English

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JST CREST/DVLSI Program Review Meeting

Development of Dependable Wireless System and Device

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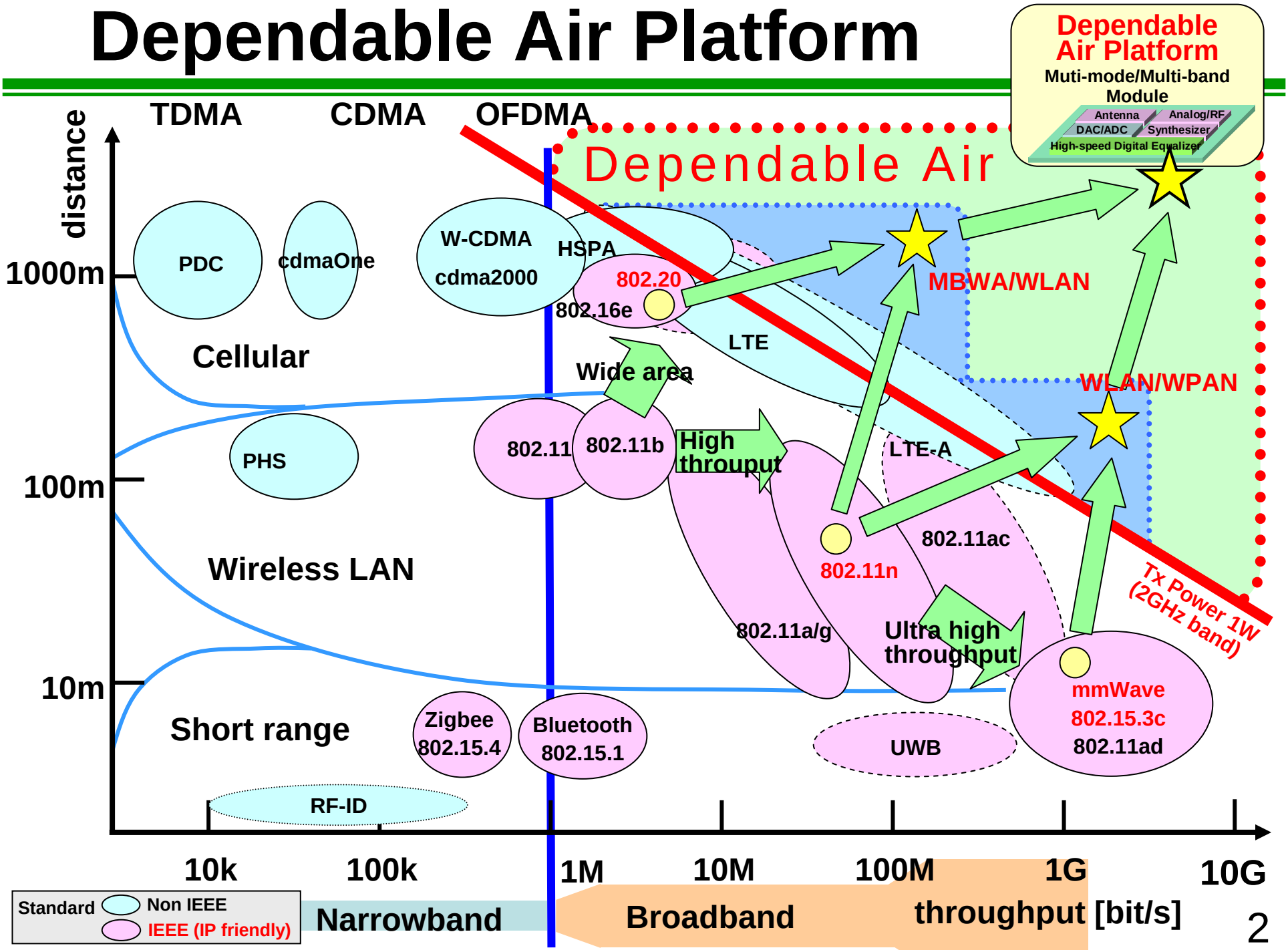
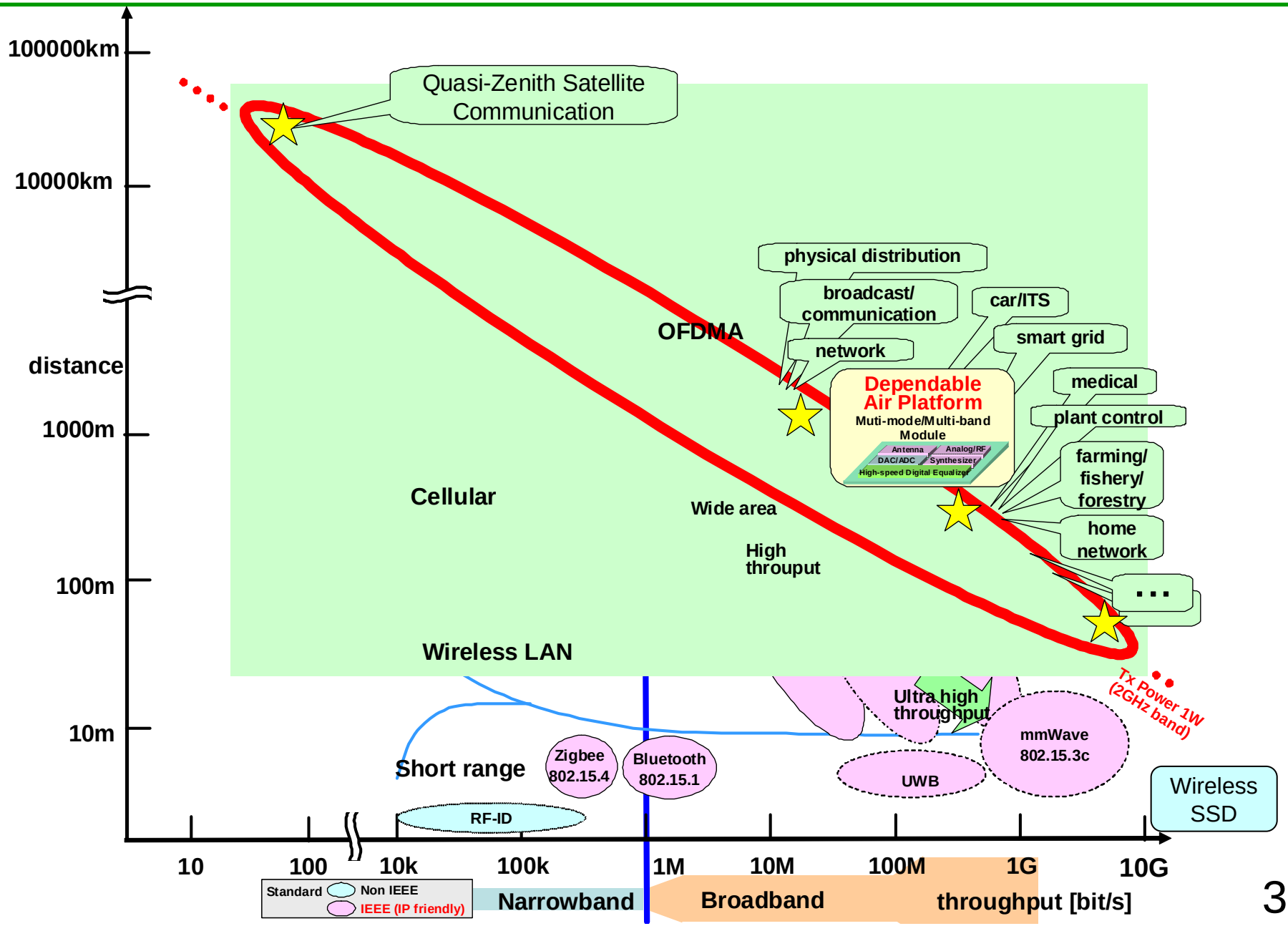
Cooperators: **NEC Corporation**
SOFTBANK TELECOM Corp. *etc.*

Dependable Air Platform



Dependable Air: Joint Terrestrial & Satellite Communication



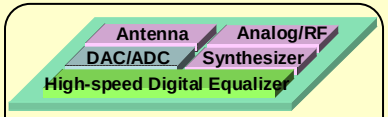
Dependable Air: Network/Chip

Hetero-Network Joint

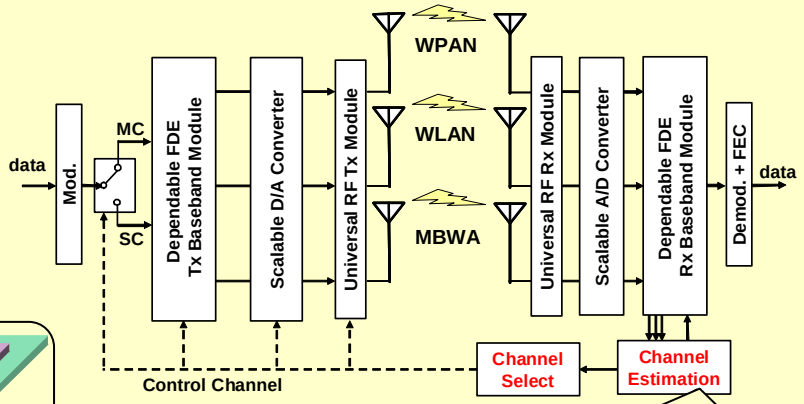
H2H, H2M, M2M
Information network &
Control network

Dependable Air Interface

(1) Universal RF
(2) FDE
(3) Scalable
A/D & D/A



All Si CMOS



(1) Wireless Dependability Measurement Using Frequency Domain Channel Estimation Method

+ Measuring multi channel functions simultaneously: distance, S/N, BER
+ Selection of optimum channels after channel compensation

(2) Hetero-Network Roaming

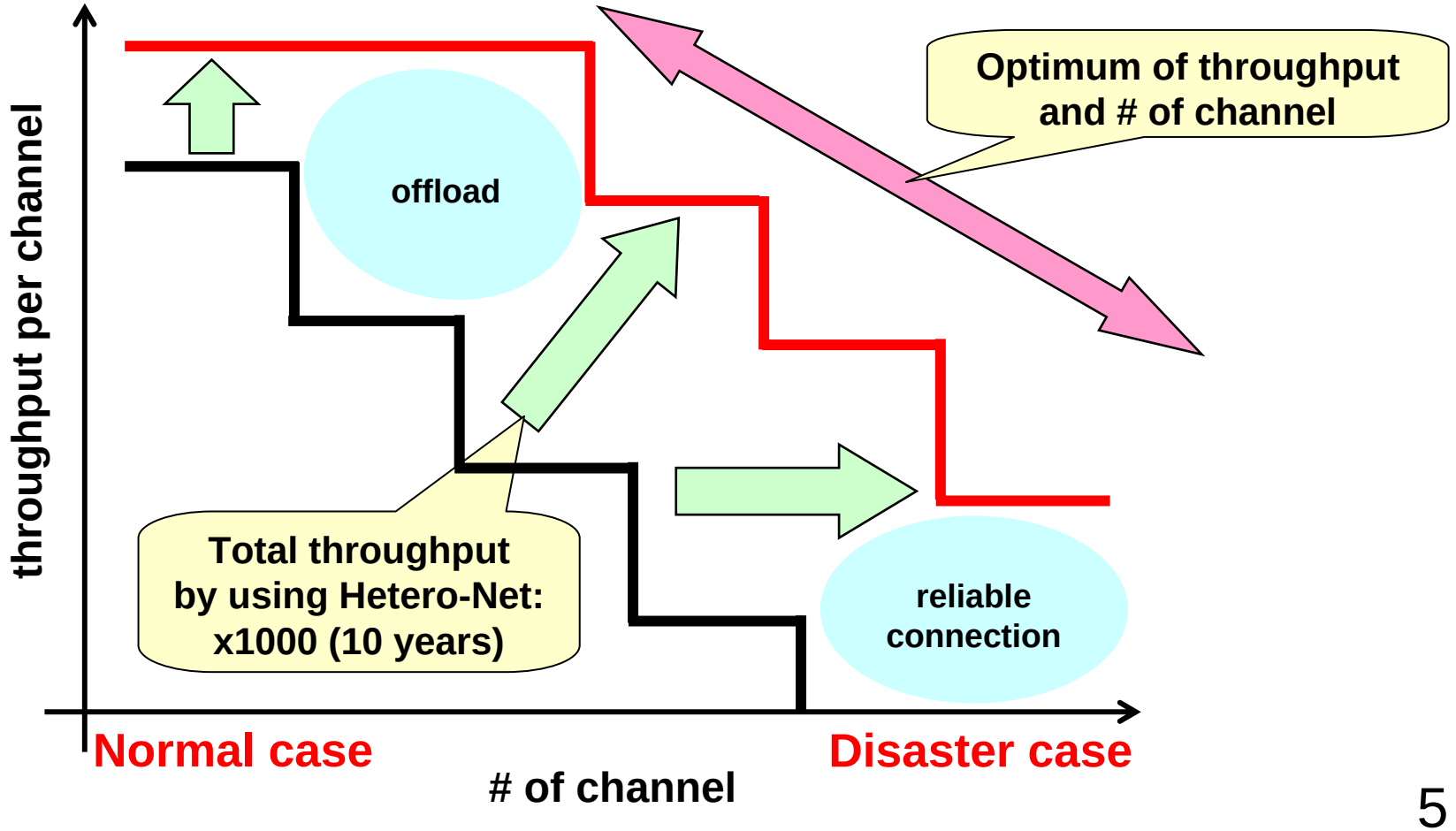
+ High mobility
+ Optimum channel selection

(3) Hybrid Single/Multi Carrier Modulation

+ Optimum modulation for distance, S/N, BER
+ Improving connectivity

Dependability of Wireless Network

Dependability Index:
(1) Reliable connection
(2) Optimum throughput and # of channel



Cellular to Wireless LAN: Issue of offload

■ Ref: Nikkei Communication, April 2012

- Instability connection:
  Connection disable (switching failure)
- Degradation of throughput after switching

Cause

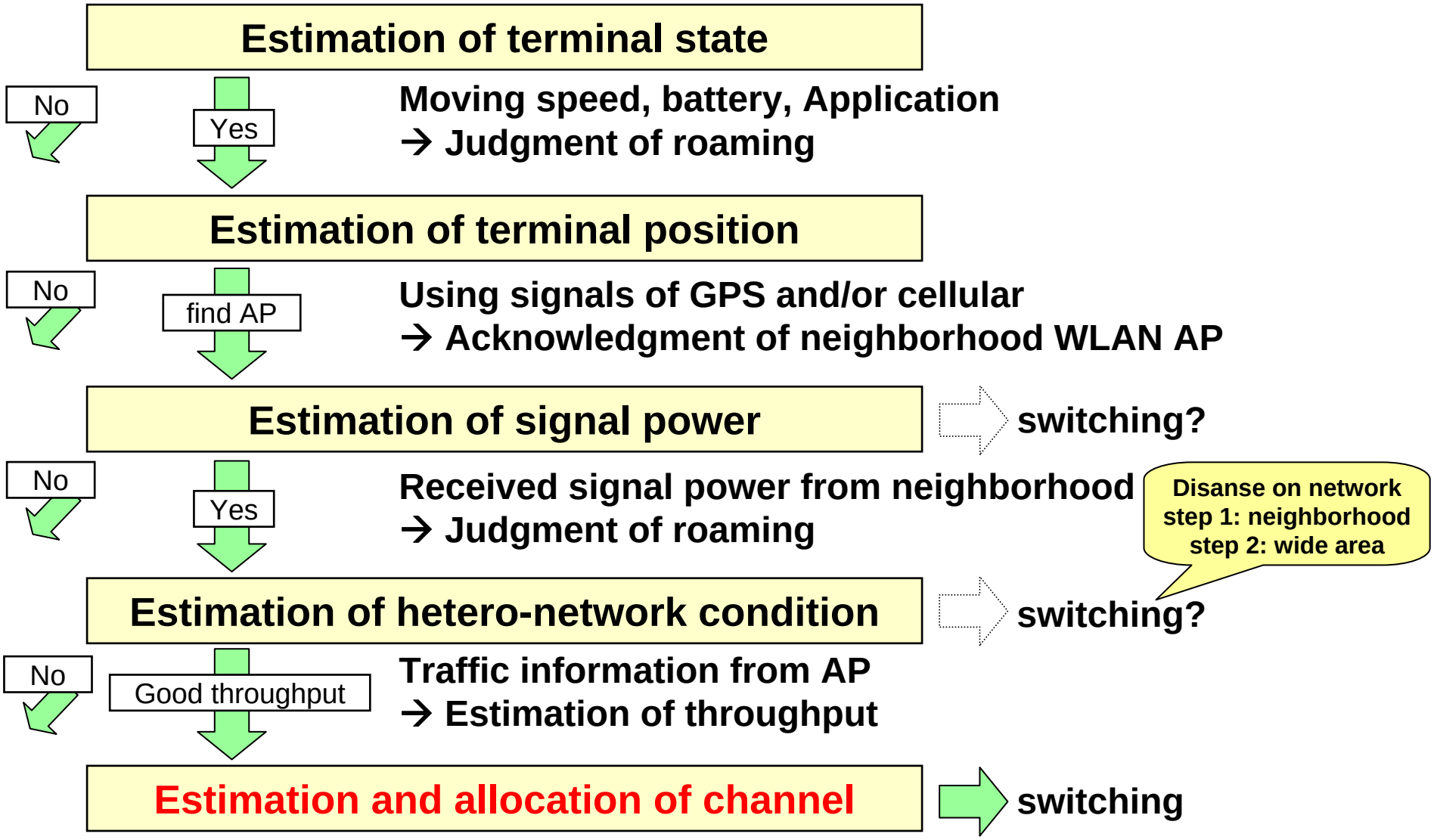
- **Traffic jam on 2.4GHz WLAN band**
  - Small # of channel: 4 channels in Japan
  - Chaotic establishment of WLAN access points
  - Spread delay of 5GHz-band WLAN

  ■ **(Answer) Dependable Air:**
  Hetero-Net technology with 5GHz- and 60GHz-bands

- **Action of automatic switching**
  - Switching to WLAN AP with unstable S/N signal power
    → Connection disable (switching failure)

  ■ **(Answer) Dependable Air:**
  Channel measurement and estimation
  Optimum channel selection

Dependable Air: Reliable Hetero-Network Roaming



Multi-Mode Scalable FDE

FDE: frequency domain equalization

Optimum channel selection method of dependable air
+ Generating MBWA and WLAN signal (via different fading channel)
+ Optimum channel selection using frequency domain measurement