



MESA REDONDA: NECESSIDADES DE ESPECTRO EM ÁREAS SECTORIAIS ESTRATÉGICAS

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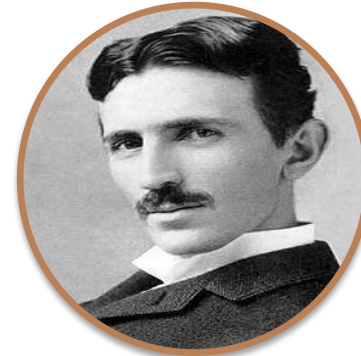
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History



Marconi was an Italian inventor. He is considered as the father of radio communication. He shared the 1909 Nobel Prize in Physics with Karl Ferdinand Braun "in recognition of their contributions to the development of wireless telegraphy".



Tesla demonstrated wireless energy transfer to power electronic devices in 1891 and aspired to intercontinental wireless transmission of industrial power in his unfinished Wardenclyffe Tower project.



Radio Communications



Broadcast Radio

Communications for the Masses

- FM/AM
- DAB



Television

High Social Impact

- DVB-T
- DVB-S



Mobile Phones

Mimicking God Omnipresence

- GSM
- 3G
- 4G



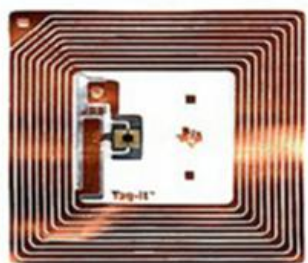
Data Communications

Interconnecting people

- WiFi



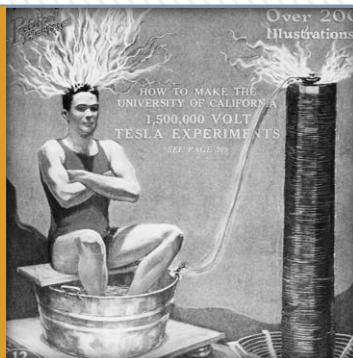
Evolution of Radio for the masses



RFID

Powering up small Tags's

- 13 MHz
- 868 MHz
- 2,4GHz
- 5,8 GHz



WPT

Power been transmitted via air !!

- WPT



WiGig

High Speed Wireless Access



M2M

Implementation of the IoT



5G

Cognitive Radios !!



Next Challenges

Wireless Things



Low bit Rate

- Low Power
- Low complexity



High bit Rate

- High Power
- High complexity



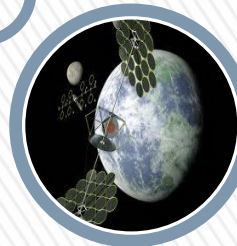
Next Challenges



Battery-less Sensors for health applications



Car Energy Collector



High Efficient Energy Collection



RFID's




Domestic Appliances Wireless Energized



Agriculture passive sensors




Next Challenges



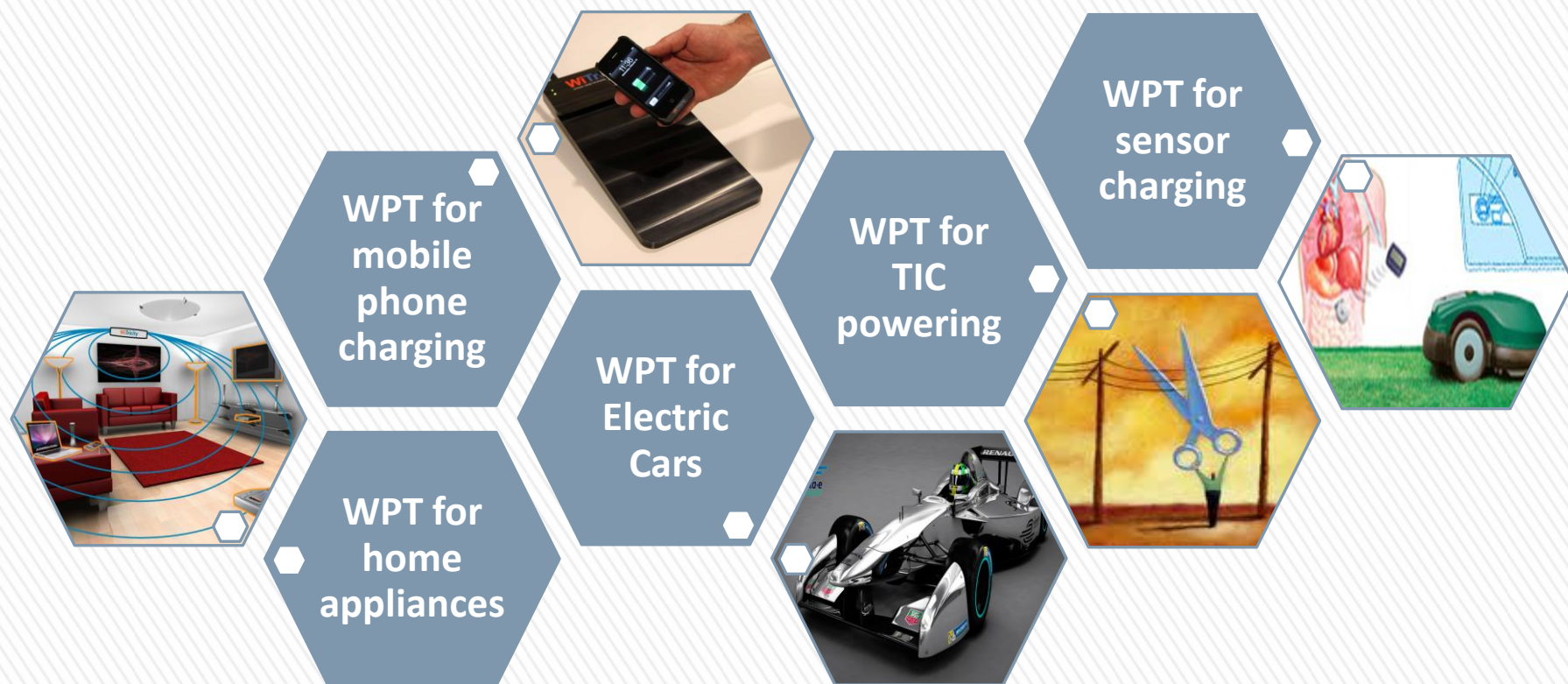
Cognitive Radios
will impose a
large amount of
technology
developments

M2M will start
to be deployed
significantly at
UHF and near
GPS frequencies



WPT will
demand for
narrow band
channels, but the
power can be
huge !!

Next Challenges WPT



Next Challenges M2M



**Satellite
Terrestrial
Sharing**



**Increase
of M2M
telematics
sensors**



**Wireless
Sensors for
environmental
monitoring**



Next Challenges 5G



**Opportunistic
Access**



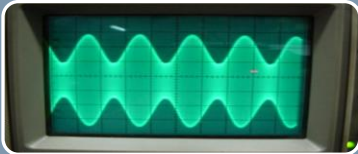
**Spectrum
Recycling**



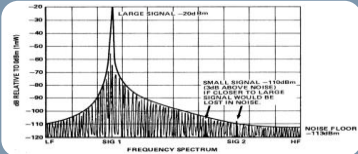
**Cloud
RAN**



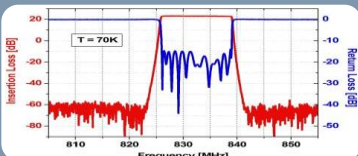
What are the Problems



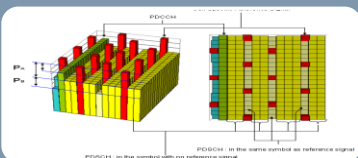
Total spectrum use often is not dominated by transmitter parameter such as modulation efficiency and out-of-band emissions, but in practice by receiver limitations



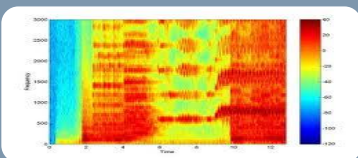
Dynamic Range of sensing radios



Filter characteristics for M2M use near GPS



Filter characteristics for LTE over DVB-T interference



Signals have a time-frequency behavior

Next Frontier



Technological Spectrum Neutrality

“Transmitters don’t use spectrum,
receivers do”

Michael J. Marcus

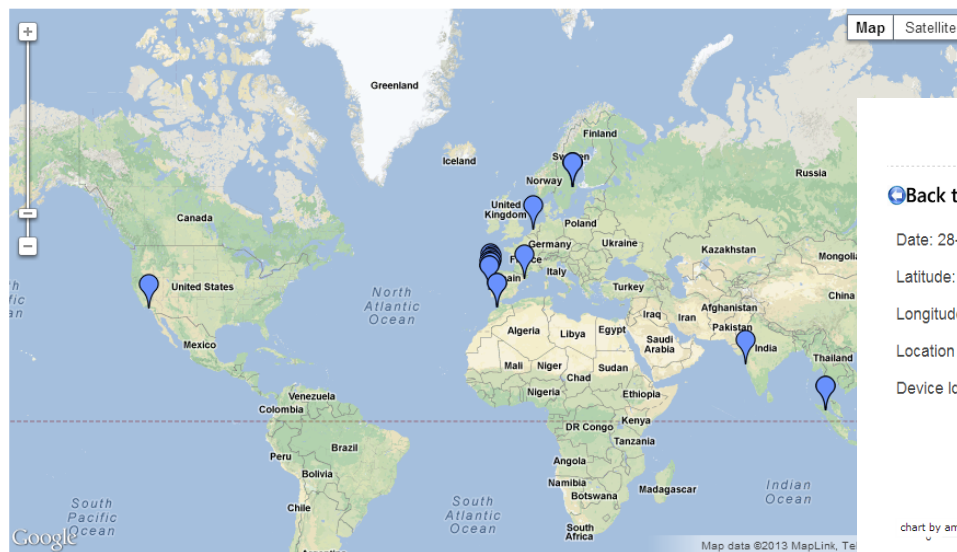


Challenges University of Aveiro

Energy Harvesting Mapping

Home Android Application Map CSV Files About

Map



Device Id
Search All Devices

Creation of a global map of energy power for energy harvesting purpose.

Details of reading

Back to Map

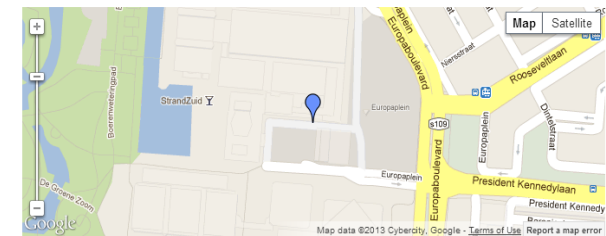
Date: 28-10-2012 11:24:34

Latitude: 52.34165204285715

Longitude: 4.8894821

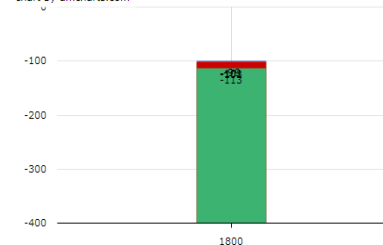
Location Type: GSM

Device Id: 3538330456876f



Mobile Network

chart by amcharts.com

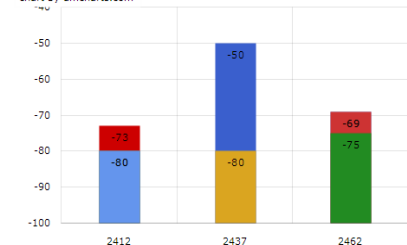


Network Cell

Operator: vodafone NL
Operator Id: 20404
Type: GSM/UMTS
CID: 46088435

Wifi

chart by amcharts.com



Wifi Spots

SSID: flexoffice
BSSID: a0:cf:5b:0f:9c:71
Frequency: 2412 MHz
Level: -80 dBm

<http://ipis.av.it.pt/ehmapping/>

Ludimar Guenda, Ana Collado, Nuno Borges Carvalho, Apostolos Georgiadis and Kyriaki Niotaki, "Electromagnetic Geo-referenced Footprints for Energy Harvesting Systems", Radio and Wireless Week, Santa Clara, EUA, January 2012.