

Japanese Scene & UWB in future

< UWB : Issues and Opportunities >

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Japanese scene toward UWB Rule

■ Rule Making efforts since late 2002

- Government council have been considering toward their consultation.
- MMAC forum have been playing their role to contribute the council.

□ MMAC forum and Industries carried out a series of experiments.

□ Consultation document are issued Mar. 2006.

□ UWB rule is expected to be issued soon.

■ What was the consequence supposed to achieve?

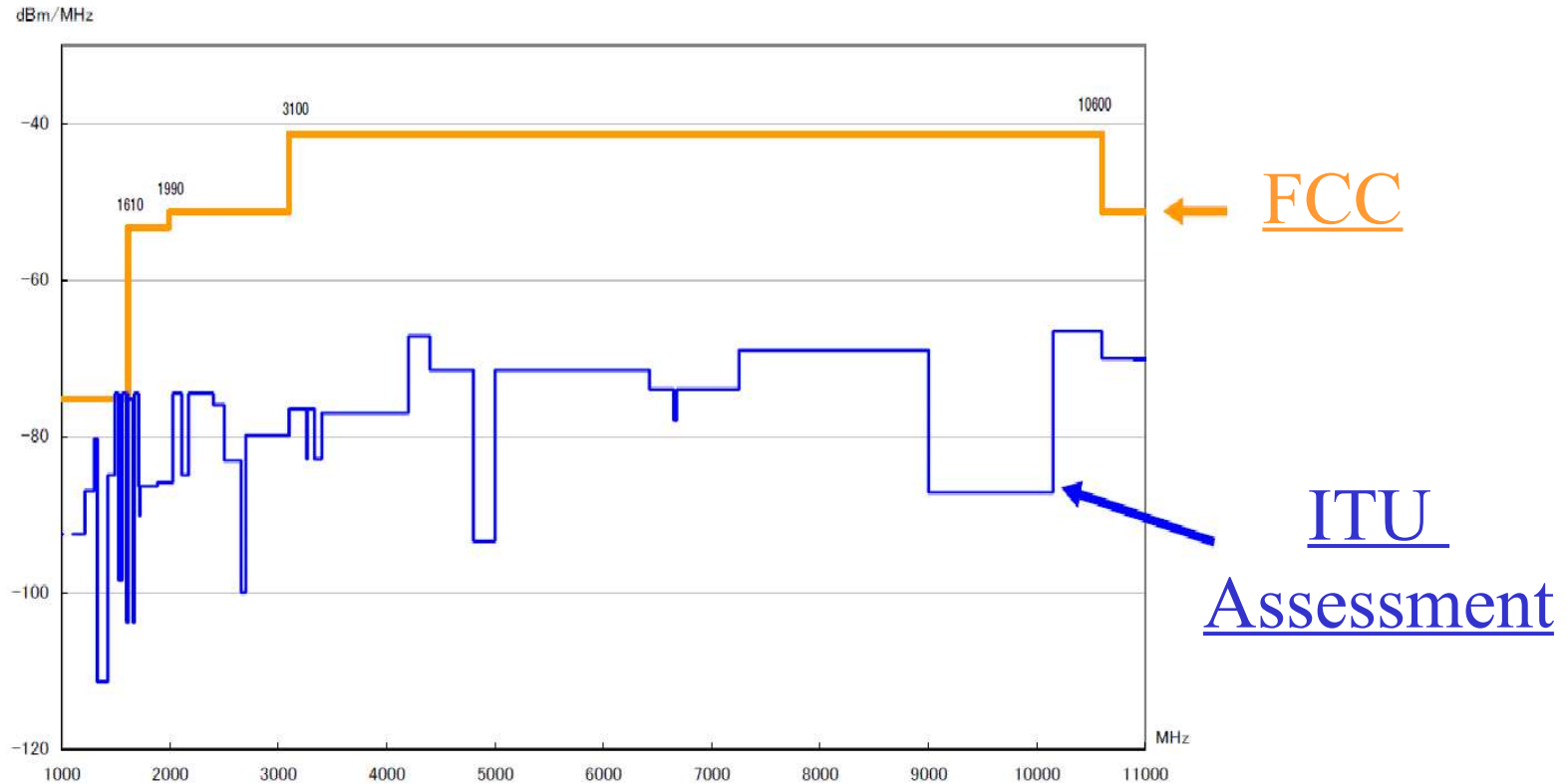
□ Spectral usage efficiency.

- **Commons** : Expansion of ISM / UNII bands. So far, the results was “So, so” since 2002.
- **Overlay** : Lot of debate still on “Cognitive radio” due to our concentrated population of Japan
- **Underlay** : UWB should have been most moderate path to new wide spectrum.

□ UWB is required to co-exist with incumbent spectrum users.

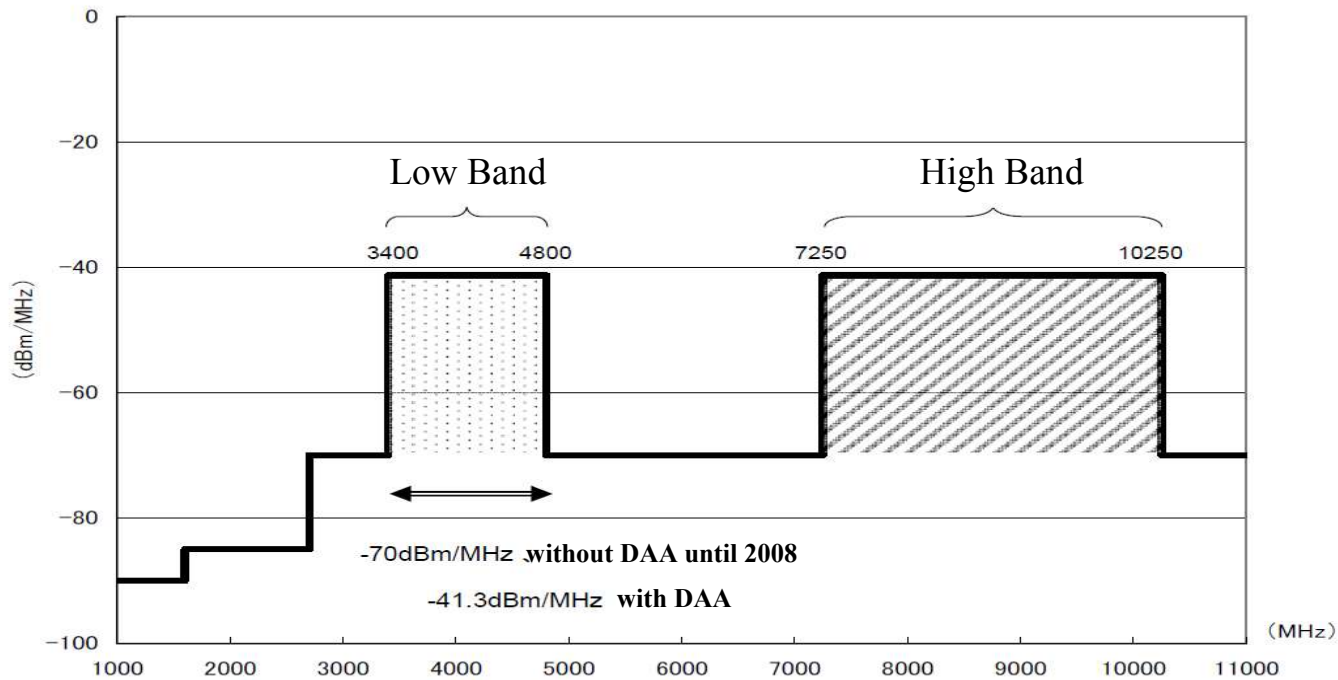
- UWB have to prove the robustness against interference of incumbent systems.
- UWB is supposed to provide interference mitigation capabilities, c.f. DAA

FCC mask & ITU interference assessment



Difference between : Intentional & unintentional, Interference & Noise

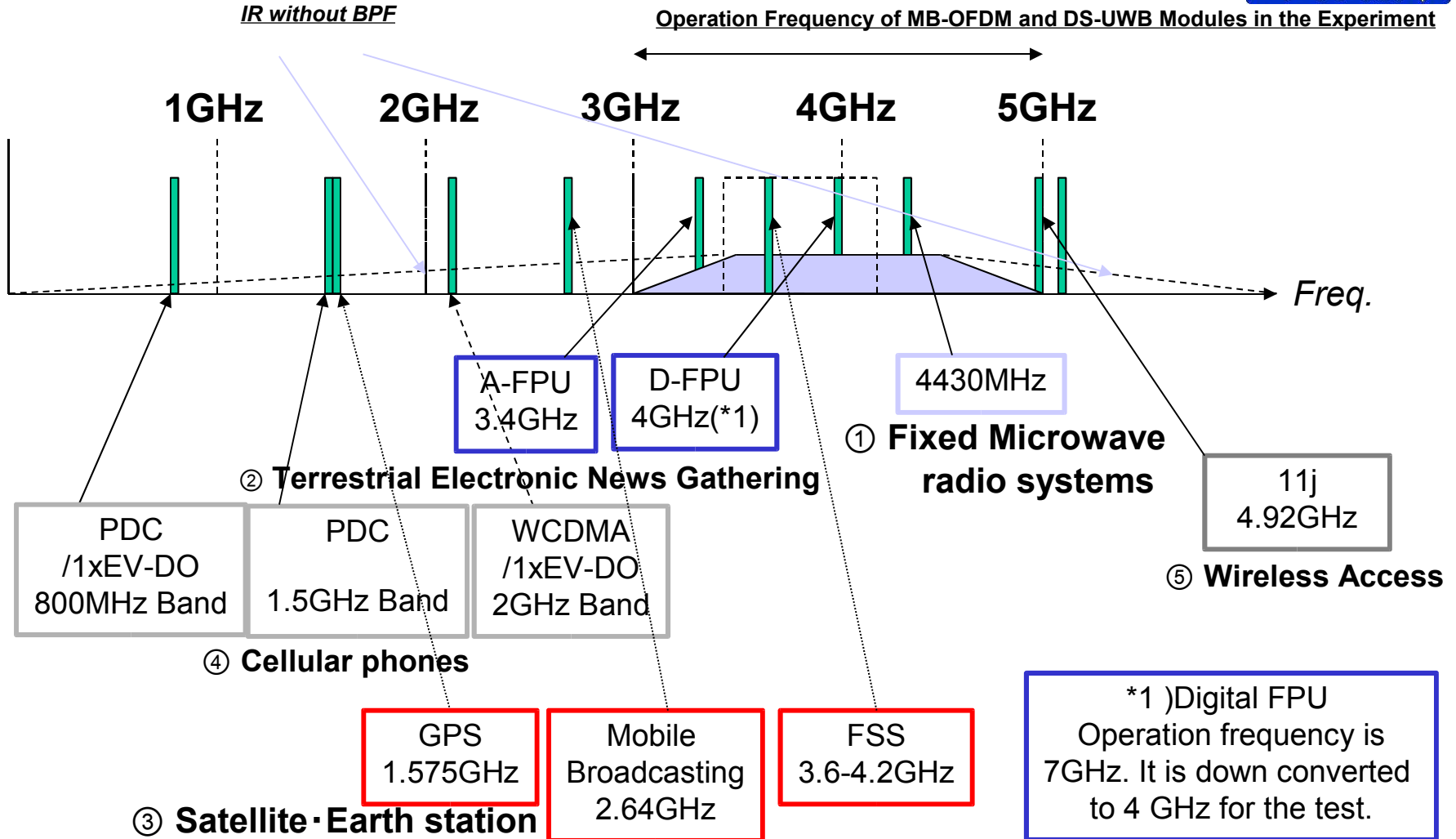
Proposed Japanese UWB Mask in Consultation



Need to prove the coexistence capability, mitigation functions

**Outdoor usage is not allowed. Automobile usage is not allowed.
Sensor network applications are not allowed, so far.**

MMAC forum & Council requested a series of tests



UWB Experiments Task Force

Over 30 companies joined

Leader Prof. Sanada, Keio University: Secretary Mr. Yuasa, ARIB

Intel Corporation
WILLCOM, Inc
Japan Aerospace Exploration Agency
Space Communication Corporation
NEC TOSHIBA Space Systems, Ltd.
NHK Science & Technical Research Laboratories
NTTDoCoMo, Inc
Tokyo FM Broadcasting Co., Ltd.
KDDI CORPORATION
JSAT CORPORATION
National Institute of Information and
communication Technology (NICT)
Advanced Space Business Corporation
Sony Corporation
TDK Corporation
tv asahi corporation
TV TOKYO Corporation
TOKYO ELECTRIC POWER COMPANY
Tokyo Broadcasting System, Inc.

Texas Instruments Japan Limited
NIPPON TELEVISION NETWORK CORPORATION
NIPPON TELGRAPH AND TELEPHONE CORPORATION
The National Association of Broadcasters in Japan (NAB)
Japan Radio Co., Ltd.
Hitachi, Ltd.
FUJITSU LIMITED
Fuji Television Network, Inc.
Freescale Semiconductor Japan Ltd.
Furuno Systems Co., Ltd.
Furuno Electric Co., Ltd.
Nippon Cultural Broadcasting Inc.
Matsushita Electric Works, Ltd.
Mitsubishi Electric Corporation
Mobile Broadcasting Corporation
YOKOGAWA Electric Corporation

*The name of the participants are listed on pp.35-36.

So what to learn from the outcome

- Consultation & Experiments suggest,
 - Expected UWB Std systems are statistically similar to AWGN interferer.
 - Several coexistence scenarios are hypothesized and requires somewhat less harmful than AWGN, i.e. AWGN – 20dB or so.
 - DAA could be a solution in some of these scenarios.
 - No objection to reduce environmental noise sufficiently larger than AWGN.

- What I am wondering in future UWB Rule, are if,
 - UWB devices which emit less noise than Unintentional Emission Mask, can emit more UWB power.
 - UWB devices which recognize, detect & advertise the presence of potential victim receivers, can emit more UWB power.
 - UWB devices which avoid emission concerning specific conditions, can emit more UWB power.

Safe, Secure & Reliable Ubiquitous Wireless

< UWB Opportunities at ubiquitous network Study Group >



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UWB : High Rate, Low Power & Robust

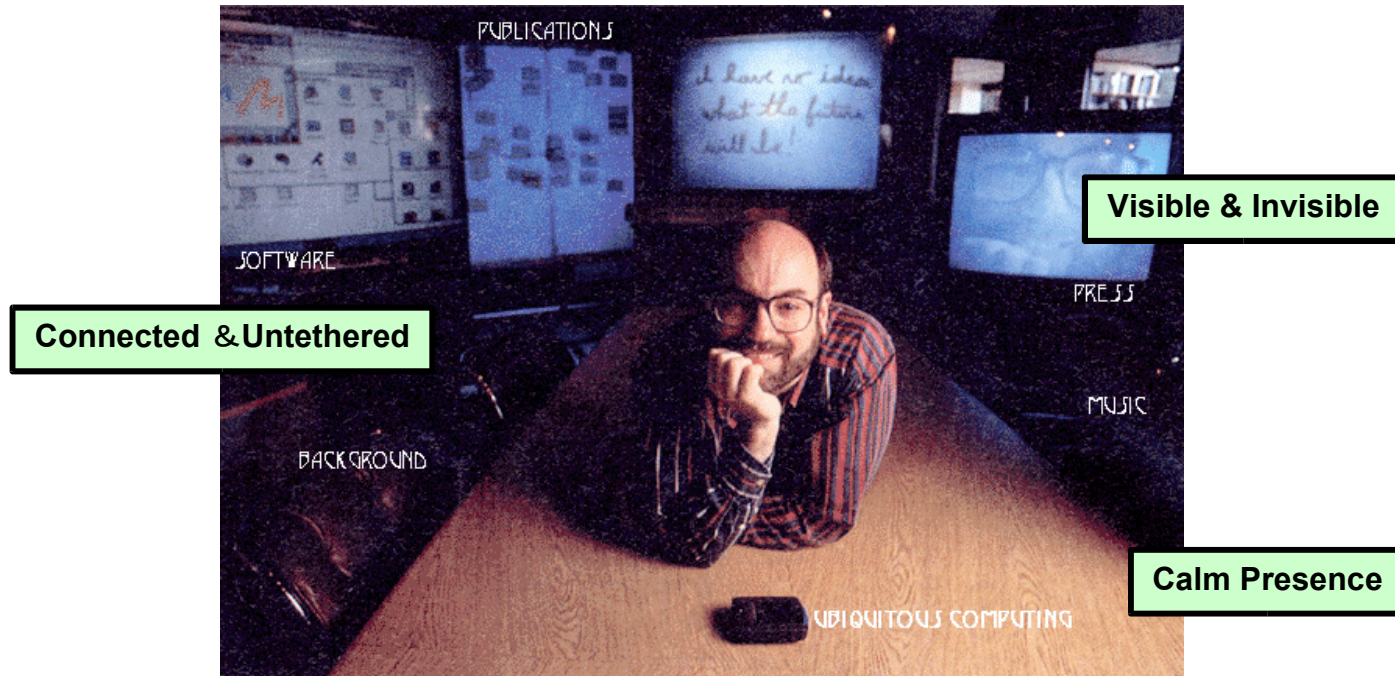
- Current Applications,
 - Still Camera, PC, Printer, DVD-FPD, Game, Cellular Handset
- Same background needs of current UWB applications,
 - Motion picture streaming : higher bit rate for higher quality of images.
 - Picture image file transfer : faster transfer time for higher definition images.

⇒ Market looks lucrative, UWB helps a lot and needs more.
- Real world objects, i.e. **THINGS** to be connected, and Safe, Secure, Reliable.
 - Invisible or visible devices.
 - Calm presence.
 - Connected & untethered.

⇒ Opportunities seems maximum, UWB is essential.

Ubiquitous Computing & Networking

Vision of 1980-1990



What is the Vision of 2000-2010

Safe, Secure & Reliable Ubiquitous Wireless

UWB : Robust, Low Power & High Rate

■ Robustness

- Because of the propagation characteristics of UWB channel.
- Potential utilization of spatial domain resolution.

■ Low Power Dissipation

- Because of low interference of multiple access neighbours and foreign services due to extremely wide bandwidth.

■ High Data Rate

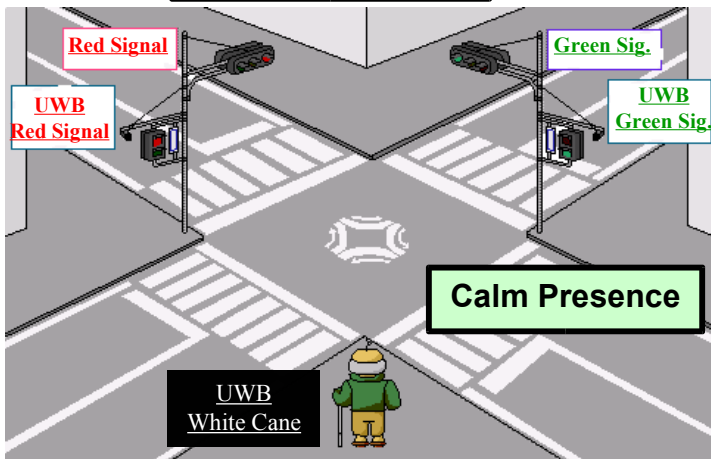
- High data rate should mean efficient spectrum utilization and subsequent capacity increase.
- High data rate is able to convert to Robustness and Low Power.

Ubiquitous UWB Networking

Sensor Network

Neighborhood

Visible & Invisible



Connected & Untethered

Planetwide



Mars

Earth

END

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