

WiMAX - WiNOT?

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What is WiMAX

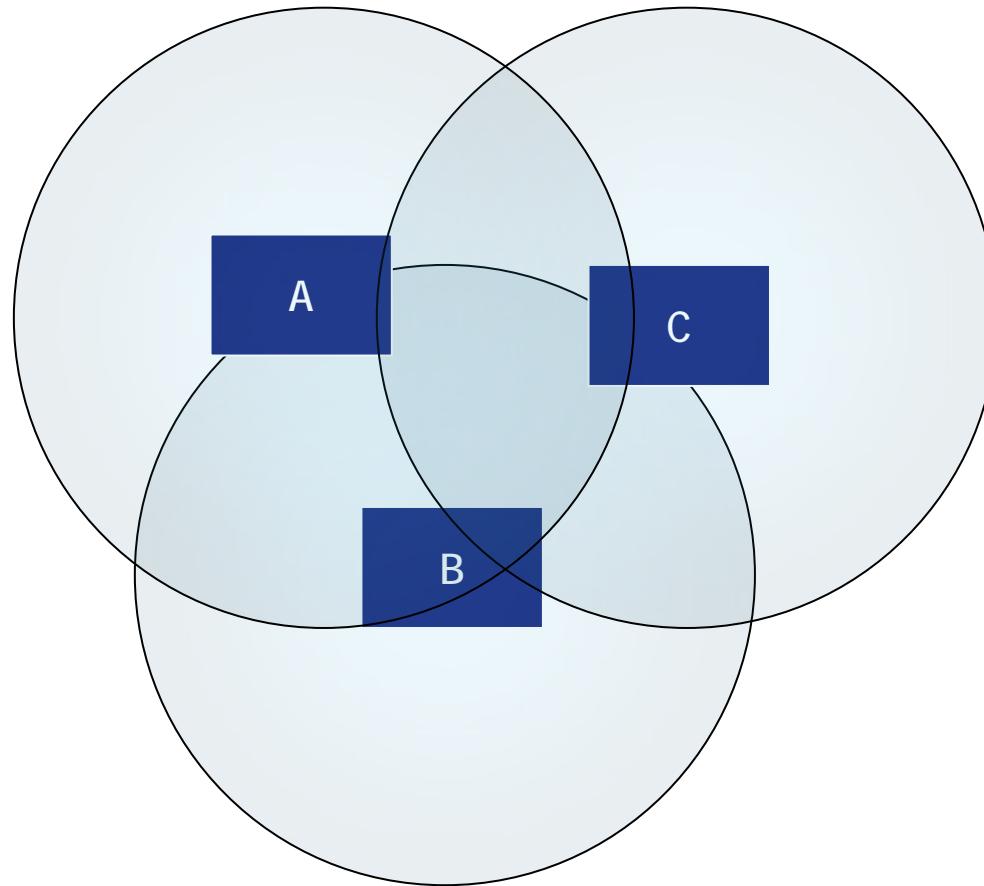
- IEEE 802.16
 - Allows 10 – 66GHz
 - 802.16-2004 amendment, 2 – 11GHz
 - Large channel sizes (>10MHz)
 - 1 - 20MHz
 - Supports TDM or FDM
 - full-duplex and half-duplex
 - MAC supports higher level protocols
 - ATM, Ethernet, IP, HiperLAN/2
 - Data rates of up to 268Mb/s each way
 - ATM type QoS metrics
 - Variable sized PDUs (protocol data unit)
 - Service Data Units (SDUs) may be concatenated in a single PDU



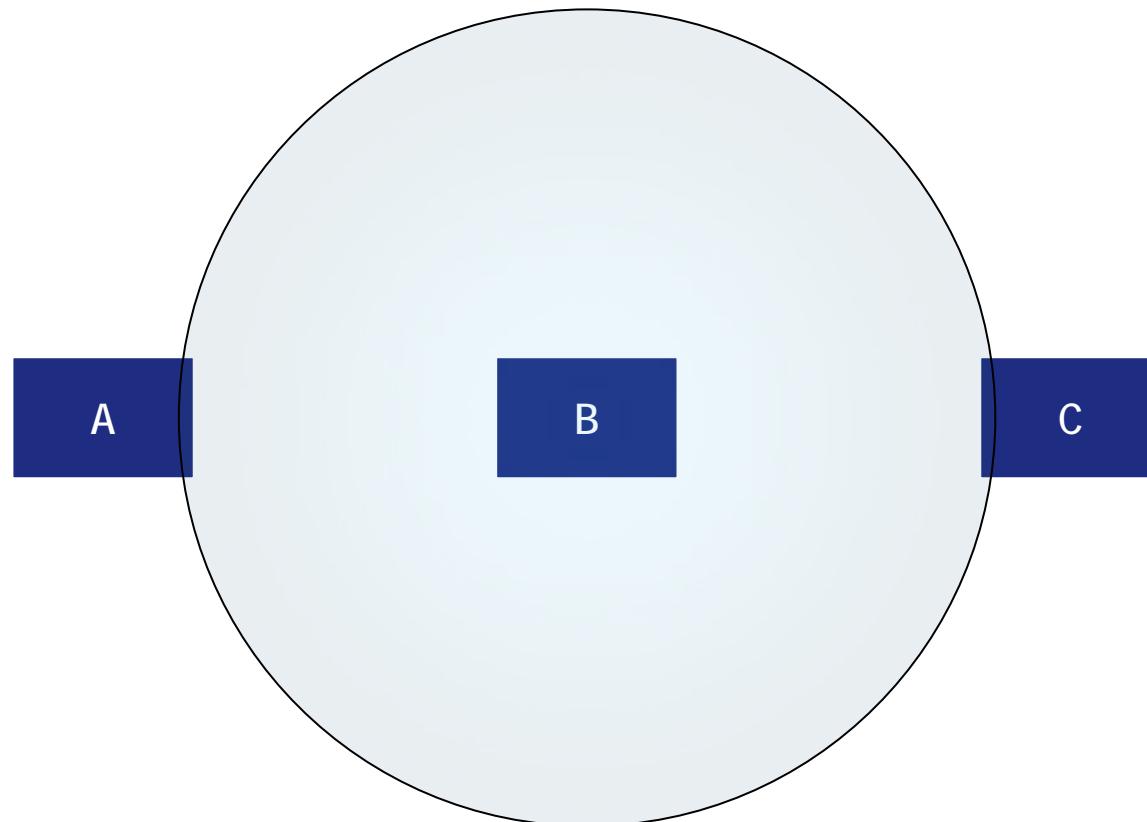
Error correcting signals



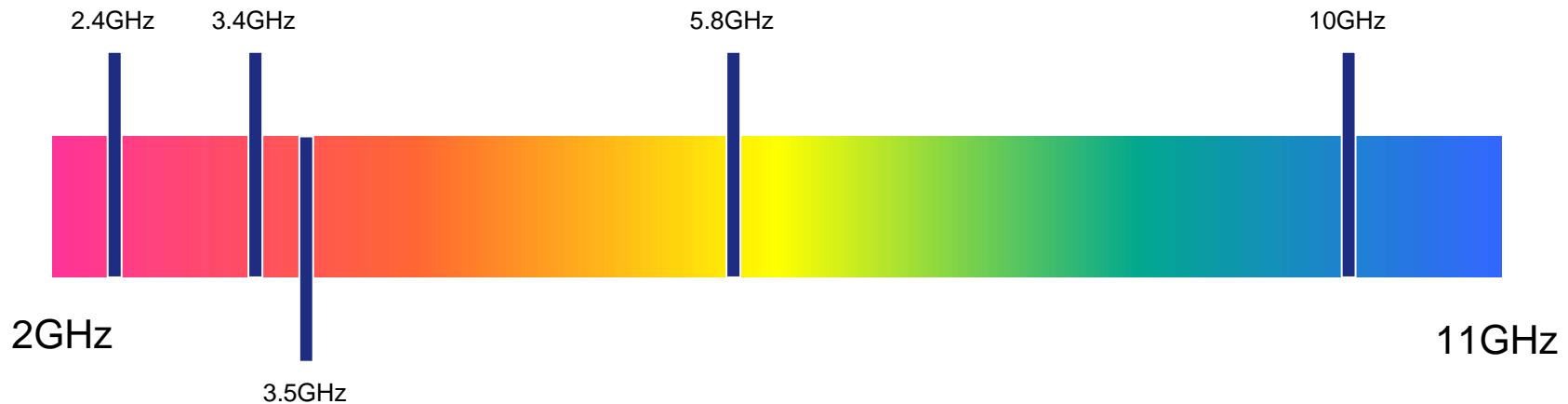
Hidden nodes – no more



Hidden nodes – no more



UK Spectrum



http://www.roke.co.uk/download/datasheets/UK_Radio_Frequency_Allocations.pdf

UK Spectrum

- In UK most spectrum allocated
- 2.4GHz ISM - WiFi, Bluetooth, Zigbee
 - Microwave ovens
 - 100mW EIRP
- 3.4GHz national license to PCCW
- 3.5GHz national license to Pipex
- 5.8GHz ISM – 802.11a (issues)
- 10GHz various local licenses (NTL)

WiMAX in the UK

- Pipex 3.5 GHz
- PCCW/Intel 3.4 GHz
- Telabria/Metranet 5.8 GHz



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5.8GHz

Band A	Band B	Band C
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5150MHz to 5350MHz

5470MHz to 5725MHz

5725MHz to 5850MHz

- Band A: 200mW EIRP, nomadic, mobile, indoor only
- Band B: 1W EIRP, nomadic, mobile, indoor/outdoor (mandates DFS)
- Interim for Band A without DFS
 - Band A: 60mW EIRP, nomadic, mobile, indoor only no TPC
 - Band A: 120mW EIRP, nomadic, mobile, indoor only TPC

5.8GHz band C

- 100mw EIRP/MHz
 - 2W max EIRP (i.e. 20MHz channels)
- Must implement DFS and TPC
 - basic 802.11a is illegal (for outdoor use)
- Requires a 5.8GHz FWA license
 - Once licensed, terminals can be registered electronically
 - £1 per terminal, min £50.
 - Annual fee (Ofcom can check compliance)
- No protection from other users
 - Licensed users protected from FWA users
- In theory protection from illegal (unlicensed users)
 - Ofcom have not prosecuted anyone as yet?

Future Spectrum

- Ofcom considering
 - 2010 to 2025MHz
 - 2500 to 2690MHz
 - 3.6 to 4.2GHz

WiMAX issues

- 5.8GHz can only (realistically) be used for fixed links
- Mobile version of WiMAX not yet standardised
 - 802.11e
- Currently 3.4 / 3.5GHz only allowed for fixed links
 - Ofcom license requirement
- No protection in 5.8GHz
 - No workable SLAs

UK != US

- US – FCC
- UK – Ofcom
 - UK part of EU
 - CEPT/ETSI
 - Needs agreement from all EU member states
- US uses ERP / EU uses EIRP
- US general policy "if it's not being used, then you can use it"
- UK "you need a license to use spectrum"
 - Wireless Telegraphy Act
 - No such thing as unlicensed spectrum
 - Some bands are license exempt
 - Moved under the Communications Act

ERP vs EIRP



Thank you for listening!

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