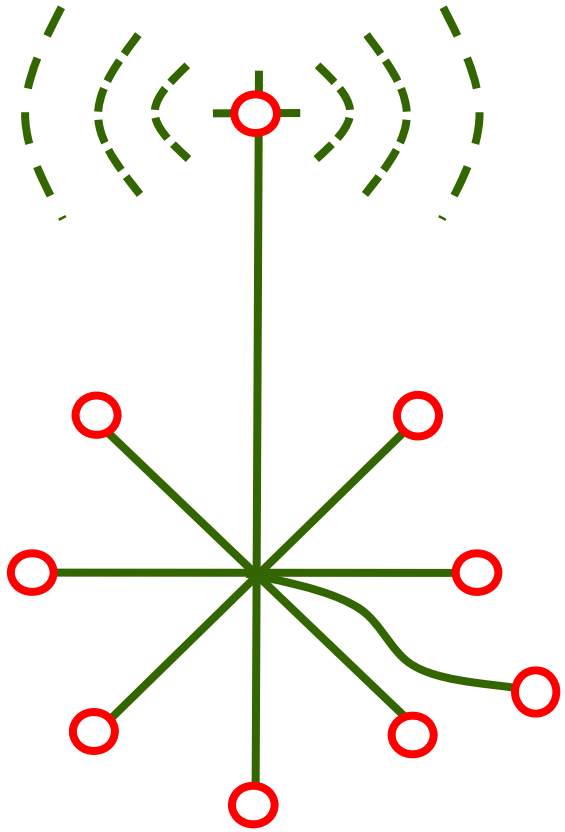
Personal Space Communication & 5G

同像異語 (single video with multi language)



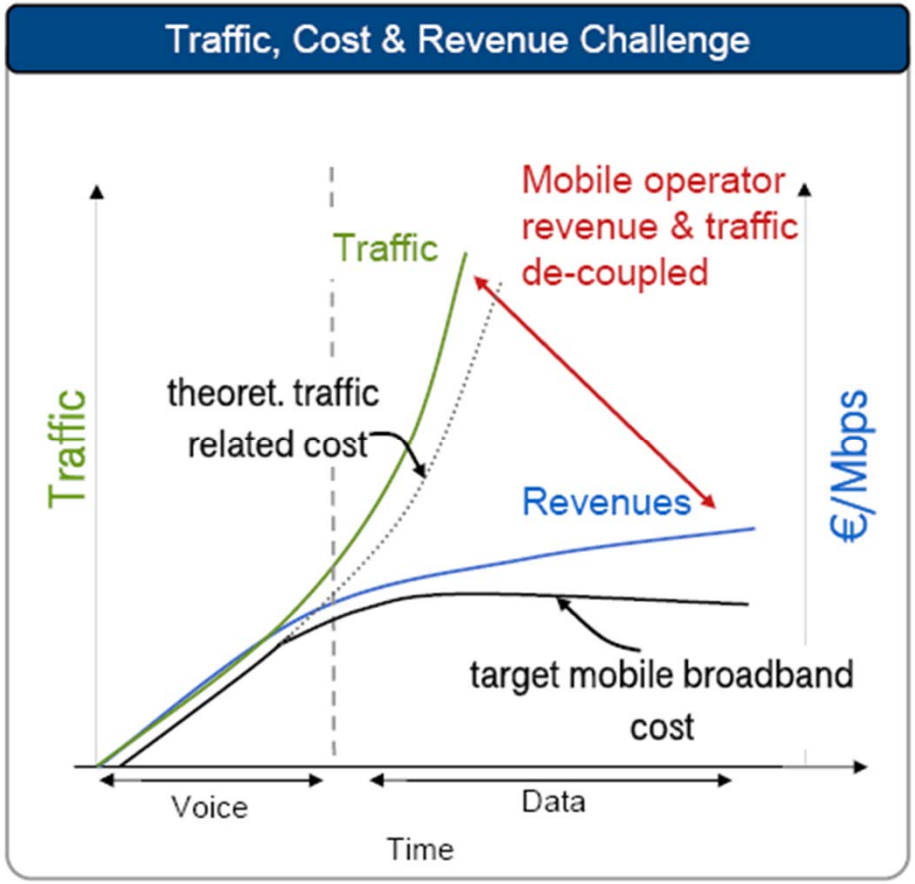
Dr. S.M. Ryu

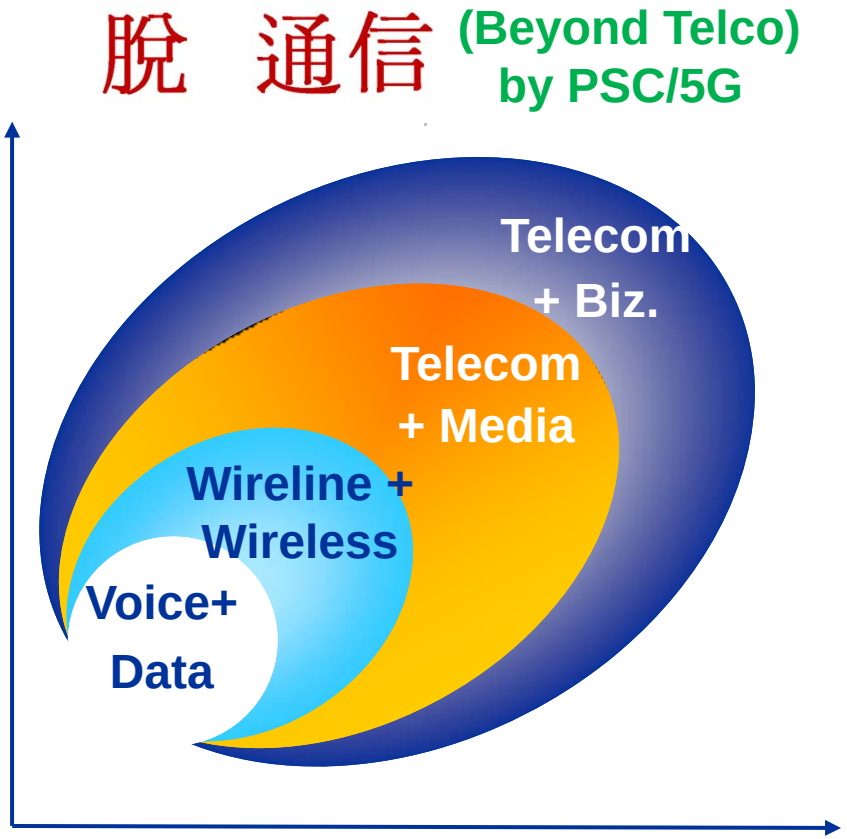
Vice Chairman,

PicoCast Forum

retaw@picocast.org

Telco Market status : Global





5G : Network Transformation and Business Model Transformation

Power Shift – Invisible World

User-Oriented Mobile Space
Personal Space Communication

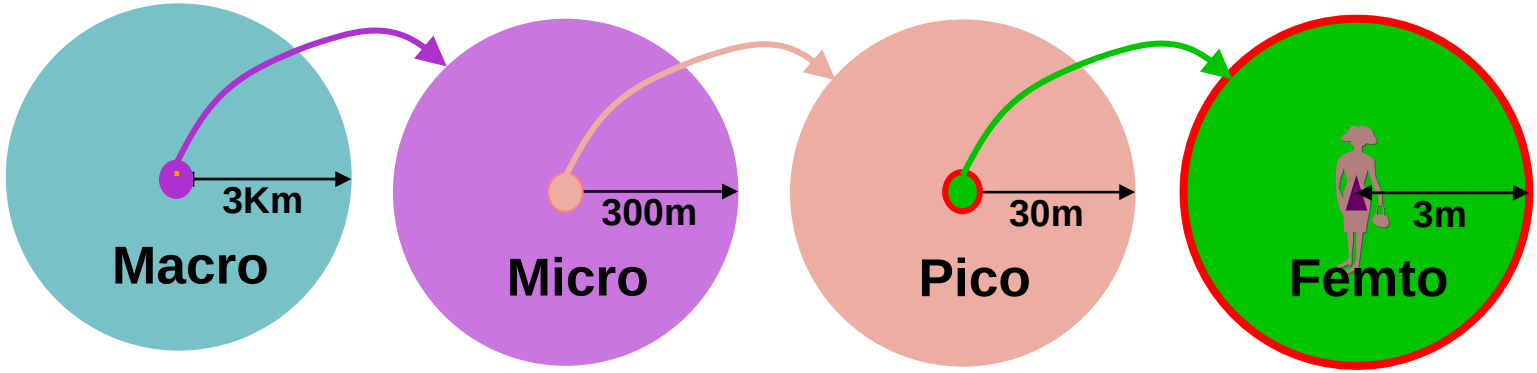
Platform	Software	Internet	Ubiquitous
Standard	Exclusive	Open, Share	Environment Mobility

User Convenience

Why WPAN ? - Capacity

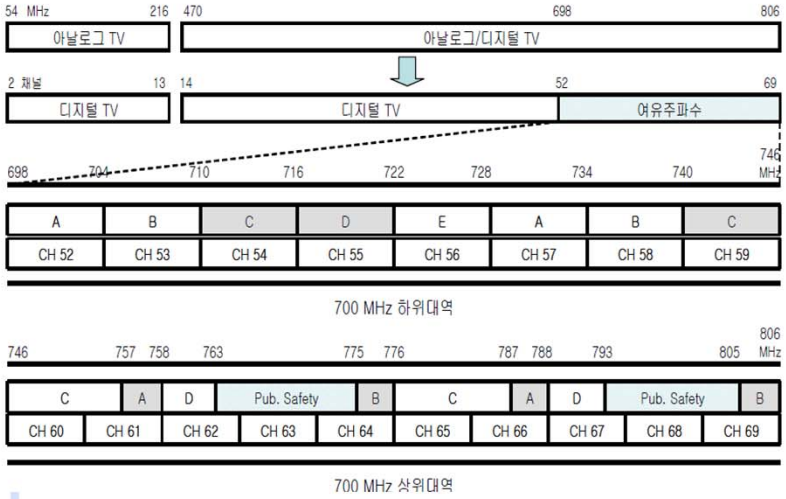
How to increase mobile channel capacity ?

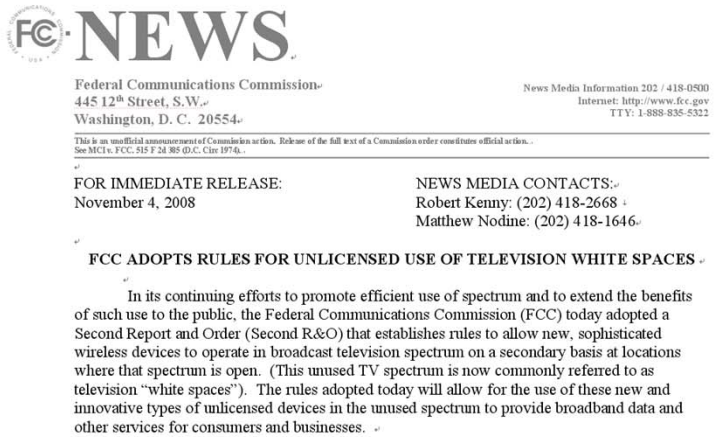
- Find new frequencies that haven't been developed?; no more available
- Find new signal processing techniques ?; only few times increasable
- The only way to achieve few thousand times capacity ; reduce cell size



	Macro	Micro	Pico	Femto
Capacity	1	100	10,000	Low Power Personal Space Mobility
Tx Power	1	1/1,000	1/1,000,000	

Digital TV White Space





FCC NEWS

Federal Communications Commission
445 12th Street, S.W.
Washington, D. C. 20554

News Media Information 202 / 418-0500
Internet: http://www.fcc.gov
TTY: 1-888-835-5322

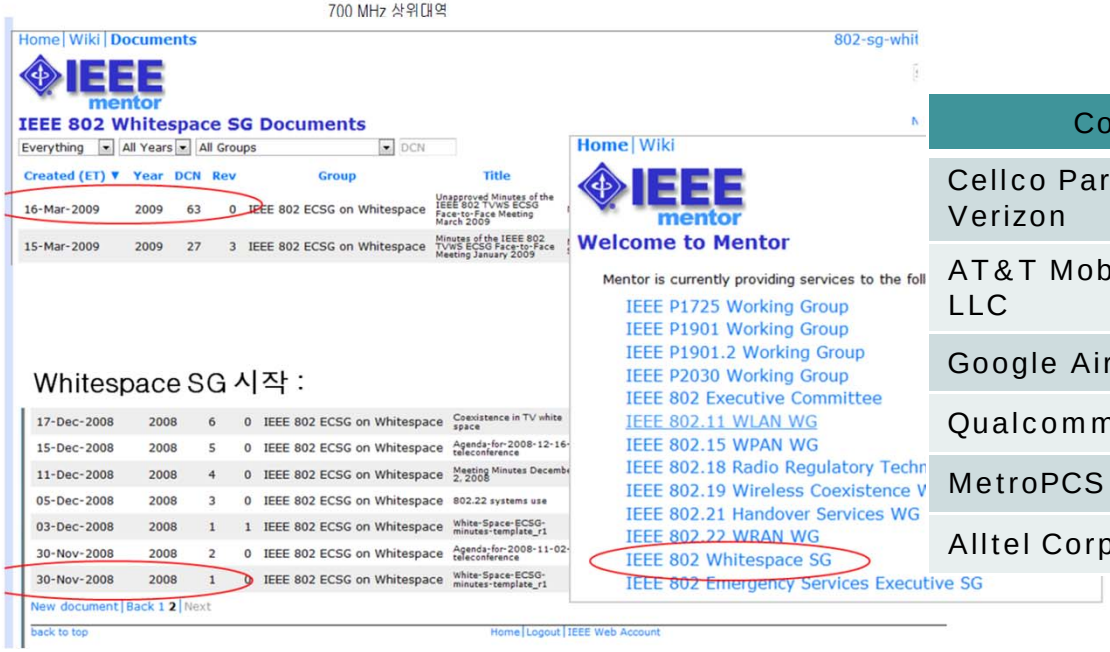
This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action. See MCI v. FCC, 515 F 2d 385 (D.C. Circ 1974).

FOR IMMEDIATE RELEASE:
November 4, 2008

NEWS MEDIA CONTACTS:
Robert Kenny: (202) 418-2668
Matthew Nodine: (202) 418-1646

FCC ADOPTS RULES FOR UNLICENSED USE OF TELEVISION WHITE SPACES

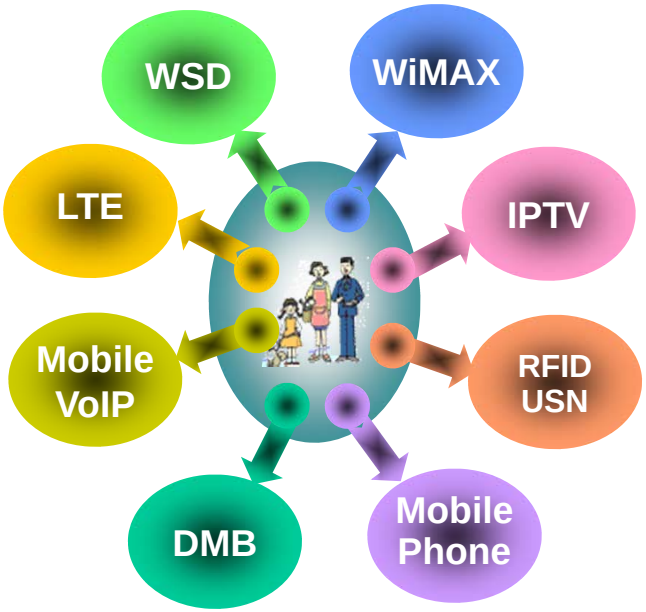
In its continuing efforts to promote efficient use of spectrum and to extend the benefits of such use to the public, the Federal Communications Commission (FCC) today adopted a Second Report and Order (Second R&O) that establishes rules to allow new, sophisticated wireless devices to operate in broadcast television spectrum on a secondary basis at locations where that spectrum is open. (This unused TV spectrum is now commonly referred to as television "white spaces"). The rules adopted today will allow for the use of these new and innovative types of unlicensed devices in the unused spectrum to provide broadband data and other services for consumers and businesses.

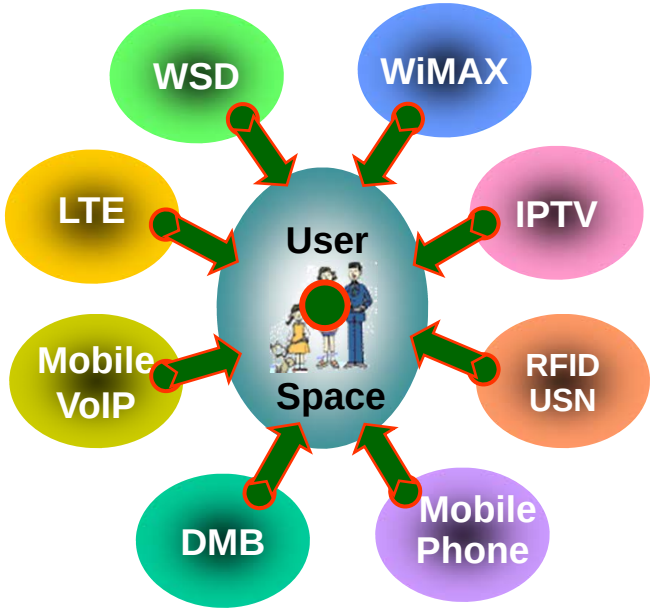


Company	Deposit($)
Cellco Partnership Verizon	885,000,000
AT&T Mobility Spectrum, LLC	500,000,000
Google Airwaves Inc	287,371,000
Qualcomm Incorporated	195,000,000
MetroPCS 700 MHz, LLC	153,681,800
Alltel Corperation	150,000,000

Power Shift – User-Oriented Terminal

Provider-Oriented → **User-Oriented**

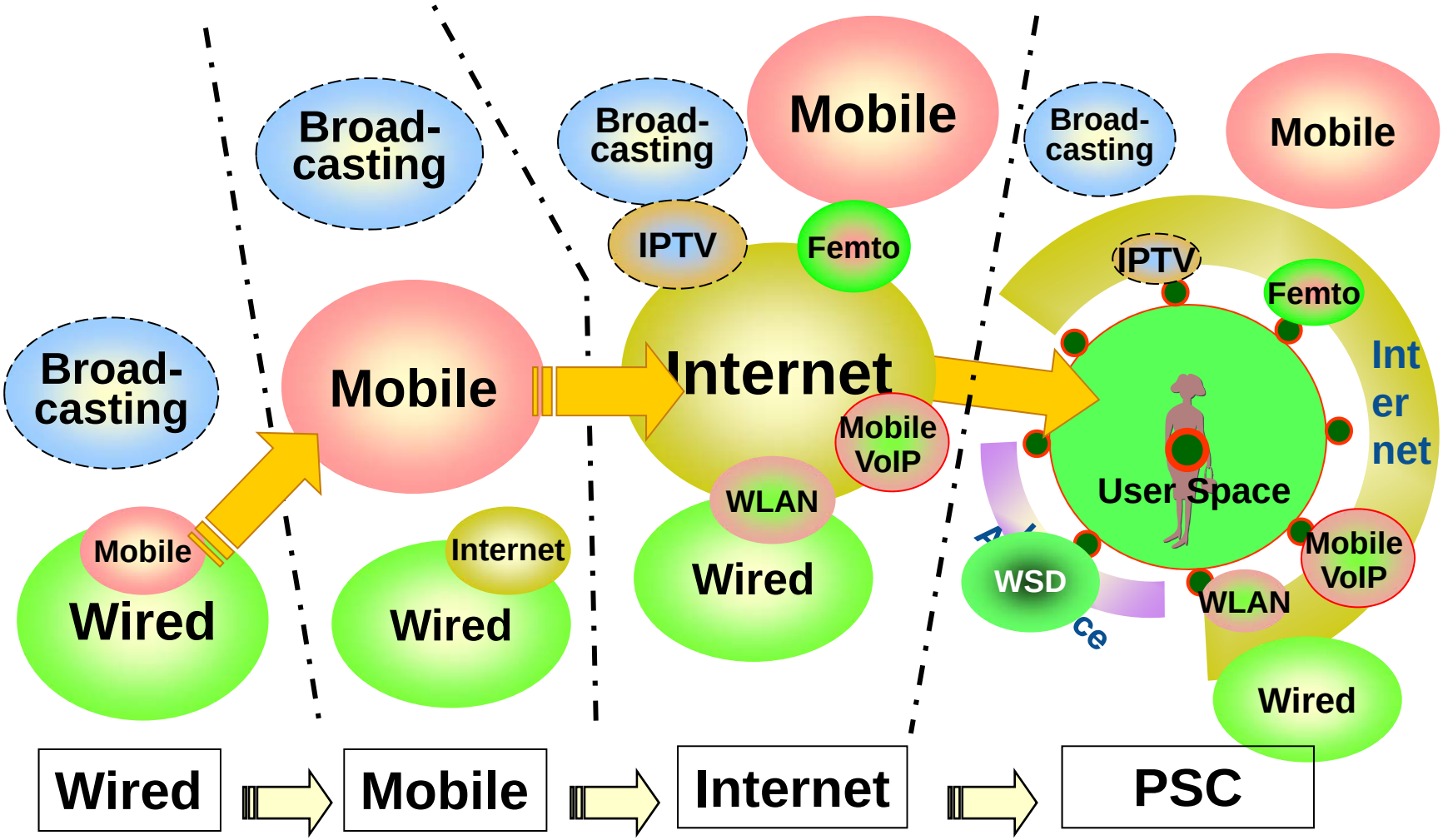




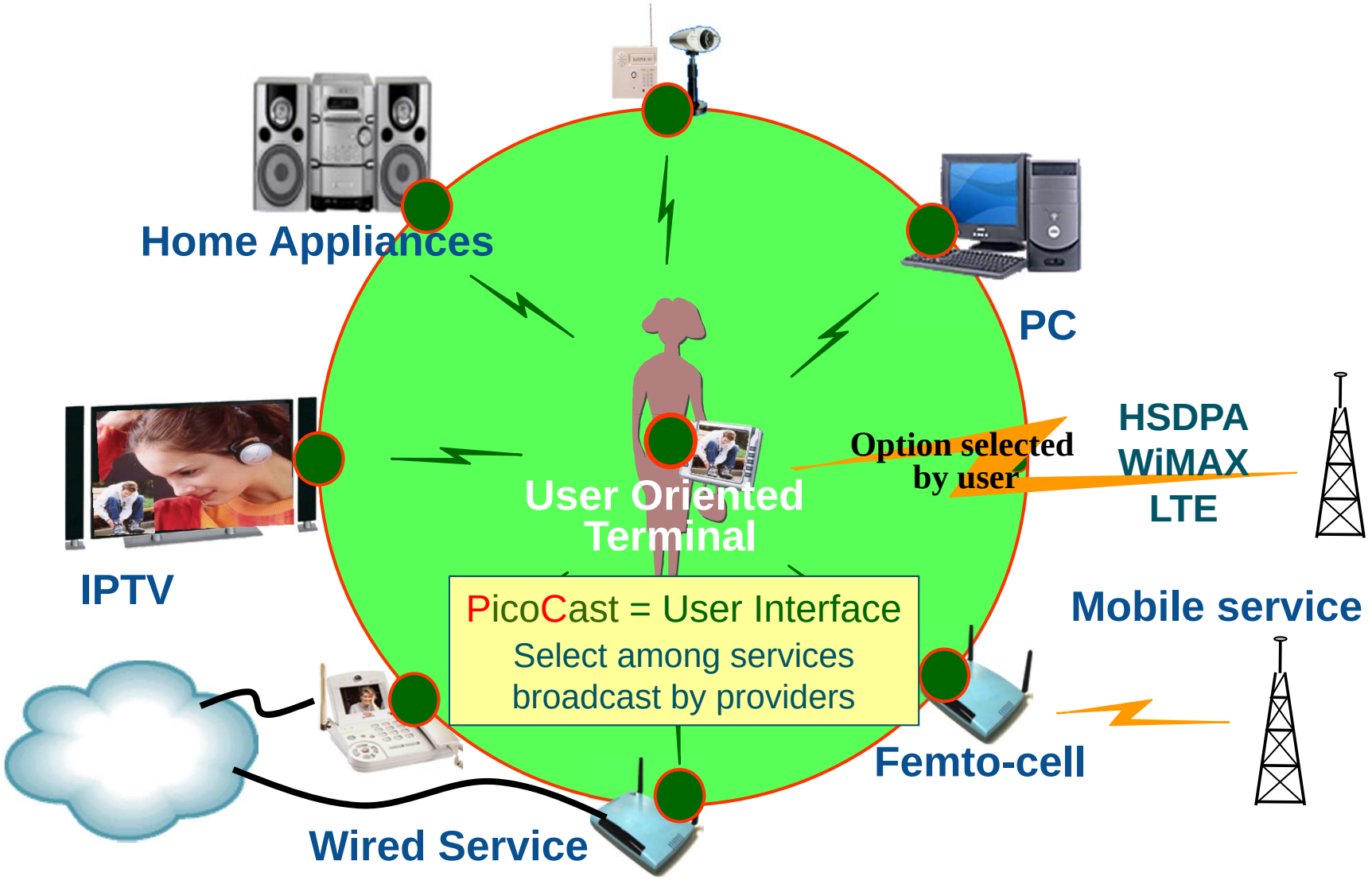
User terminals should meet provider I/F specs.

Providers should translate their services to user I/F spec. within user mobile space.

Power Shift – Personal Space Communication



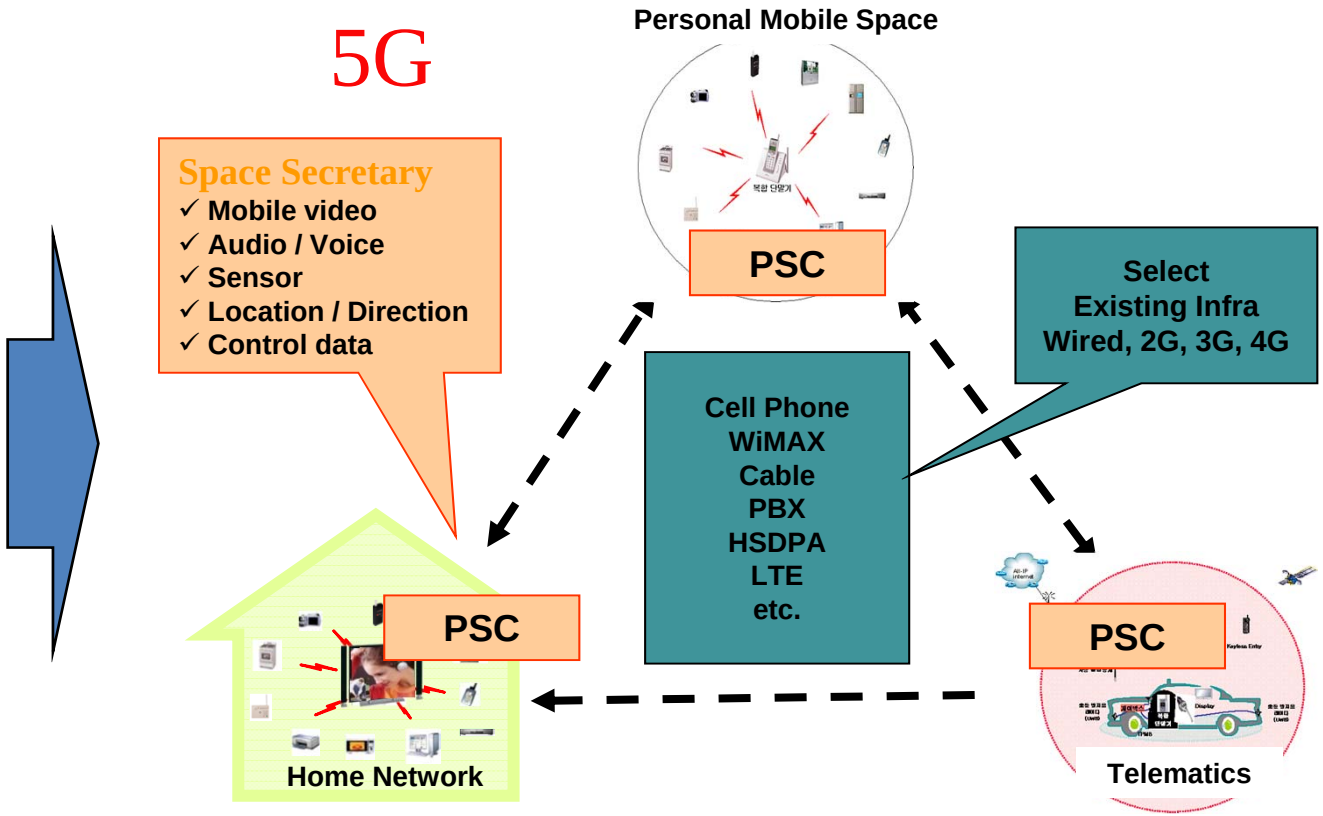
Power Shift – Zone Broadcasting (PicoCast) Service



Why PSC is so important ? ; 5G infra

We envision that, in the future, the user will be the center of the services and the Personal Space Communications will be the common interface to the environments the user moves into..

- Broadcasting /w interactive comm.
- Wireless (Mobile) VoIP:
- Group games
- Personal media
- Wireless audio
- Personal sensor network



PSC Scenario –Space Secretary

- ✓ Seeing
- ✓ Hearing
- ✓ Feeling

Space Secretary

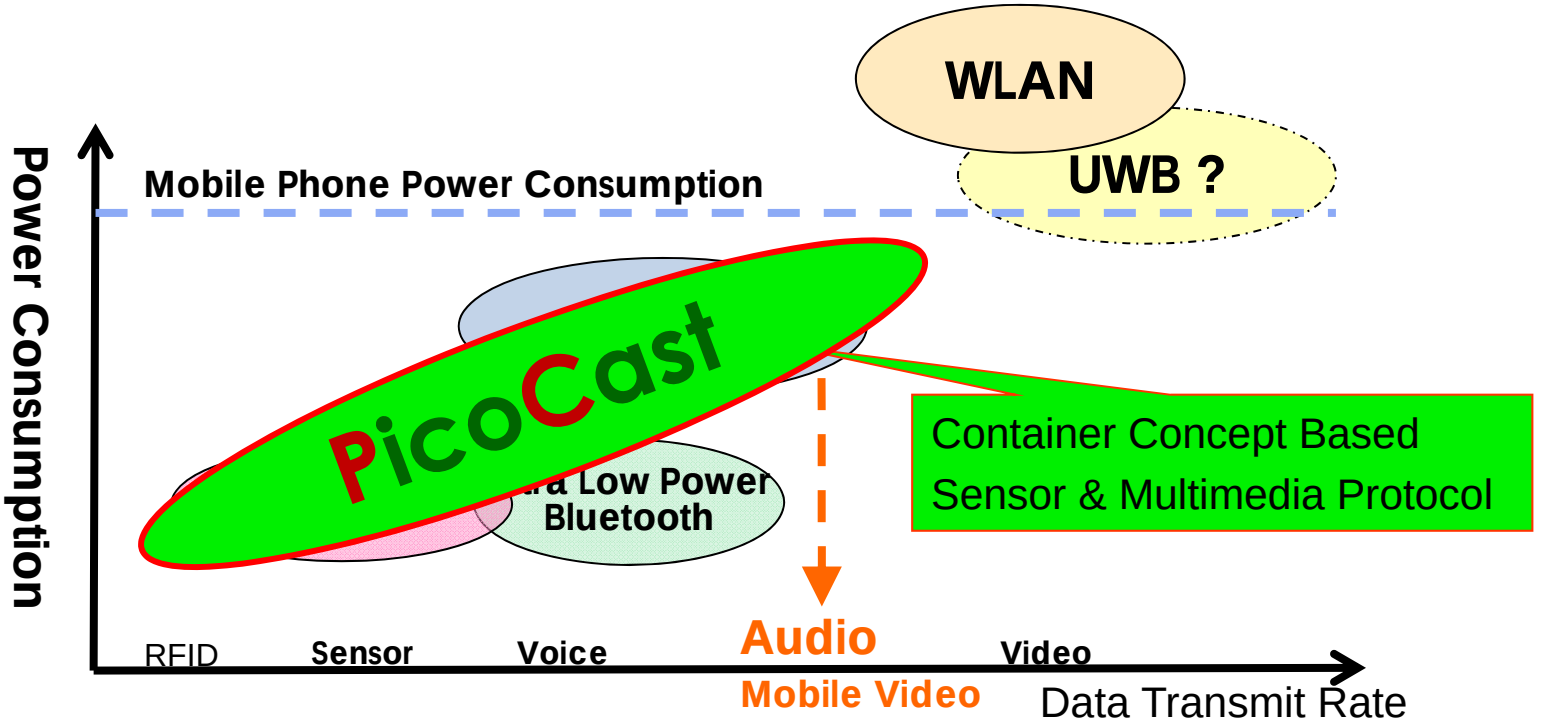
- ✓ Mobile video
- ✓ Audio / Voice
- ✓ Sensor
- ✓ Location / Direction
- ✓ Control data

Low power & Medium speed
WPAN 2-way Broadcasting

IPTV (On-line)

Off-line

PSC Requirements –Single solution for multiple services

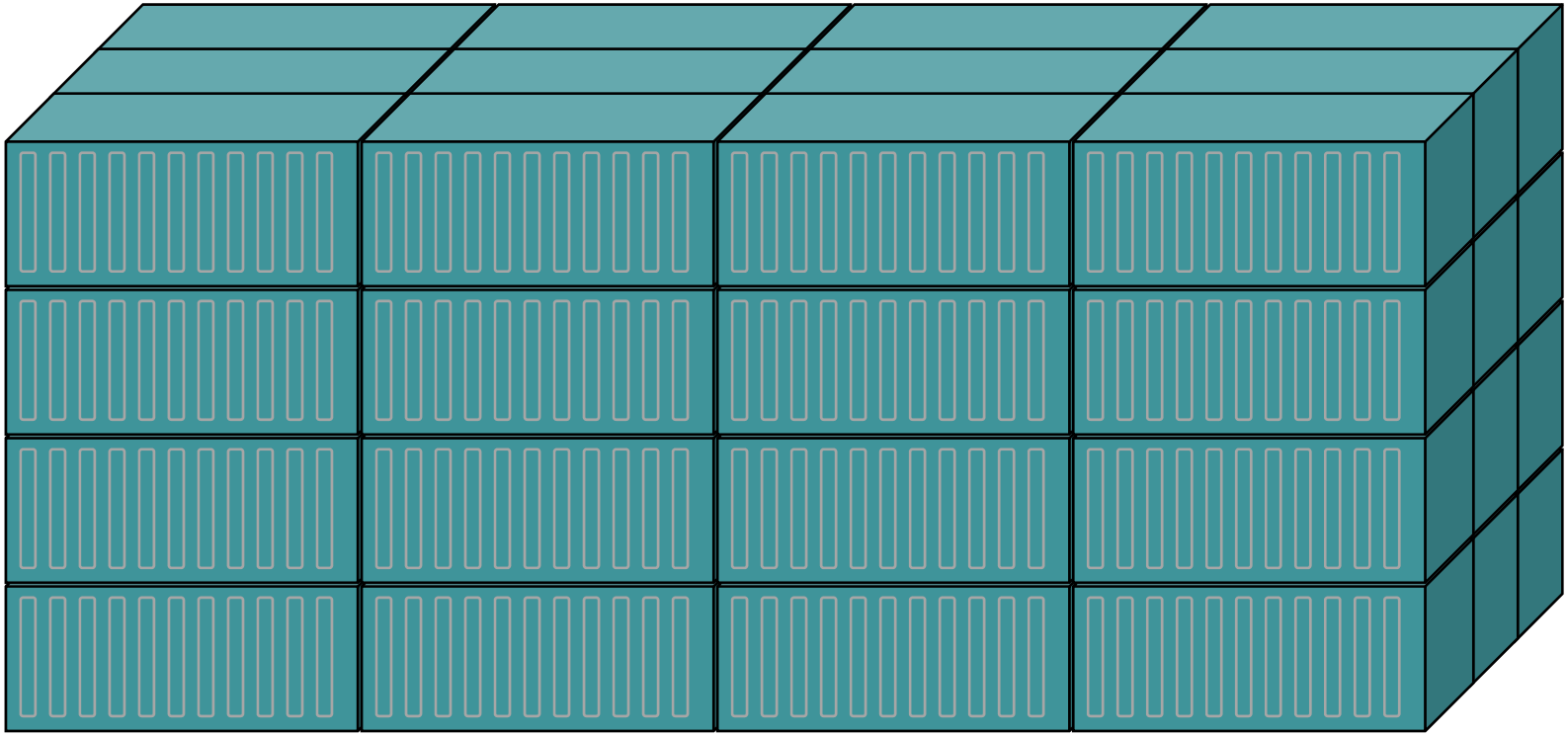


PSC needs a single solution for multiple Services

Low power consumption & Medium speed multimedia

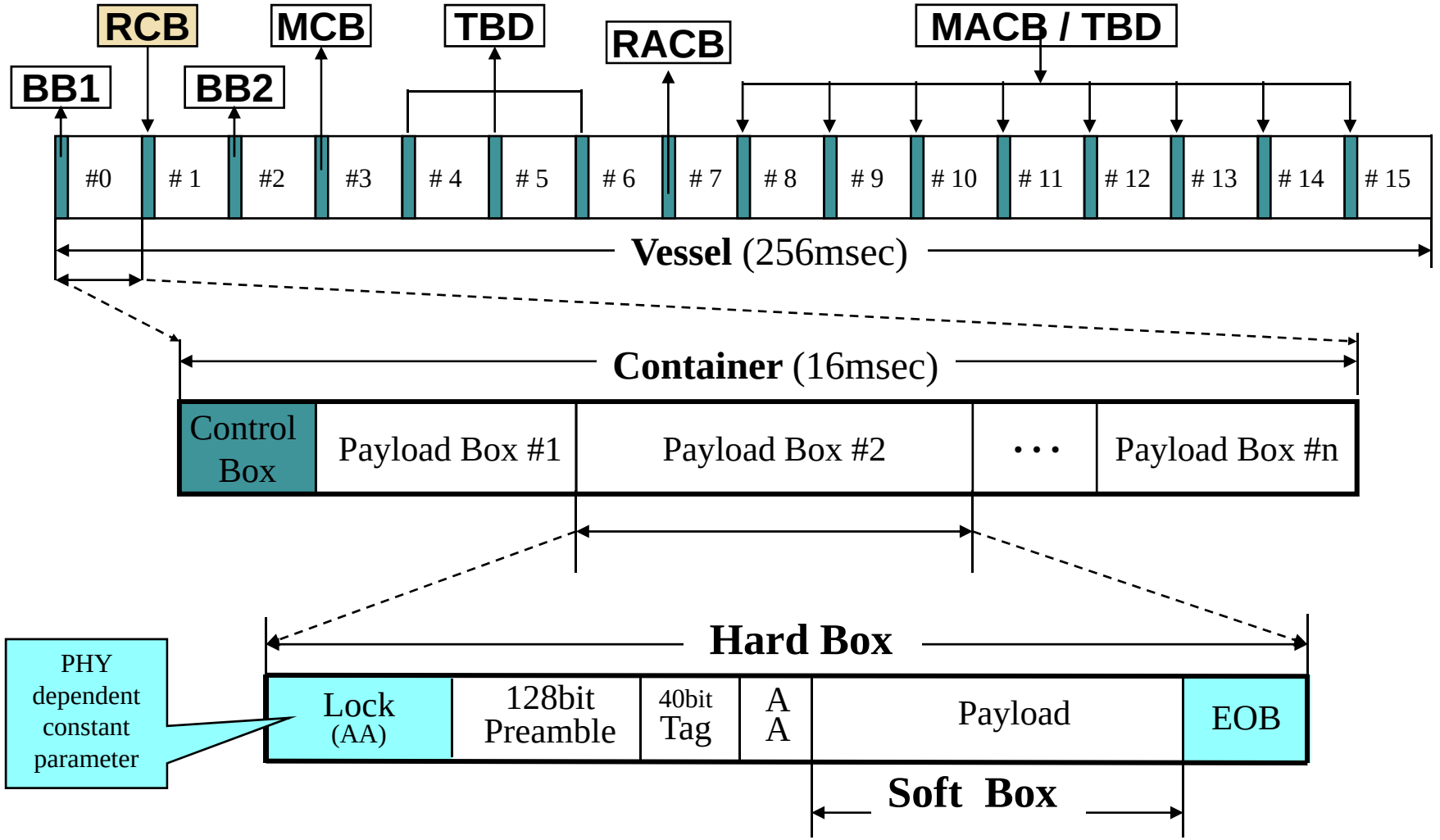
ISO/IEC 29157 IEEE802.15.psc

PSC Requirements –Container Structure



Higher synchronization performance is required ; 128bits preamble

Synchronized Container Structure



PicoCast International Standard

ISO/IEC 29157 PHY/MAC

1) NP : New Working Item Proposal
2) WD : Working Draft
3) CD : Committee Draft
4) DIS/FDIS : Draft International Standard/Final Draft International Standard
5) IS : International Standard

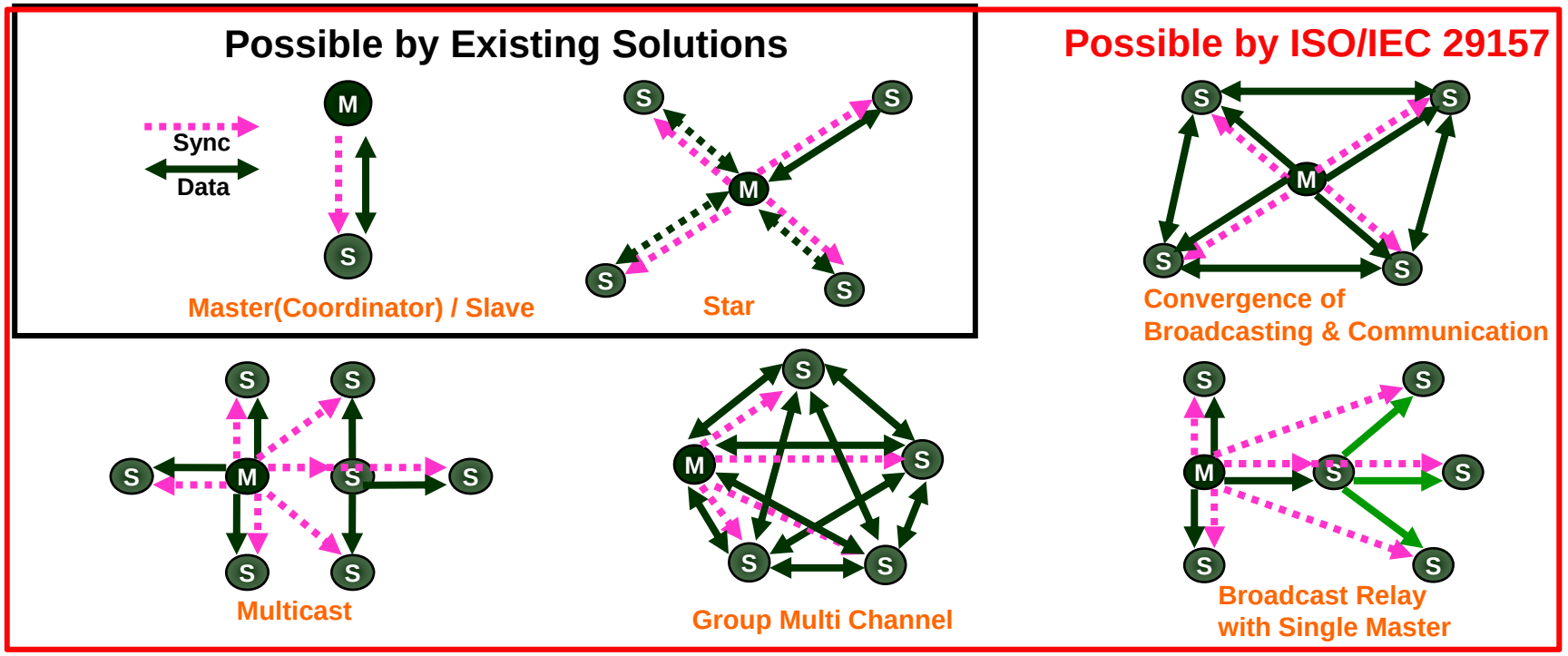
IEEE 802.15.psc PHY/MAC

1) IG : Interesting Group (Reviewing Idea for Standard)
2) SG : Study Group (Finding Sponsor + Proposing PAR & 5C)
3) PAR + 5C : Project Authorization Request & 5 Criteria
4) WG : Working Group or Task Group (to develop Draft Standard)
5) Ballot : Ballot Draft Standard (WG Ballot + REVCOM Ballot + SA STD BD Ballot)
6) ADS : Approve Draft Standard (by IEEE SA BD)
7) PS : Publish Standard

IEC TC100/TA4 :PT xxxxx Application

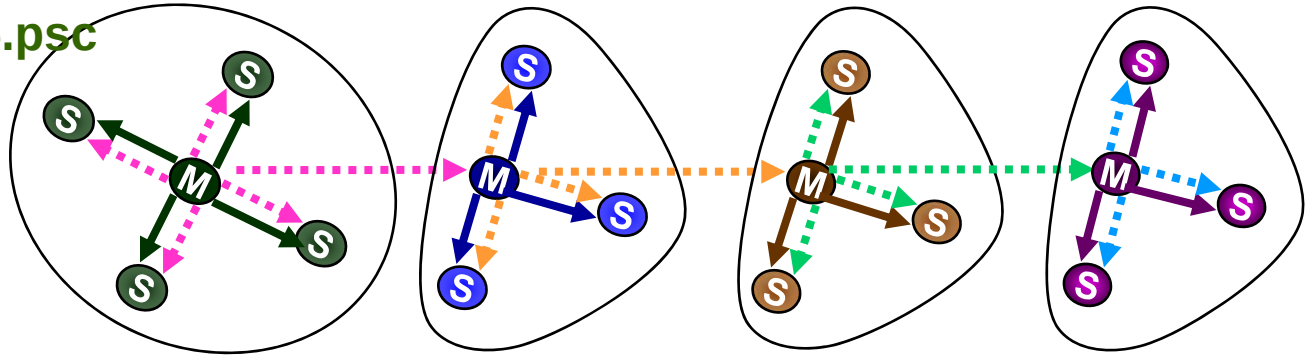
Single Video with multi language interface protocol & system

PicoCast Solution – Protocols



Add to IEEE802.15.psc

Sync Relay
- Ad-hoc
- Hand-over



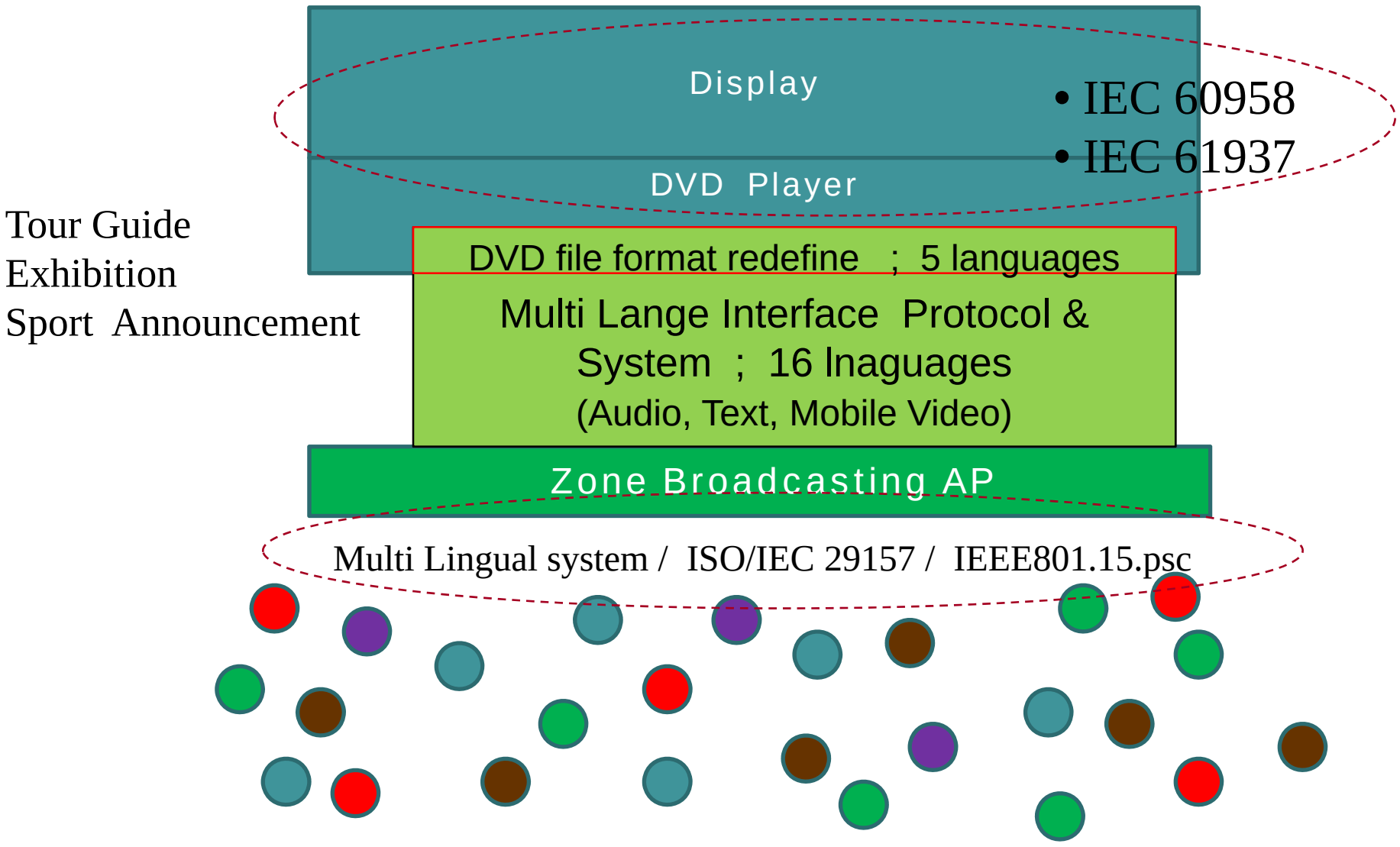
New Work Item Proposal ; 同像異語

- IEC 60958
- IEC 61937

New Work Item Proposal

- Multi Lingual system
- ISO/IEC 29157
- IEEE801.15.psc

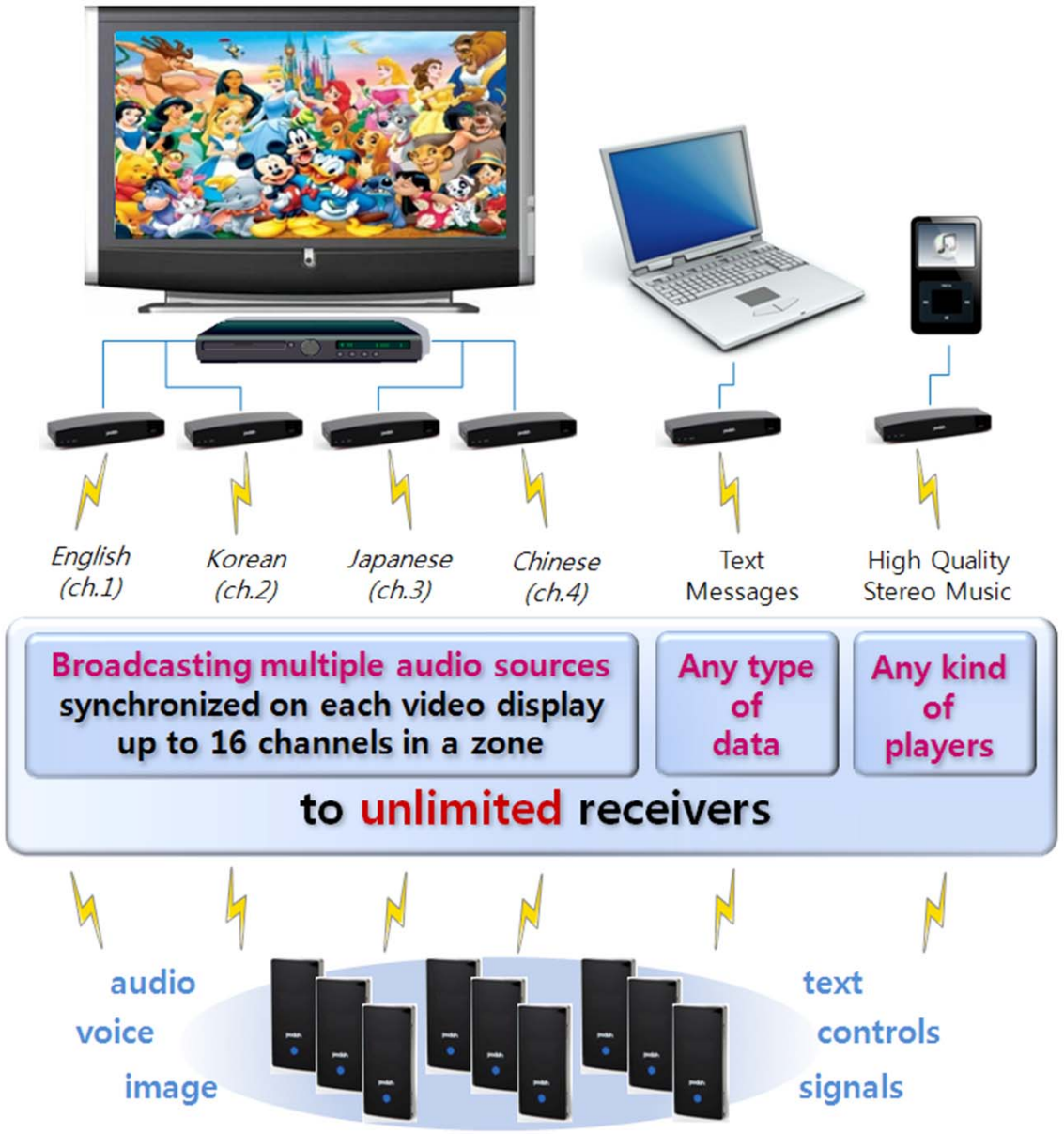
NP Scope ; Interface protocol & Devices



DVD file format redefine; 1st step

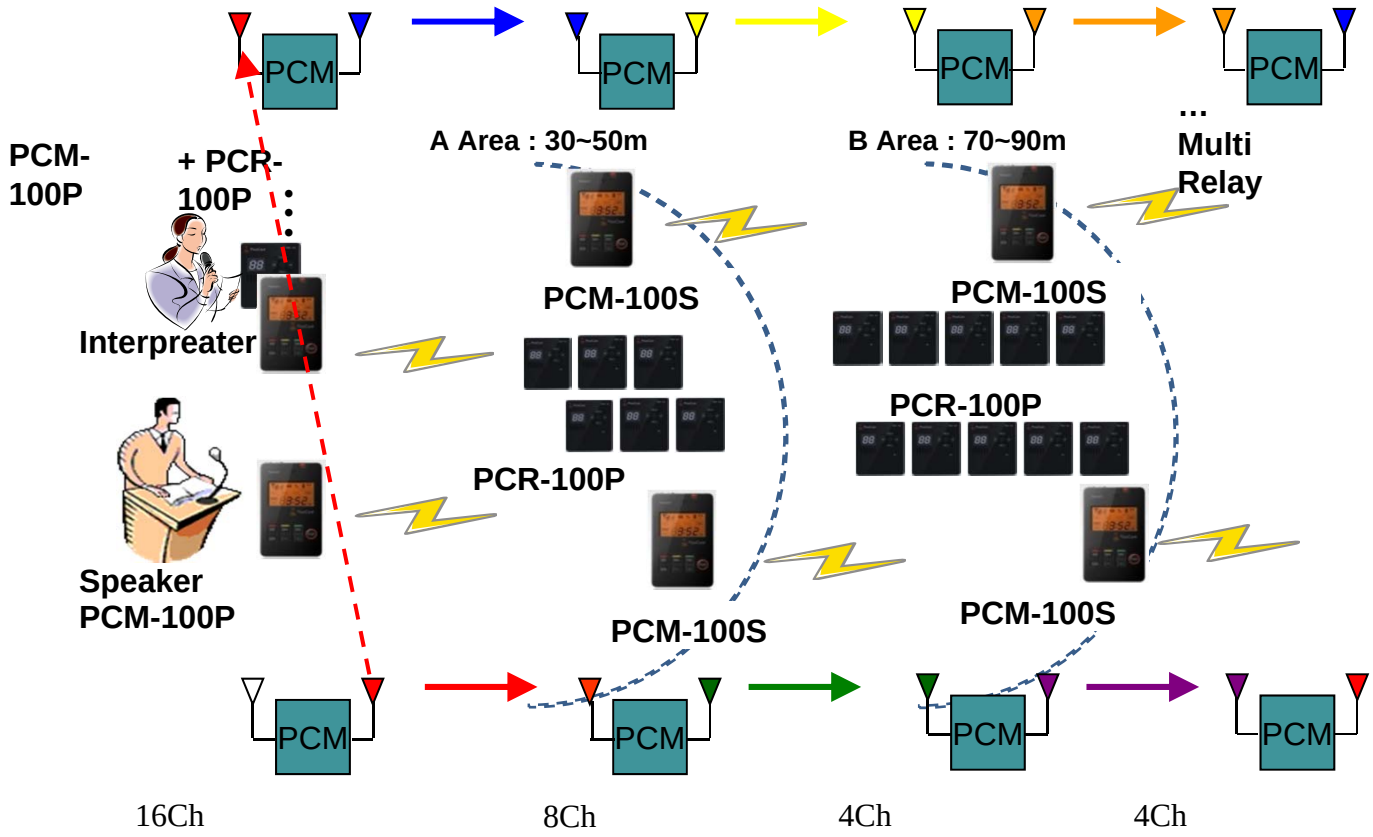
Video file						
Language #1	FR	FL	center	BR	BL	sub
Language #2	FR	FL	center	BR	BL	sub
Language #3	FR	FL	center	BR	BL	sub
Language #4	FR	FL	center	BR	BL	sub
Language #5	FR	FL	center	BR	BL	sub
Multi Lingual	FR+ FL	FR+ FL	FR+ FL	FR+ FL	FR+ FL	Multi Text

Wireless Multi-lingual Personal Story telling tour system



Multi Lingual Interpretation System with cell extension

Cell extender: Synchronous system with robust sync



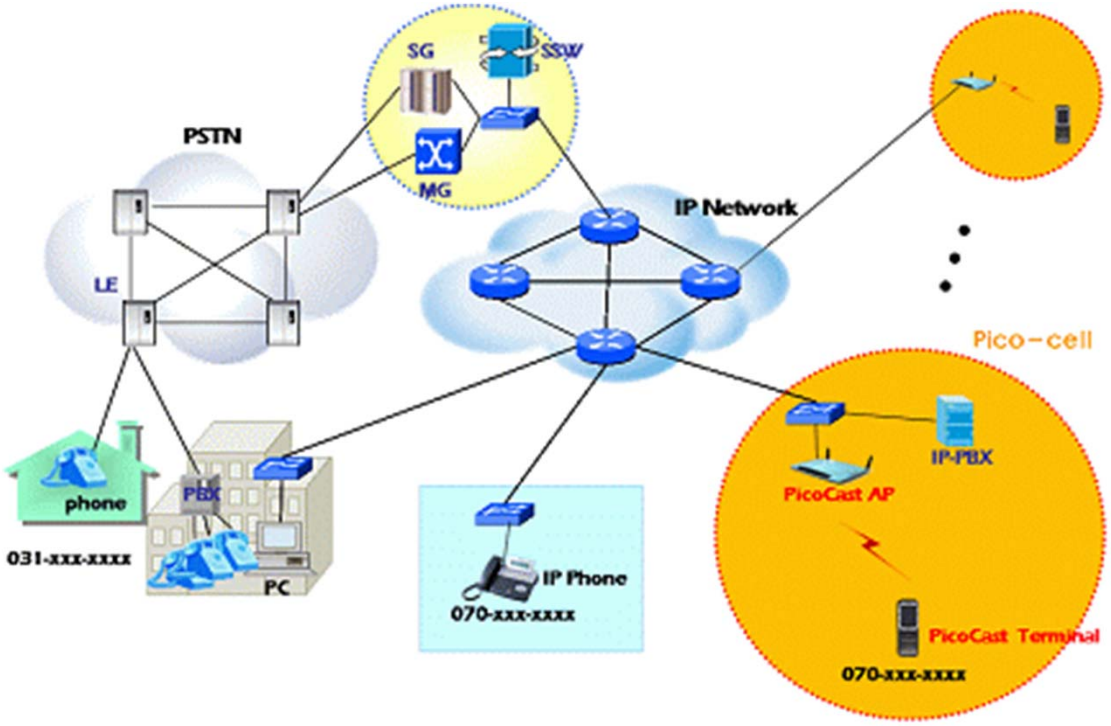
Wireless (Mobile) VoIP:
Mobile VoIP, Wireless PBX

Channel capacity
- Concurrent active channels

Soft handover

Privacy

Repeater - Cell extender



Group games

Latency: < 16ms
Wired Voice quality
Channel capacity
Concurrent active channels

Sure, it is.
Let's enjoy
Group Game…

Thanks, Grandpa.
"Smarterphone"
is also a
Chatting Game
Machine

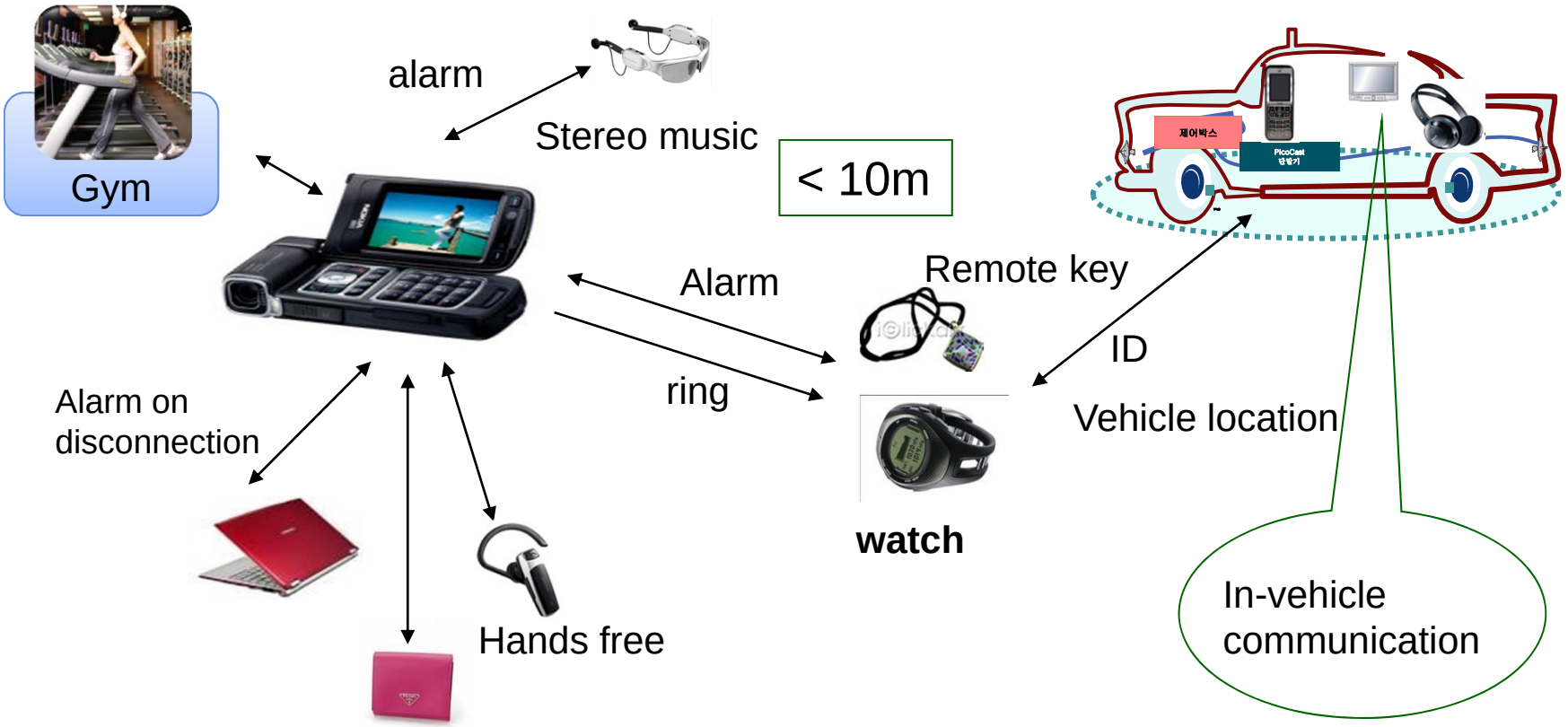
Personal Sensor network:

Health, Safety , lost & found

Power consumption

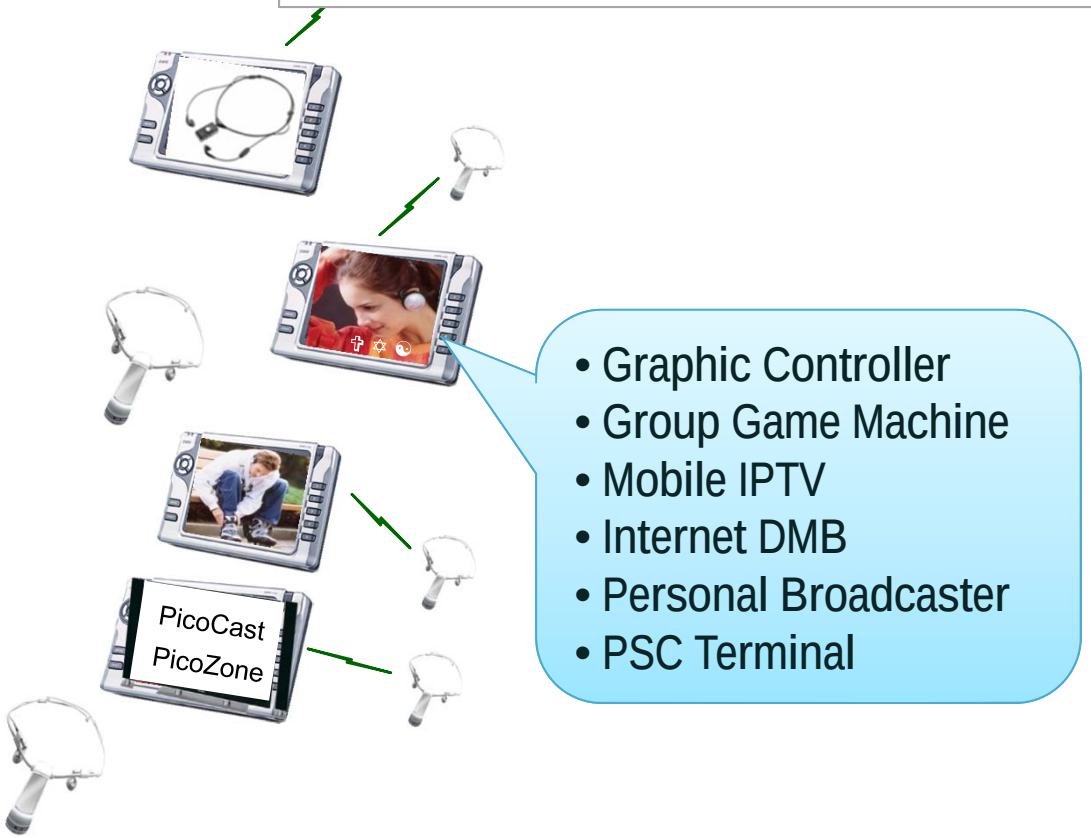
Number of devices

Convergence: audio, video, sensor



Personal media: CD quality
music, video, remote controller

Latency: < 16ms
Data rate: < 4M bps
Convergence: audio, video, control
Channel capacity
Concurrent active channels



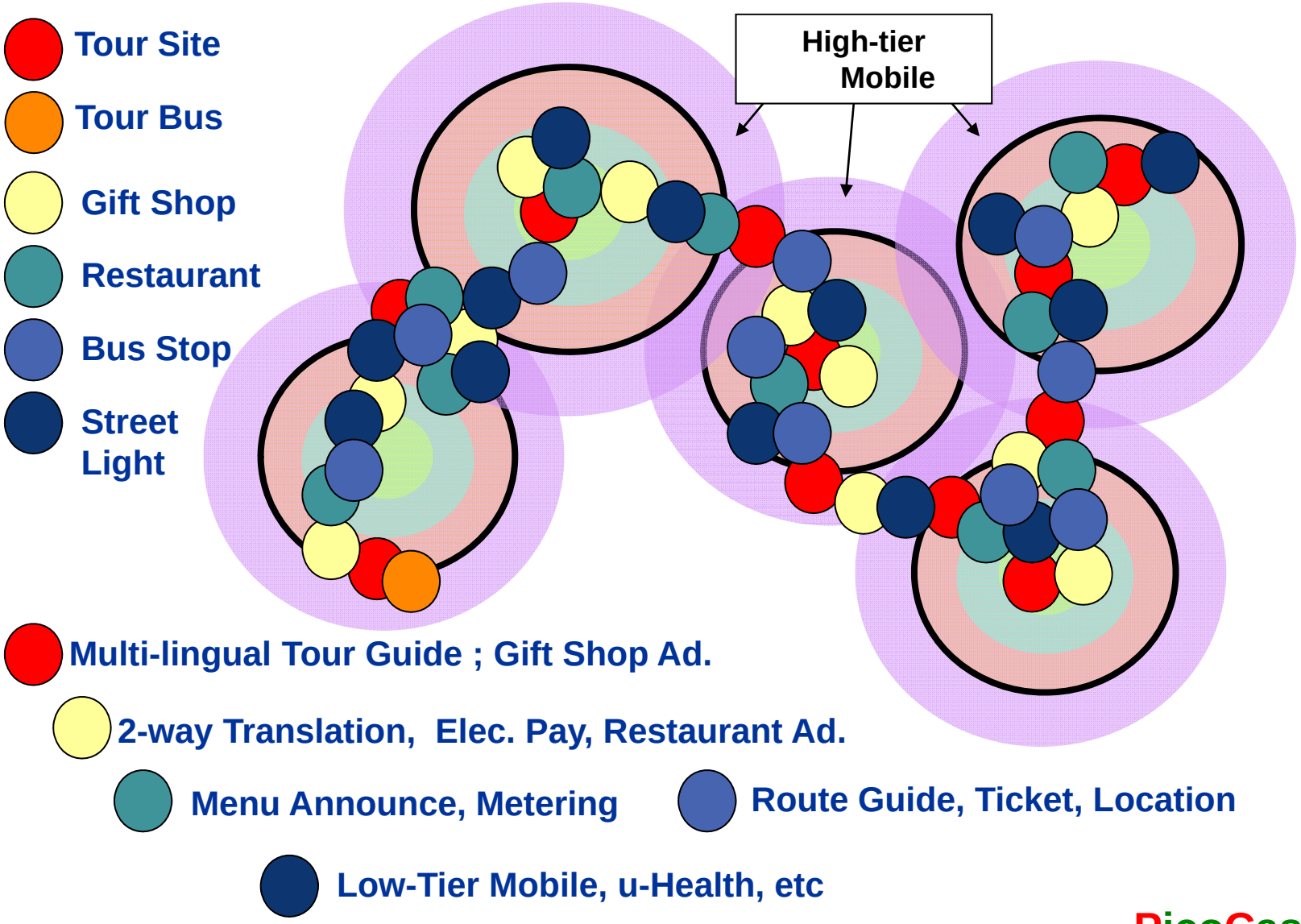
- Graphic Controller
- Group Game Machine
- Mobile IPTV
- Internet DMB
- Personal Broadcaster
- PSC Terminal

Others: Amusement parks

Multi-Lingual
- Concurrent broadcasting
- Unlimited receivers

Wireless VoIP to Home

u-City from PicoCast u-Tour



Conclusions

- **What is the PSC(Personal Space Communication) ?**
  - Facilities surrounding users can be automatically configured to user preference.
  - The user interface environment within user space follows when a person moves.
  - It provides broadcast, multicast, communication & sensor convergence service.
  - User terminal can select a service among services broadcast by providers.
  - It could be leading & killer application of Ubiquitous services.

- **What are the PSC Requirements ?**
  - Service convergence with single solution; Especially broadcasting is necessary.
  - 3-D frequency planning to avoid mutual interference in dense environment.
  - Enough capacity to support ubiquitous wireless traffic; 1000 times increase
  - Soft handover between AP only by protocol without additional device.

- **Why PicoCast solution is suitable for PSC ?**
  - Dual support for both low power sensor and high speed multimedia.
  - Container concept to reject mutual interference and converge various services.
  - Digital zone broadcasting which is the essential function for PSC is possible
  - Both of major international standard; ISO/IEC 29157(finalized) & IEEE.802.15.psc
  - 5G network merely a connection of user oriented mobile spaces (PSC).
  - White space devise requirements would be satisfied with PicoCast protocol.
  -

- **Multi-lingual zone broadcasting system(MLZB) required for global market**
  - MLZB can be implemented by interface existing IEC standards or PSC concept
  - Suggest Multi-lingual zone broadcasting interface as IEC TC100/TA4 NP
  - The core technology of MLZB would be the core technology of PSC application.

Thank You !!!

Q & A

Seung Moon Ryu

Vice President, PicoCast Forum (www.picocast.org)

CTO, Casuh Corp. (www.casuh.com)

retaw@picocast.org