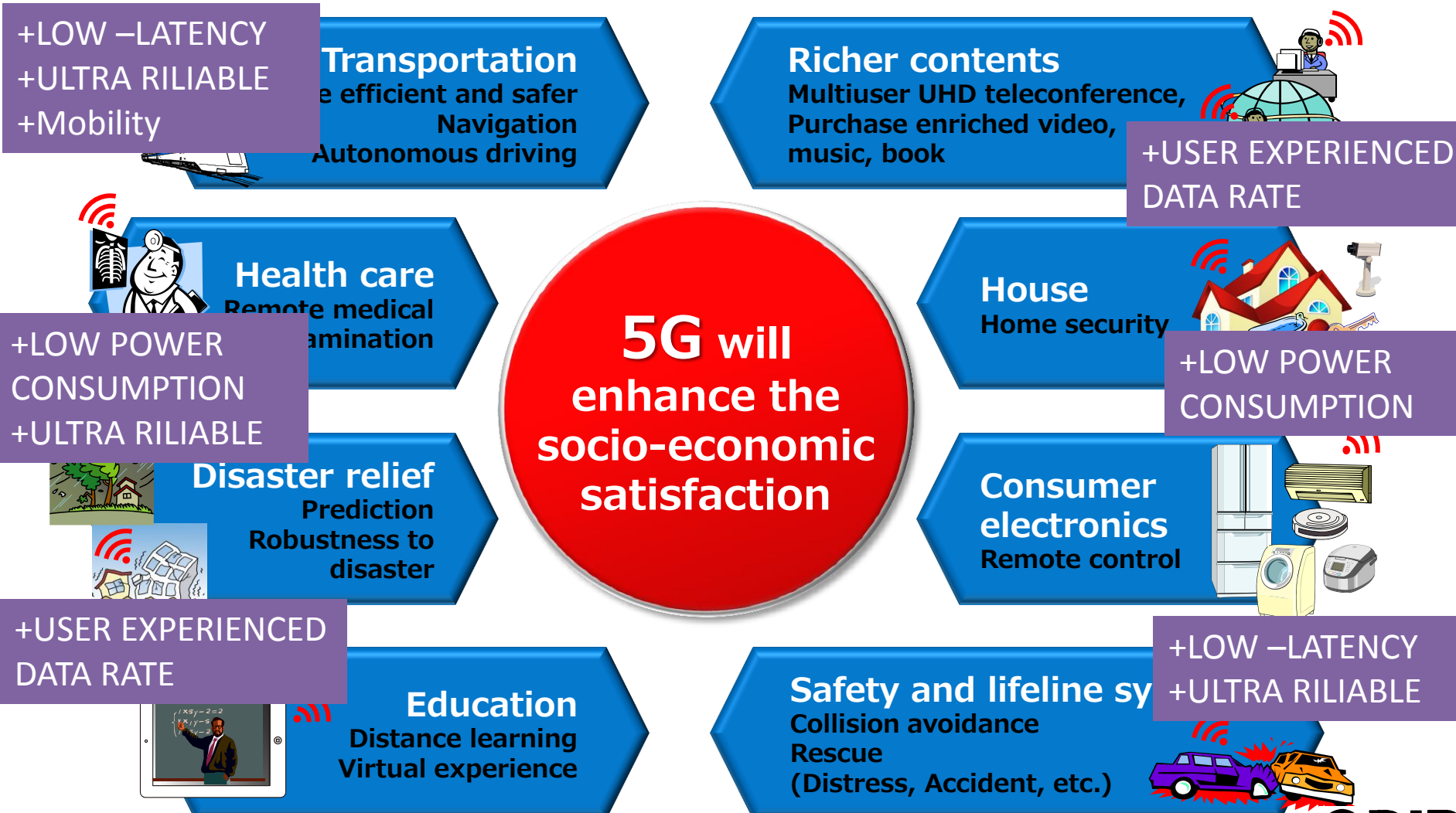
High capacity

10million devices/km²

Low power consumption

over 10 years operation
without battery change

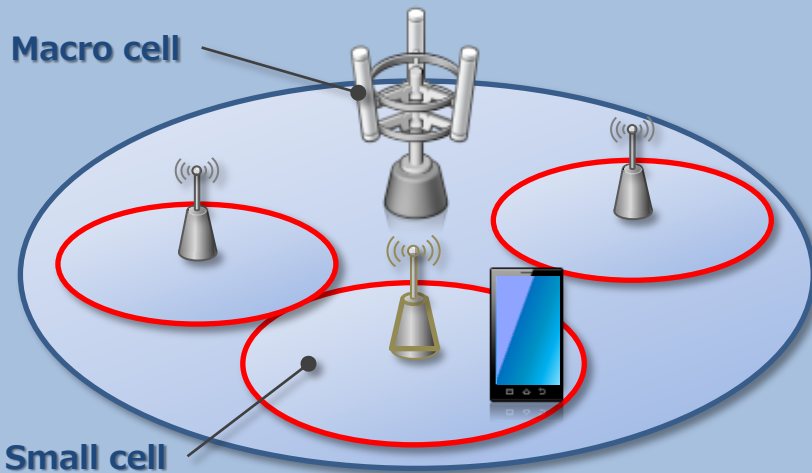




REF. : Interim version of ARIB White Paper「Mobile Communications Systems for 2020 and Beyond」Sept.2014

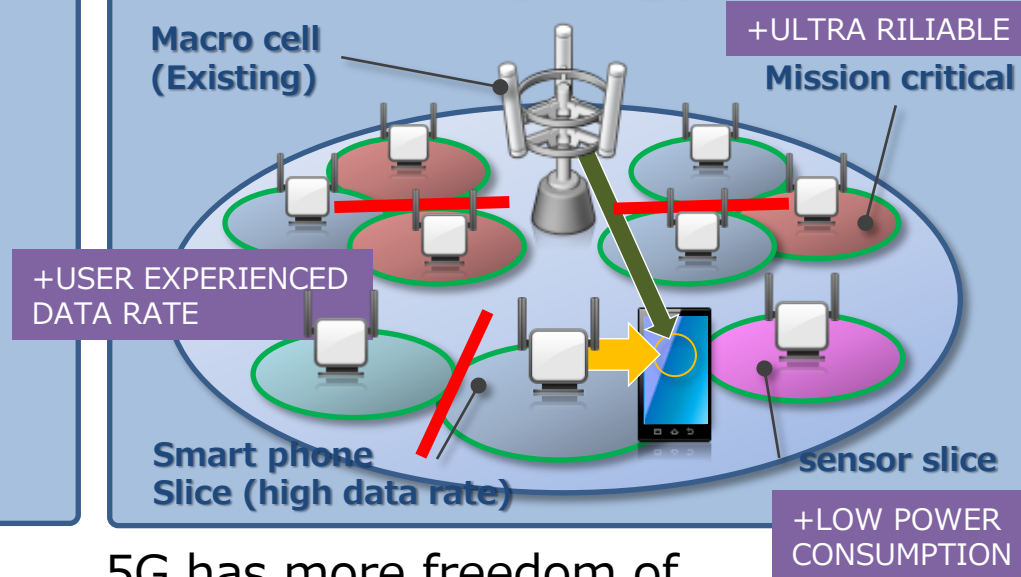
- Multiple radio technology achieve multiple service operation at a high level.

LTE Homogeneous network (existing)



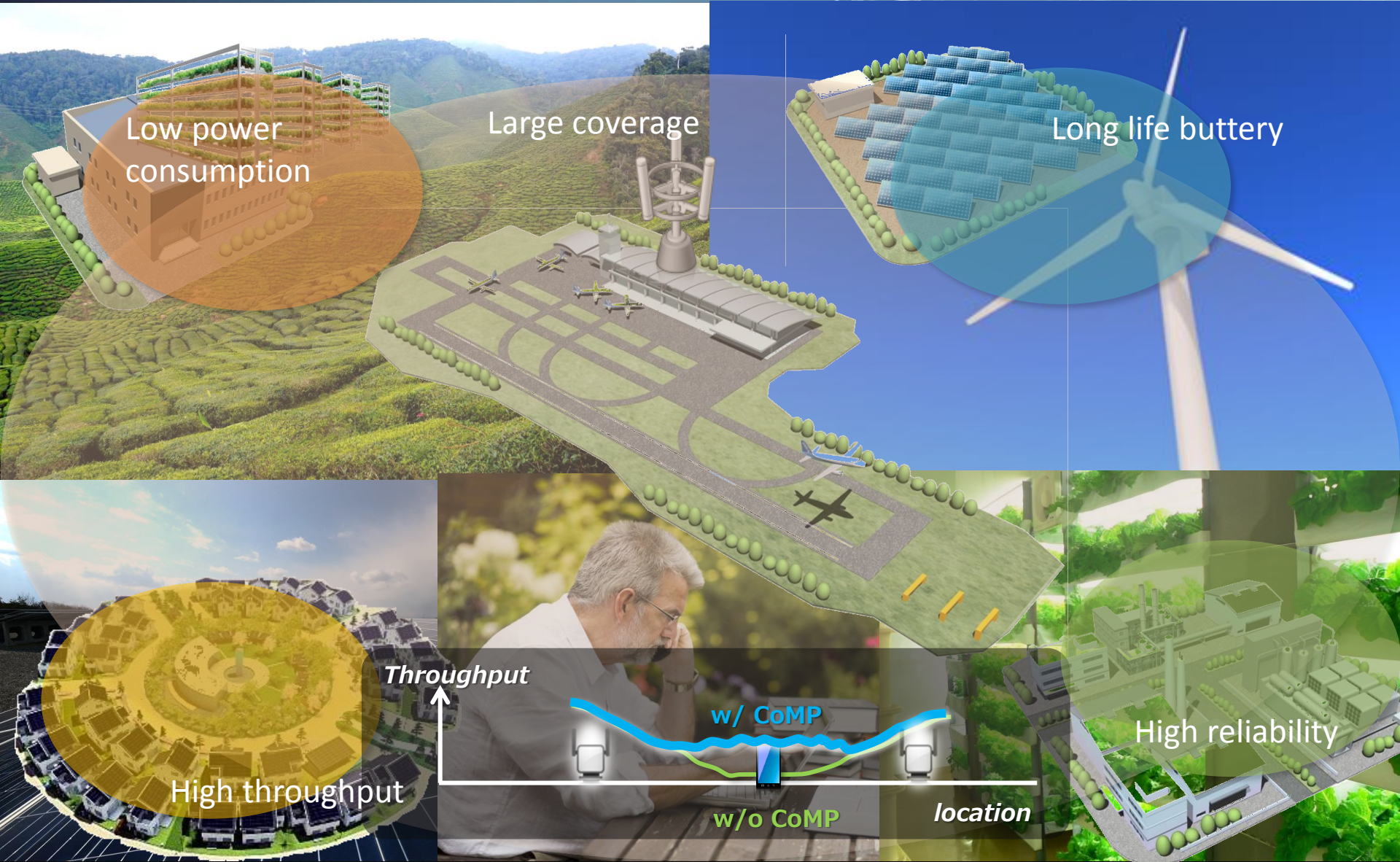
Interference (red line) avoidance is necessary to keep higher bitrate and system reliability.

Heterogeneous network topology



5G has more freedom of frequency (>6GHz)
5G system exist with existing network but interference (red line) is still remaining at edge of same frequency.

5G covers multiple requirements for aerotropolis



Compact Aerotropolis is the city to solve social issues **Panasonic**



Wonders!
by Panasonic

Release digital divide and disparity of life opportunity



5G for Aerotropolis

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<https://www.youtube.com/user/ChannelPanasonic>