IEEE 1900.7 White Space Radio Potential Use Cases For TVWS

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Use Cases

- Forseen use cases for TV white space:
  - Rural broadband
  - Dynamic backhaul
  - Indoor networking (with inside-to-outside coverage)
  - Machine-to-machine (longer term use case)

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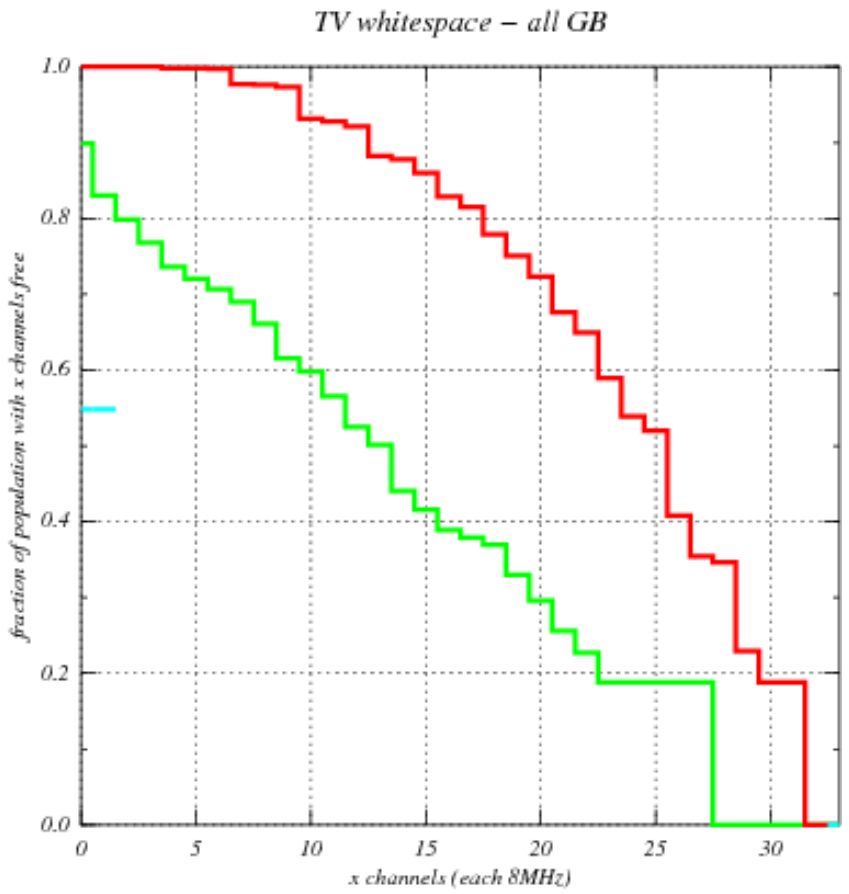
Rural Broadband

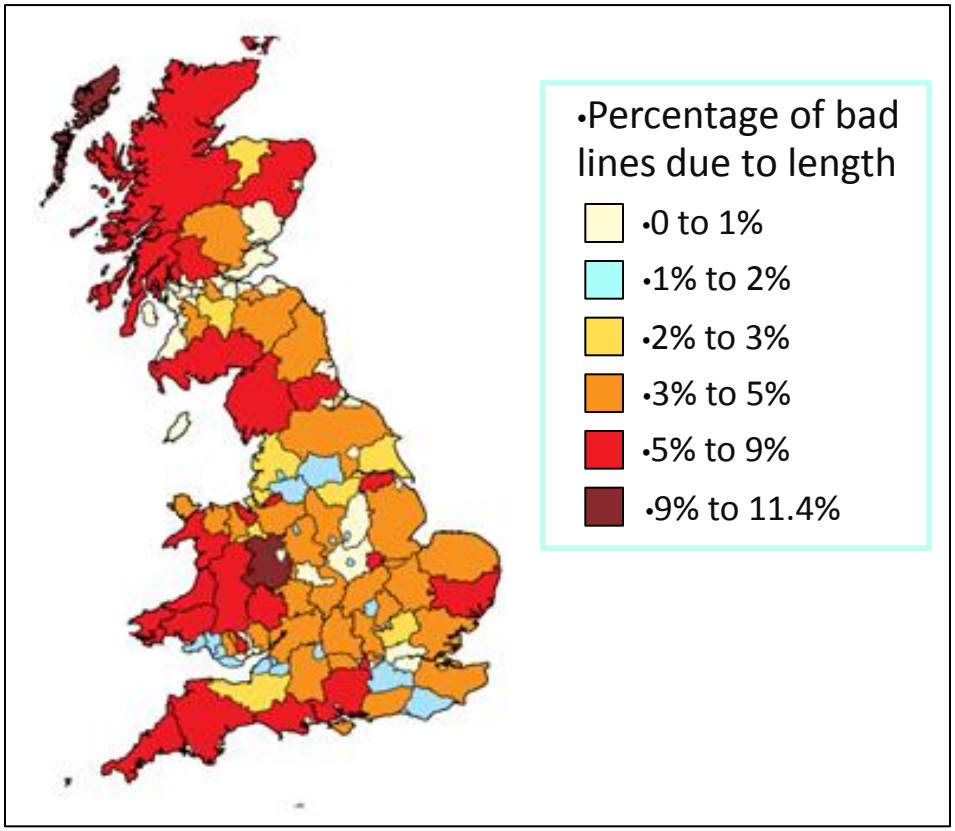
- TVWS availability in UK (weighted by population)

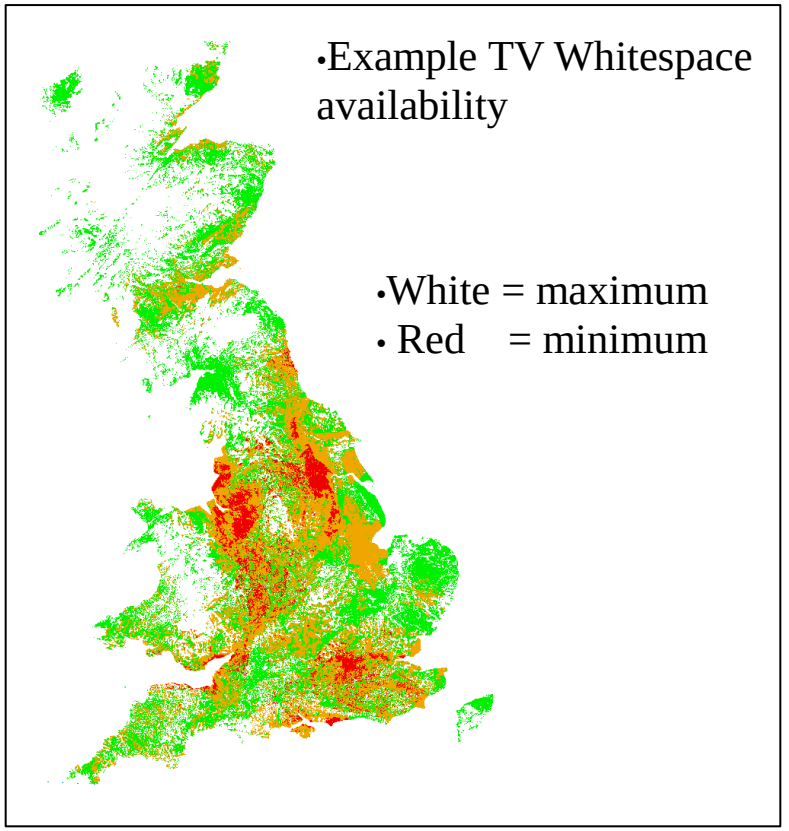
- If adjacent channels can be used everyone can see at least 40MHz and 50% can see at 200MHz (red line)
- If adjacent channel are not allowed then 70% can see 40MHz and 50% can see 100MHz (green line)



Rural Broadband

- Not-spot locations correlate well with TVWS availability

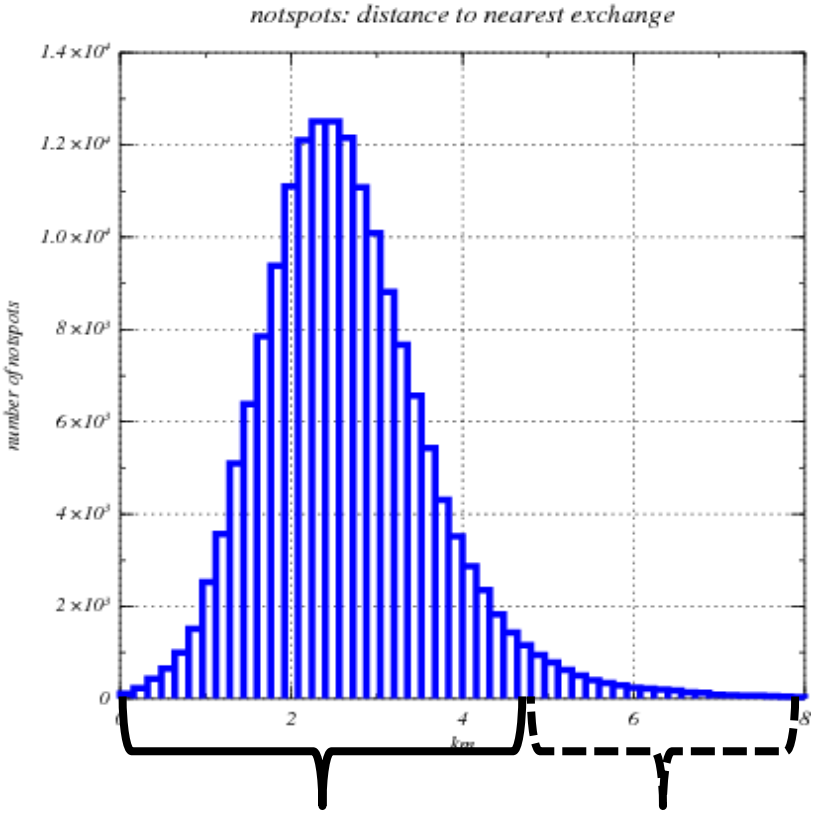




Rural Broadband

- Fixed broadband is limited by length of copper lines. Copper often does not take the shortest route

- Average not-spot 3km from nearest exchange
- UHF can provide >2Mbit/s up to appox 5km NLOS and up to approx 8km LOS
- Rural broadband trial already underway



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Dynamic backhaul

- Fixed broadband is limited by length of copper lines. Copper often does not take the shortest route

- Cell sizes are reducing and planning is becoming infeasible. Backhaul that organises itself means easy installation of small cells for both licensed and unlicensed systems

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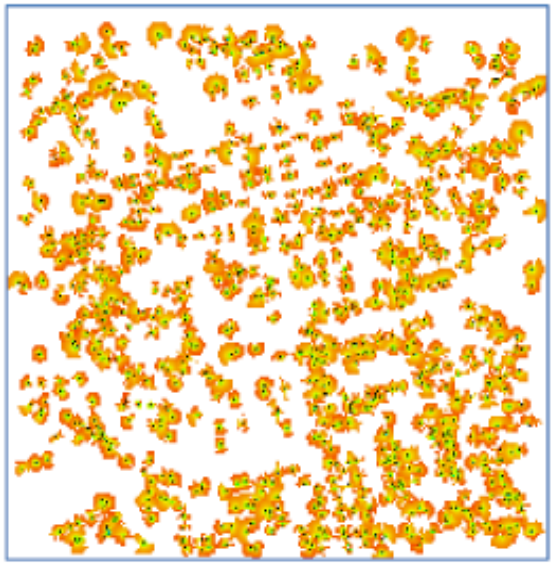
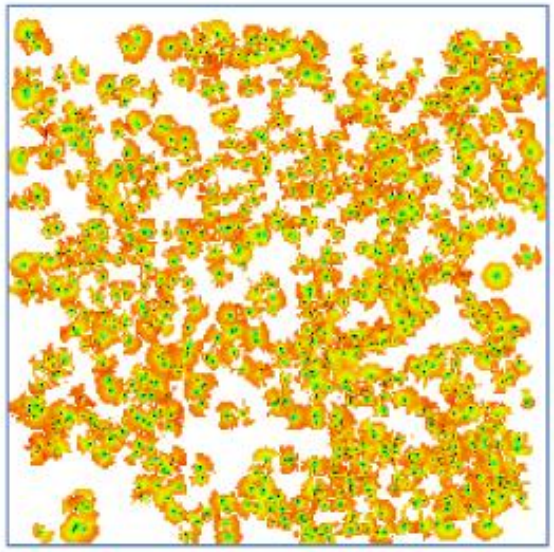
Indoor Networking (inside-to-outside)

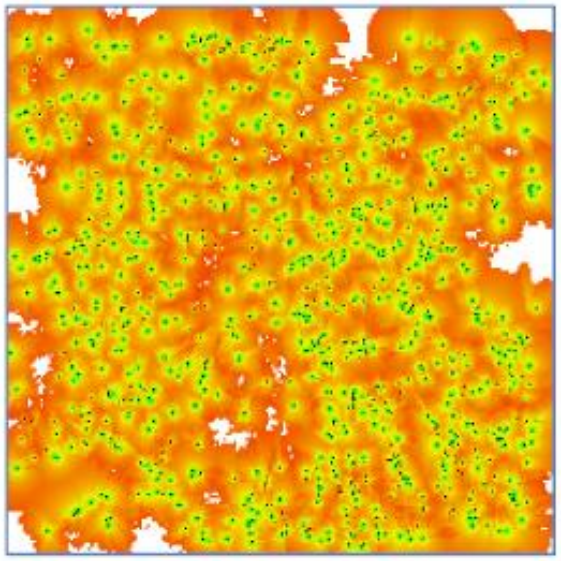
- Distribution of bandwidth inside premises when NGA is delivered (Indoor networking)
  - Millions of homes in urban areas with high speed broadband that can reach at least 50Mbit/s
  - WiFi at 2.4GHz is already congested and 5GHz will not reach around even a moderately sized house
  - UHF uses lower energy than 2.4 / 5GHz for the same coverage and throughput

Indoor Networking (inside-to-outside)

- Area – 1sq km in London, household density 5k







- (a) 5GHz (b) 2.4GHz (c) TVWS
  - TVWS band provides coverage similar to a mobile broadband network – with a 20% deployment density

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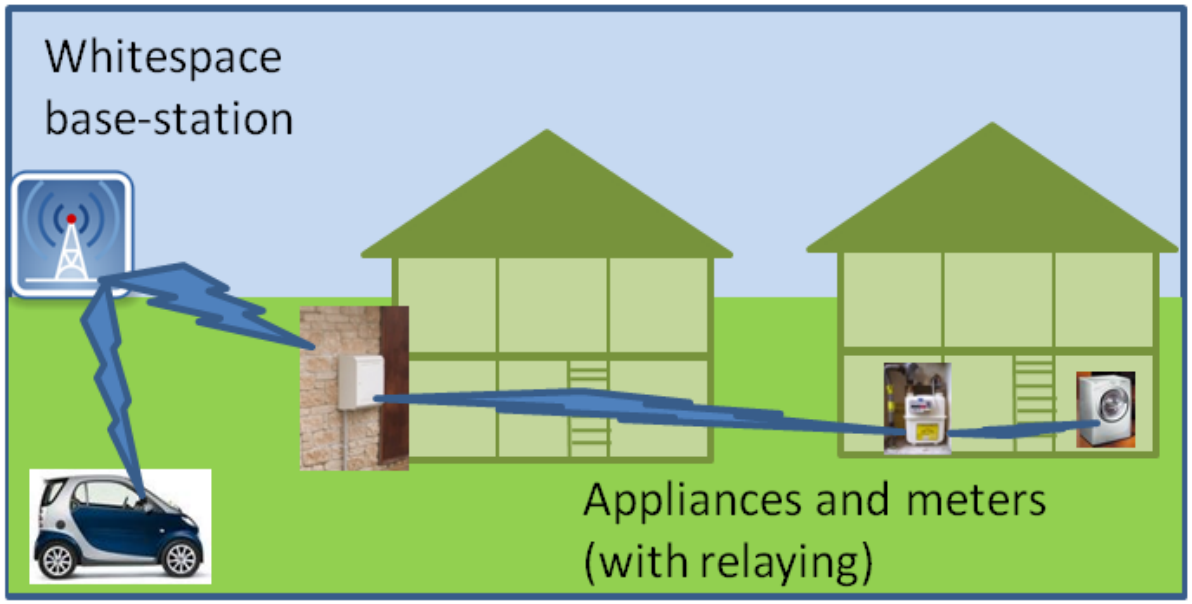
Machine-to-machine

- High number of devices in a small area
- Relaying used to reach base stations
- Some device fixed, others mobile
- Typically low power



Conclusions

- Several use cases suggested for TV white space:
  - Rural broadband
  - Dynamic backhaul
  - Indoor networking (with inside-to-outside coverage)
  - Machine-to-machine (longer term use case)
- Early use cases fixed. Later use cases become increasingly mobile.