

# Emerging Applications and Use Cases in the UWB Domain

***Koji Matsumoto***  
***Sales & Marketing Manager***  
***Realtek Semiconductor Japan Corp.***

Wireless USB Conference, Wireless Japan 2008

2008.07.22

# Outline

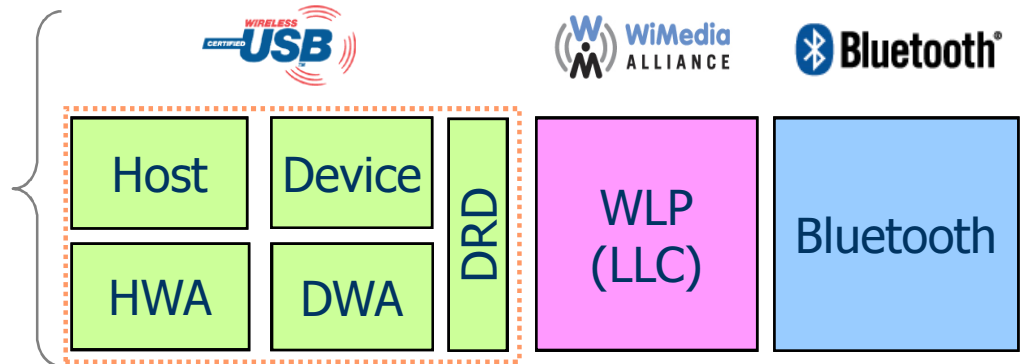


- Common radio platform: UWB MAC/PHY
  - WUSB, WLP, Bluetooth, etc.
- UWB features
- UWB market
  - PC peripheral connectivity
  - Home/car entertainment
  - A new mobile lifestyle
- Next generation UWB

# UWB Ecosystem



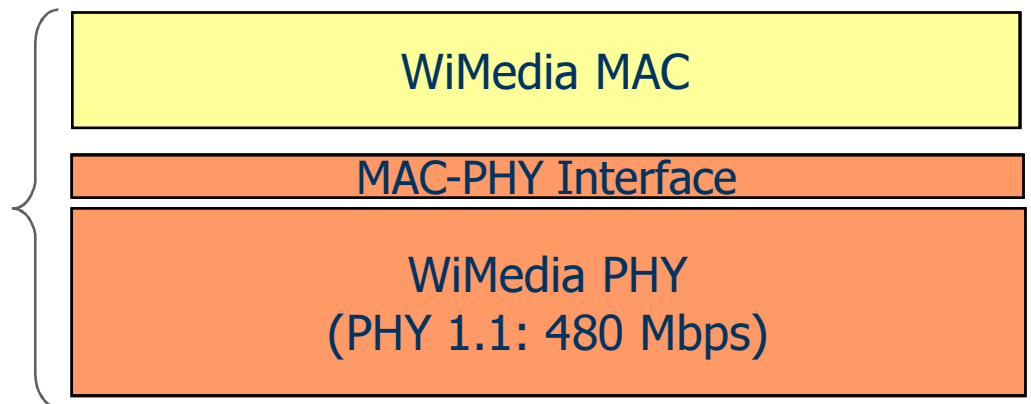
- Support for multiple protocols
- Coexistence between protocols by design



- Established markets with huge volumes:
  - Wired USB
  - Bluetooth



- Industry group with broad support
- Intel, Nokia, Sony, Philips, Microsoft, NEC, Samsung, 100+ others



- Distributed MAC
- Auto-discovery & configuration
- Wide bandwidth enables very low power consumption per Mbps
- Enables very high data rates

# WiMedia Common Radio Platform

- UWB MAC/PHY provides a flexible platform for supporting multiple protocol adaptation layers.
  - Certified Wireless USB PAL
    - Specified by USB-IF
    - Transition existing USB 2.0 applications to wireless
  - WiMedia Logical Link Control Protocol
    - Ethernet LLC for WiMedia MAC
    - Migrate TCP/IP applications over UWB
  - UWB AMP PAL for Bluetooth
    - Next-generation Bluetooth
    - Migrate BT 2.1/EDR applications to a higher data rate physical layer

# UWB Features

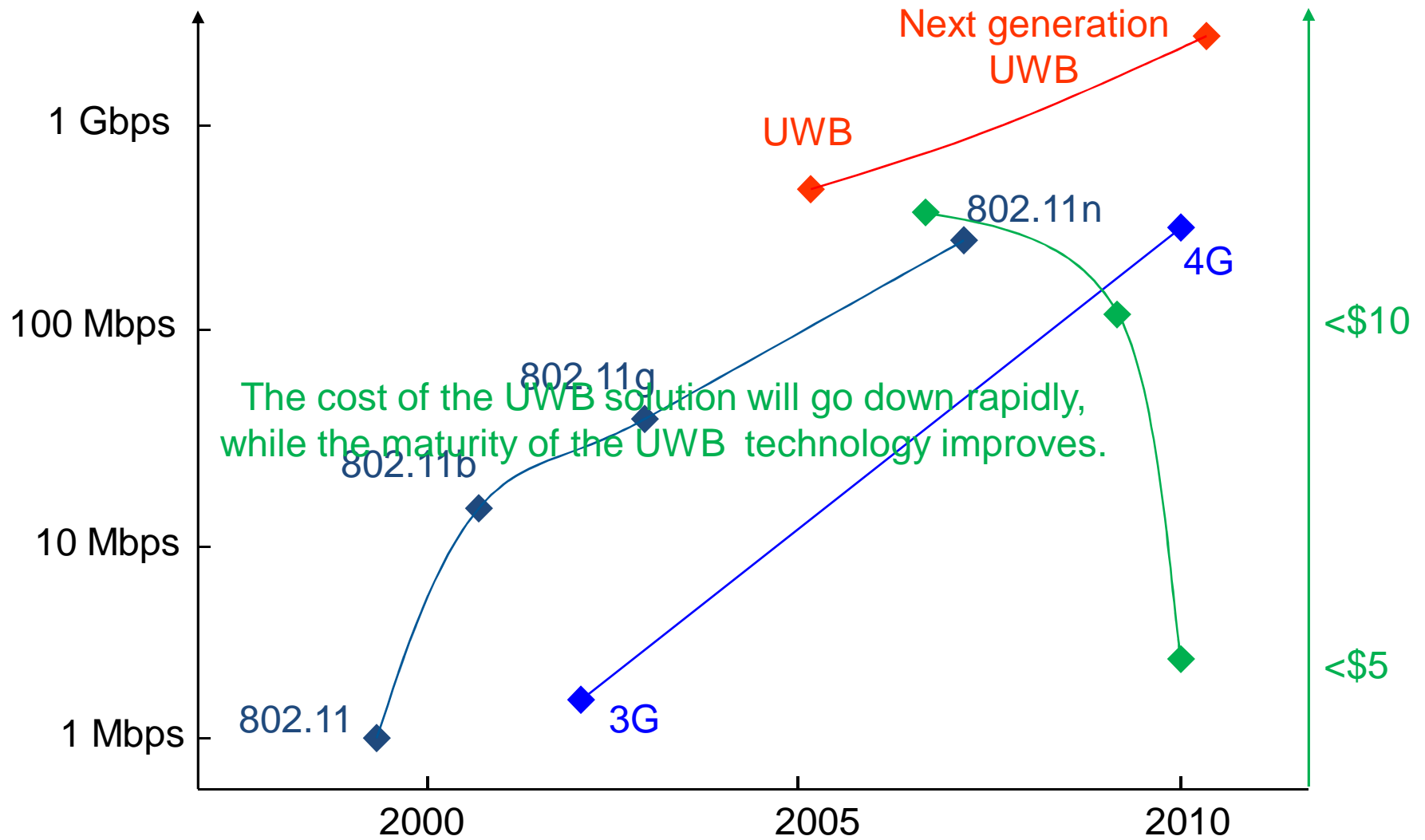


- High data rate
- Common radio platform for multiple protocols
- High spatial capacity
- Low power
- Low cost
- Low interference

		Bluetooth	802.11g	802.11.n	UWB
<b>Speed</b>	<i>Mbps</i>	1	54	200	480
<b>Range</b>	<i>ft</i>	30	100	150	30
<b>Power Efficiency</b>	<i>mW/Mbps</i>	100	19	10	2
	<i>mAh/GB</i>	67	12	7	1.3
<b>Price</b>	<i>US\$</i>	\$4	\$9	\$20	\$7

Power Consumption (Realtek Solutions)	RTU7105	Next Generation
Maximum (RX/TX)	800mW/600mW	450mW/400mW
2 Gbyte data transfer over WUSB (RX/TX)	550mW/450mW	310mW/300mW

# Technologies evolve!



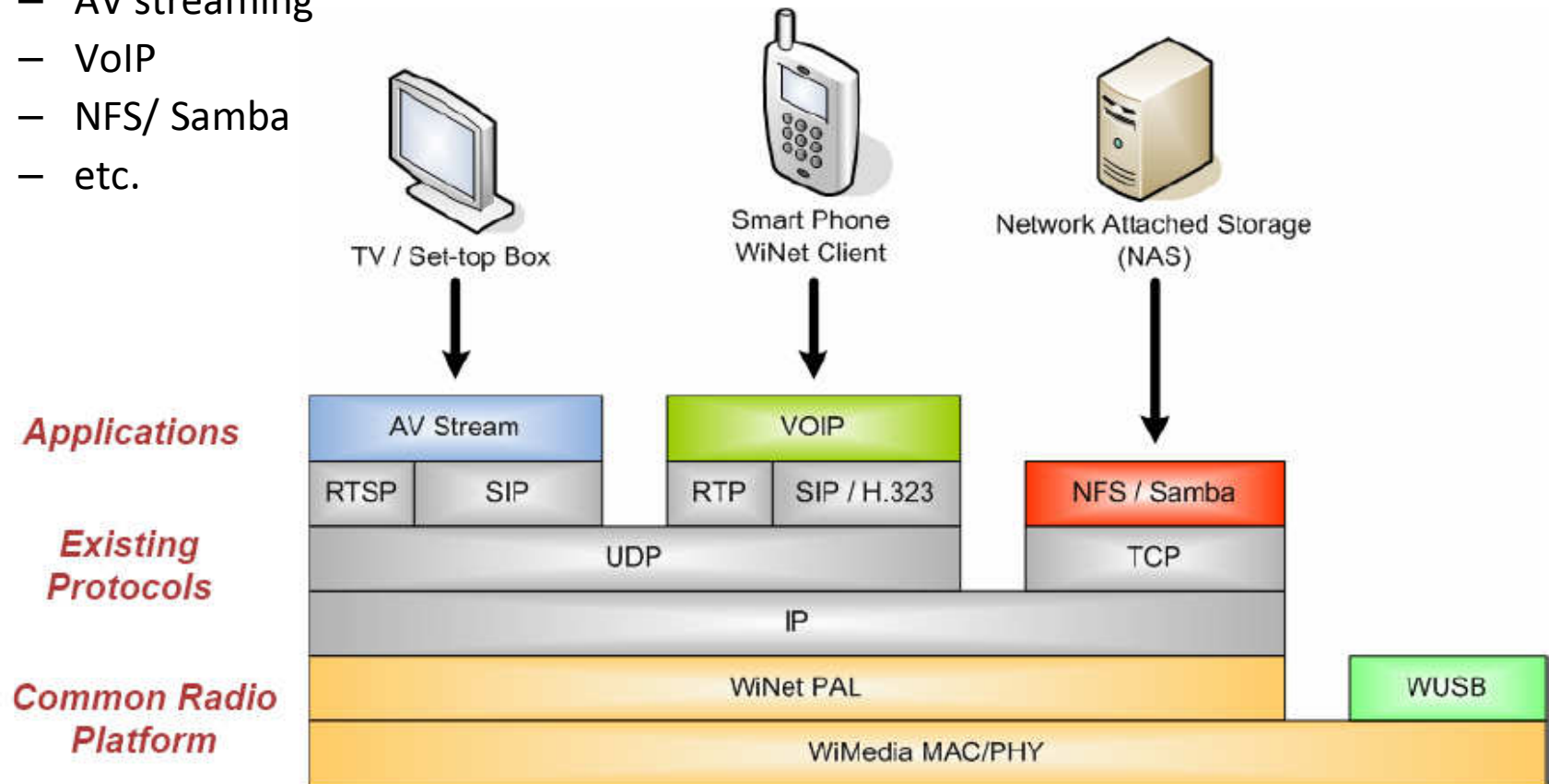
# Certified Wireless USB



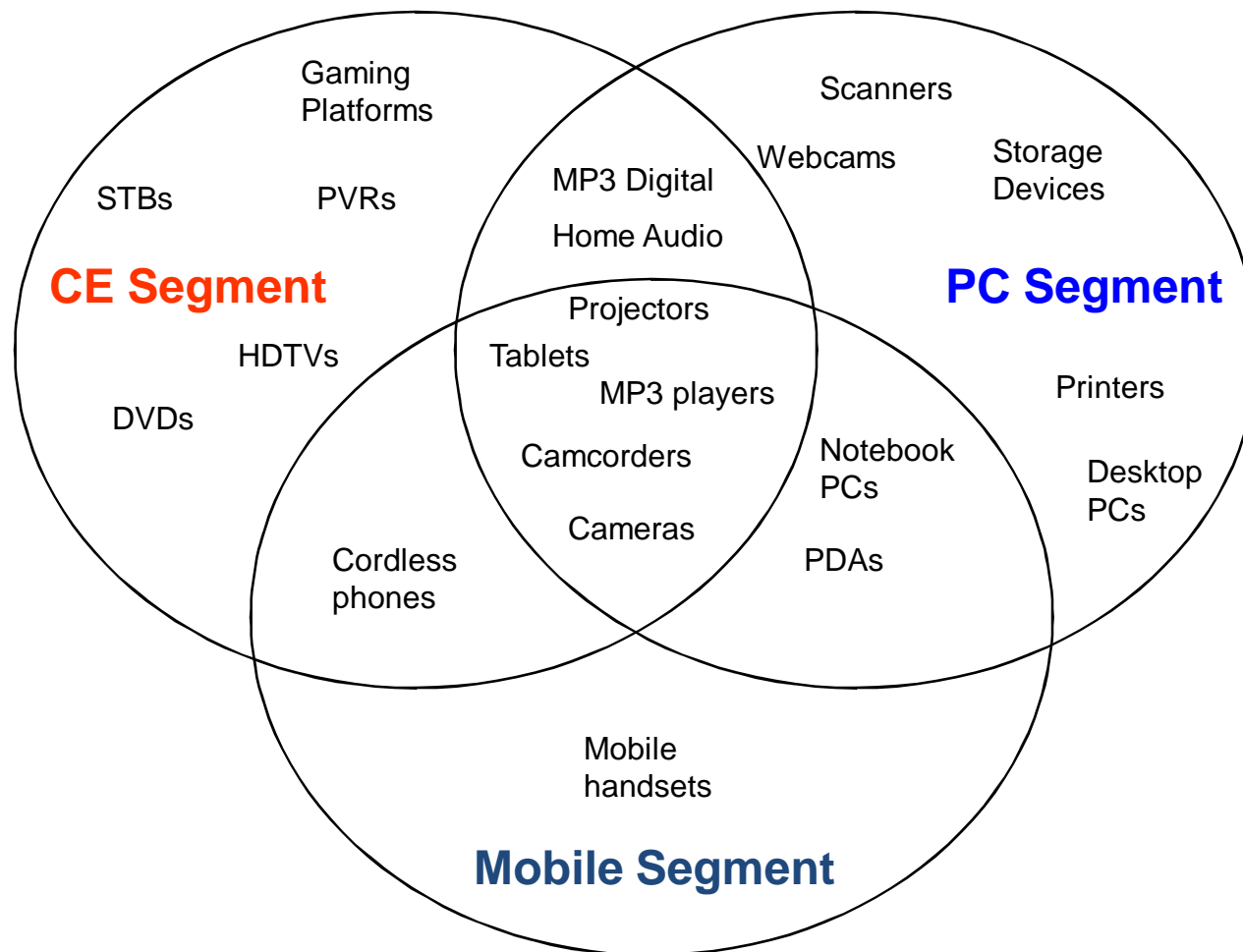
- **Host radio solutions**
  - Wireless Host Controller Interface
    - PCI or PCIe based
  - Host Wire Adaptor (HWA)
    - Wired USB dongle
- **Device radio solutions**
  - Device Wire Adaptor (DWA)
    - Wireless hub
    - Proprietary or non-USB interface for integrated
- **Dual role device (DRD)**
  - Static DRD: Act as a host or device at a given time
  - Dynamic DRD: Device and host simultaneously
    - *Printer connected to PC and camera*
    - *Two mobile phones/mp3 players connected*
- **Concurrent Devices**
  - Connected to more than one host at a time
  - Arbitration between the hosts handled by the device
    - *Shared printer/projector between two PCs/phones*

# IP Application Stack

- **WLP:** UWB radio platform uses the existing IP protocol stack.
- IP Applications
  - AV streaming
  - VoIP
  - NFS/ Samba
  - etc.



# Market Convergence



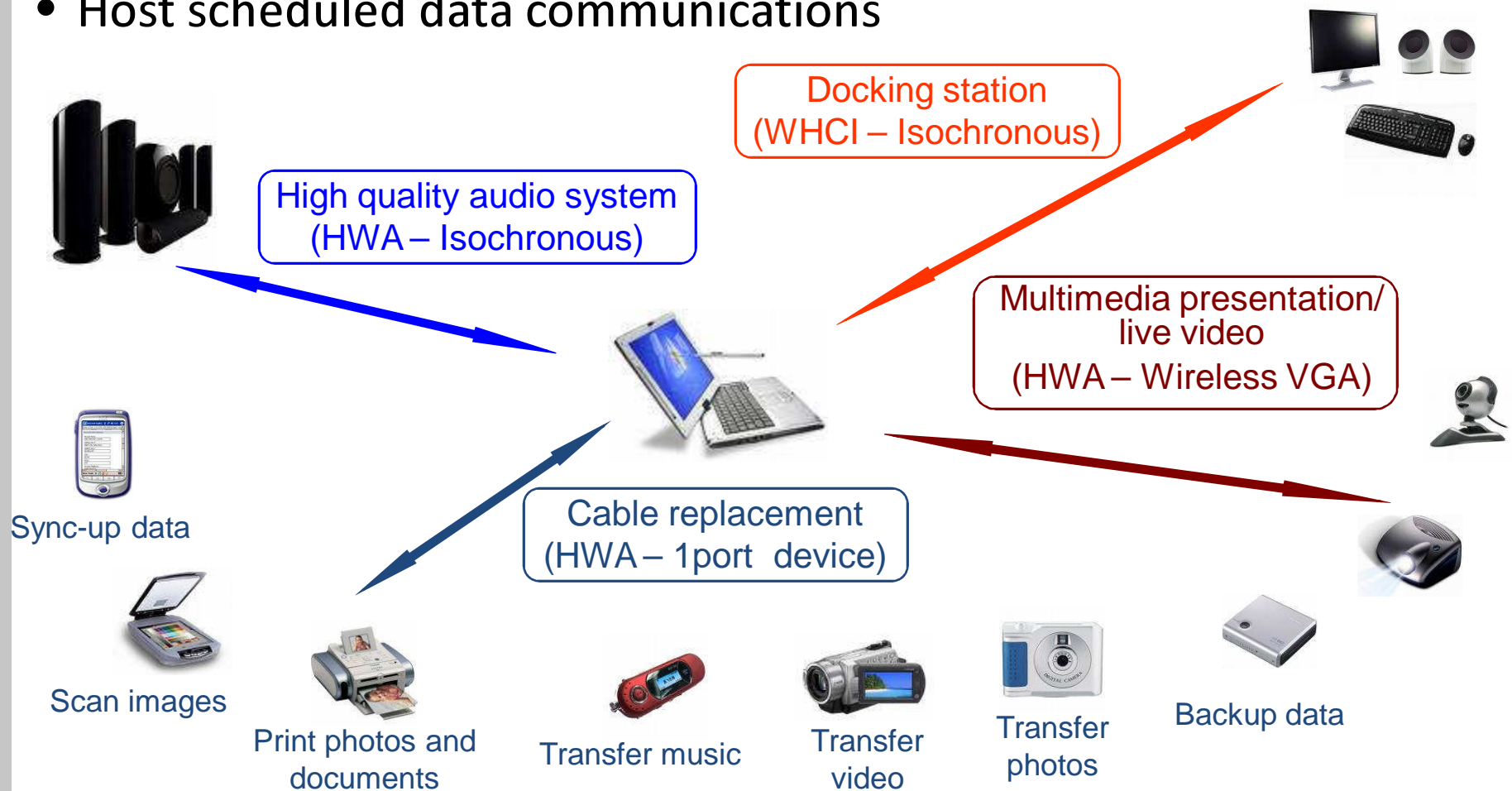
*UWB = Wireless personal area connectivity between PC, CE, and Mobile devices*

# PC Peripheral Connectivity



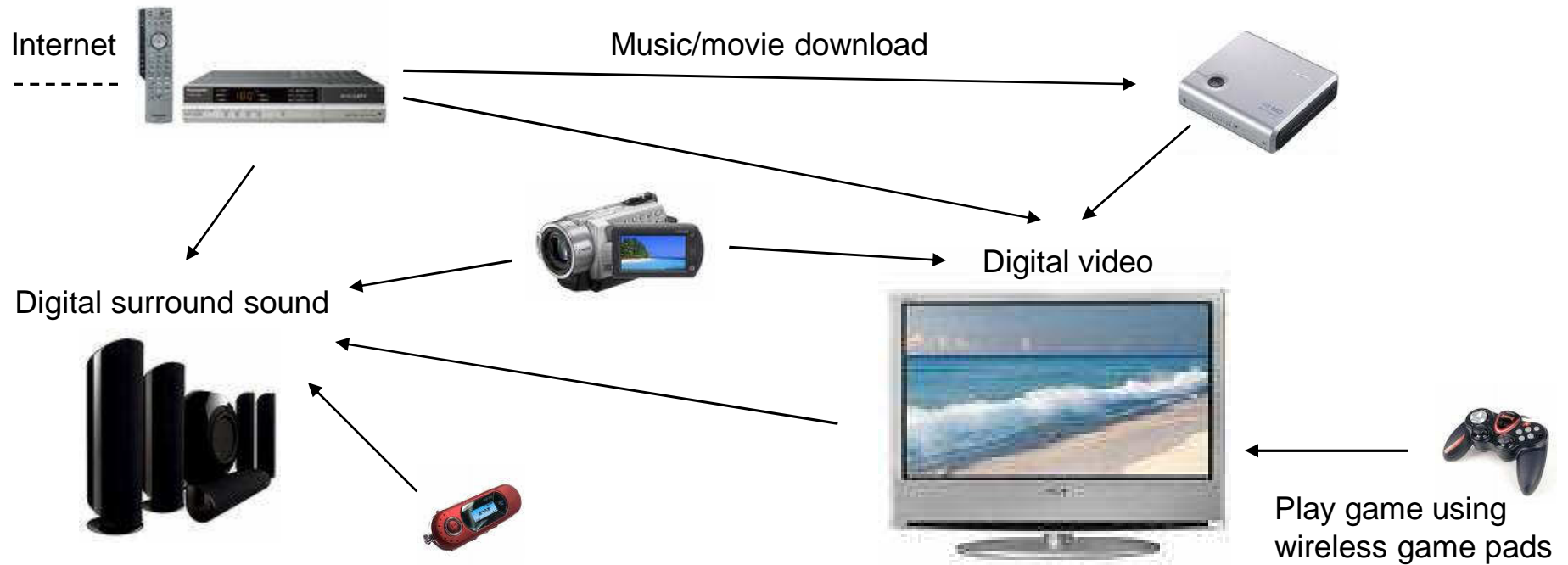
- Point-to-point connections
- Host scheduled data communications

[Realtek Computex Demonstrations](#)



# Home Entertainment

UWB enables many *end-to-end* applications.



# A New Mobile Lifestyle



## Handset to Display

- Use as source for presentation
- Use as source for in-car entertainment
- Portable PVR



## Dual Role Device Connectivity



## Handset to Handset

- Share desktop applications
- Transfer files/photos/music



## Handset as an Access Point

- Use as webcam/microphone/modem to make a conference call where response comes from PC speakers and display
- Upload photos from your digital camera to internet

## Handset to Peripheral

- Play high quality music
- Print photos



# Next Generation UWB

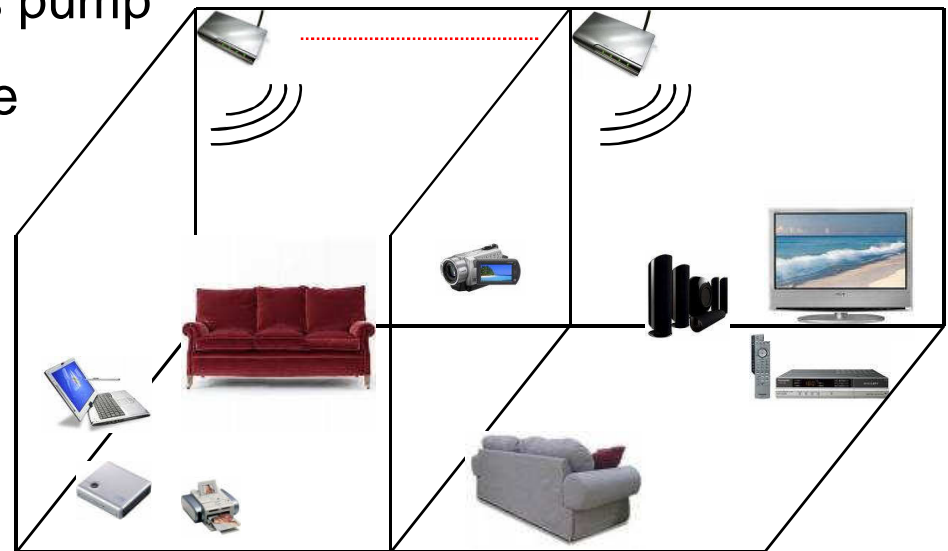


- Data rate enhancements to accommodate multi-Gbps  
Physical layer
- MAC layer Distributed Reservation Protocol  
enhancements for efficient channel utilization
- Detect-and-avoid support
- Improved power management schemes
- Enhanced user interface/security
- Mesh networking support

# UWB in the Short-term Future



- Your mobile phone is your PC!
- Movie/music/photo upload/download at kiosks
- Local broadcast at retail locations
- Handset-to-display in car/home/office
- Maintenance info of your car to gas pump
- Mesh UWB networks at home/office



**UWB = Convenient end-to-end high-throughput low power communication!**

Thanks!