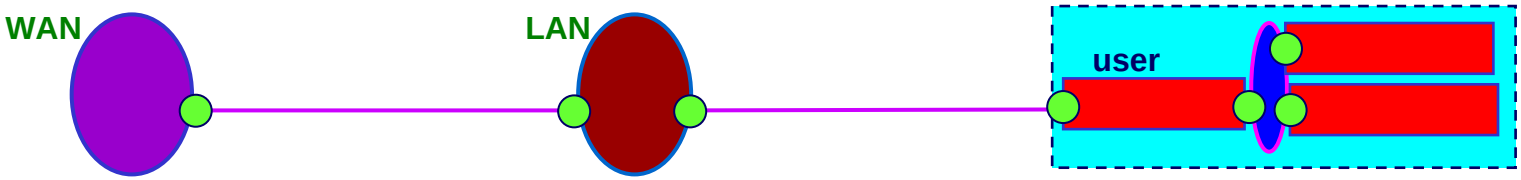
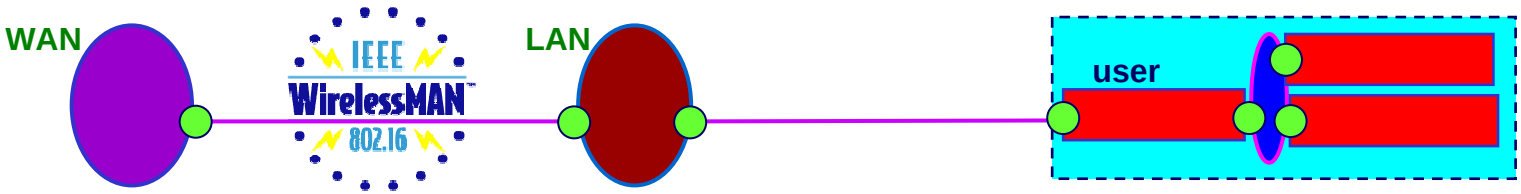
WIRELESS ACCESS SYSTEMS PROFILES



	WAN	Access to WAN	LAN	Access to LAN	PAN
Distance		long		short / medium	very short
Capacity		very high		high	medium / low
Ad hoc		not needed		needed	needed
QoS		critical		not critical	not critical
Freq band		licensed		unlicensed	unlicensed
Access		scheduled		contention	contention
NLOS		needed (long distances)		not relevant (short distances)	not relevant (very short distances)
Mobility		needed		needed	not needed

BWA Technologies
by Sorin M. SCHWARTZ
www.sorin-schwartz.com

WIRELESS ACCESS SYSTEMS STANDARDS

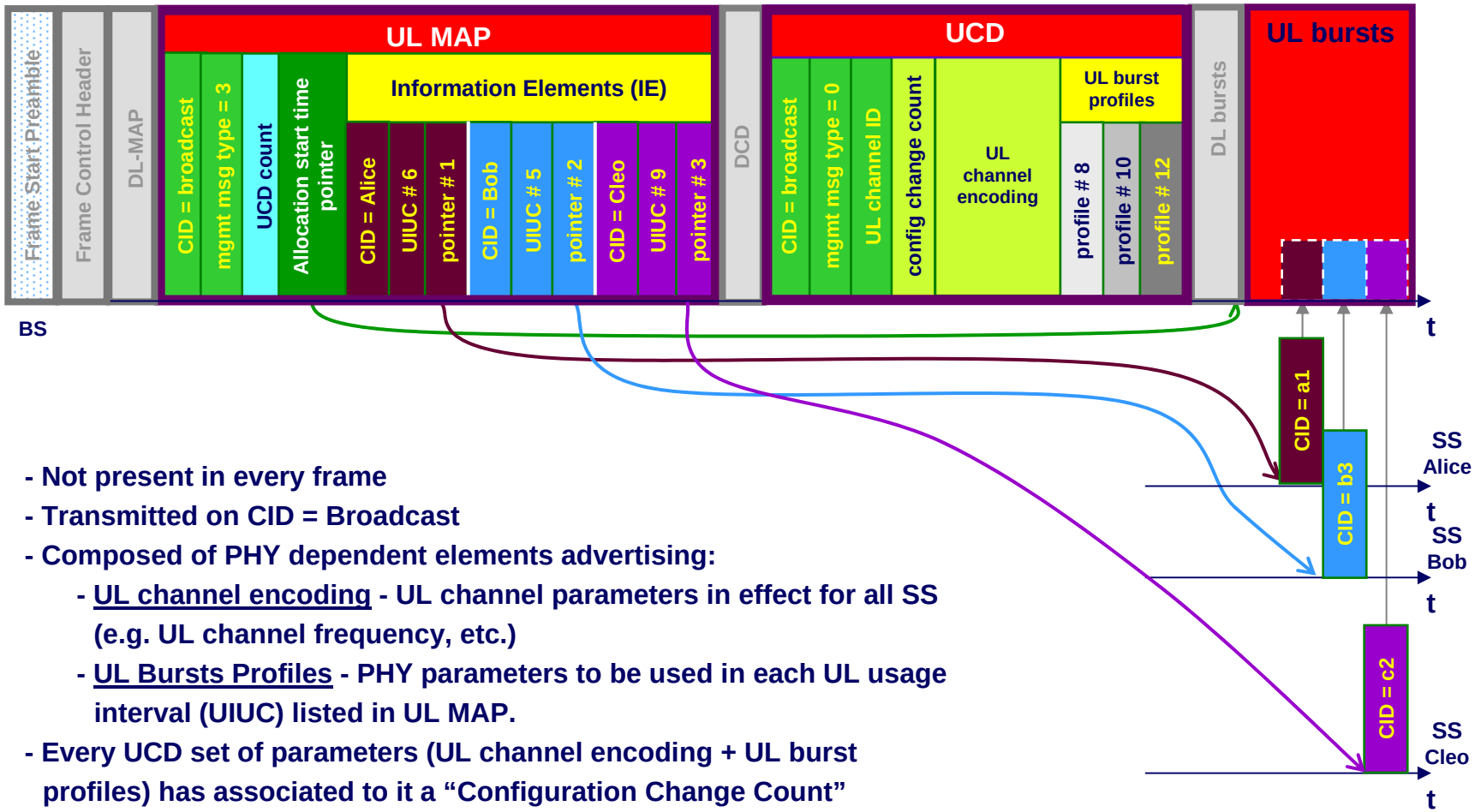


	WAN	Access to WAN	LAN	Access to LAN	PAN
Distance		**IEEE 802.16** - 802.16 - 10 - 66 GHz - 120 Mbps - 50 km - Single Carrier - LOS (high freq) - 802.16. a - 2 - 11 GHz - 120 Mbps - 50 km - Single Carrier, OFDM, OFDMA - NLOS (low freq) - 802.16.e - mobility		**IEEE 802.11** - 802.11 - 2.4 GHz - 1, 2 Mbps - 5 km - FHSS, DSSS, IR - 802.11.a - 5.x GHz - 54 Mbps - 5 km - OFDM - 802.11.b - 2.4 GHz - 11 Mbps - 2 km - DSSS - 802.11.g - 2.4 GHz - 54 Mbps - OFDM - 802.11.n - 320 Mbps	**IEEE 802.15** - 802.15.1 - Bluetooth - 2.4 GHz - 720 kbps - 10 m - FHSS - 802.15.3 - UWB (Ultra Wide-Band) - High rate WPAN - 480 Mbps - 802.15.4 - Zig Bee - Low power consumption - Low rate - 200 kbps - 2.4 GHz; 915 MHz; 868 MHz
Capacity					
Ad hoc					
QoS					
Freq band					
Access					
NLOS					
Mobility		**IEEE 802.20** - MBWA (Mobile BWA) - under 3.5 GHz - 1 Mbps per user - up to 250 km/h			

WIRELESS ACCESS SYSTEMS BASICS

TRANSMISSION SCHEDULING - Point-to-Multipoint

UCD (Uplink Channel Descriptor)

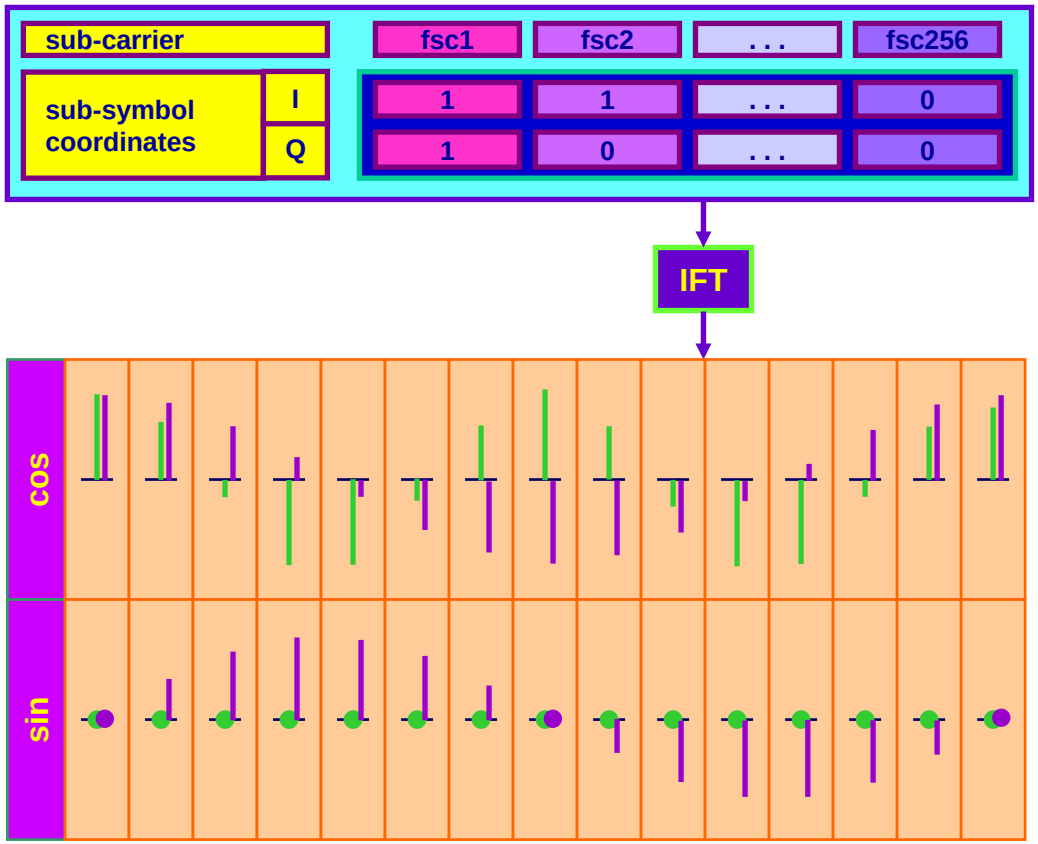


- Not present in every frame
- Transmitted on CID = Broadcast
- Composed of PHY dependent elements advertising:
  - UL channel encoding - UL channel parameters in effect for all SS (e.g. UL channel frequency, etc.)
  - UL Bursts Profiles - PHY parameters to be used in each UL usage interval (UIUC) listed in UL MAP.
- Every UCD set of parameters (UL channel encoding + UL burst profiles) has associated to it a “Configuration Change Count”

OFDM - THE MODULATION PROCESS

APPLYING INVERSE FOURIER TRANSFORM (IFT)

• *Understanding IFT* • ***example #4***



Numerical representation of a cosine with parameters:

- frequency: fsc1 - phase: +π/4

superimposed over another cosine with parameters:

- frequency: fsc2 - phase: 0