

Wireless Broadband in the UK

Presentation to ISART 2005

Presented by Dr Andrew Muir
March 1, 2005



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LATEST NEWS

The Role And Impact Of WiMAX And Proprietary BWA Technologies

Business case for broadband wireless technologies requires mobility to get beyond low-margin fixed Internet access, say Analysys.

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Geographic Approach To Business And Regulatory Strategy

The two most significant variables are customer profitability and market share.

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Mason Designs National Transmission Network

Mason supported by Redsoft has developed the ten-year plan of a 100+ node, national SDH/DWDM network.

Leveraging this successful partnership, Mason and Redsoft have joined forces to offer a comprehensive core network design, planning and

optimisation service.

[View Case Study PDF](#)

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Catalyst Autumn 2004 Newsletter

View the latest edition of our newsletter.

News items include an announcement on the new Analysys Mason Group

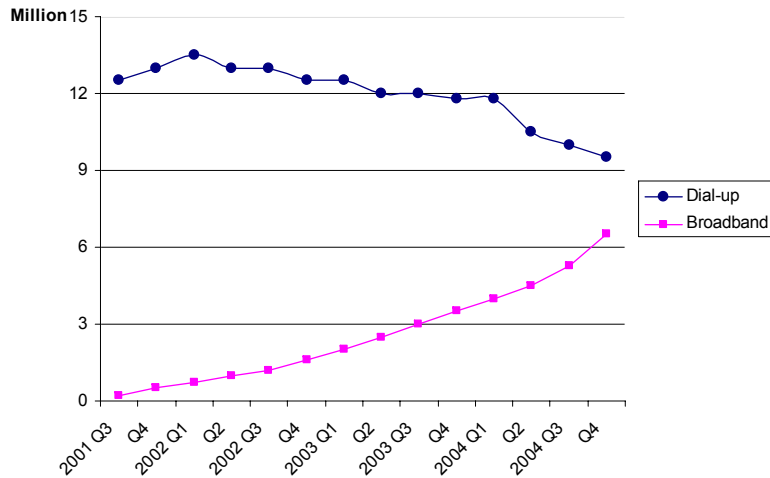
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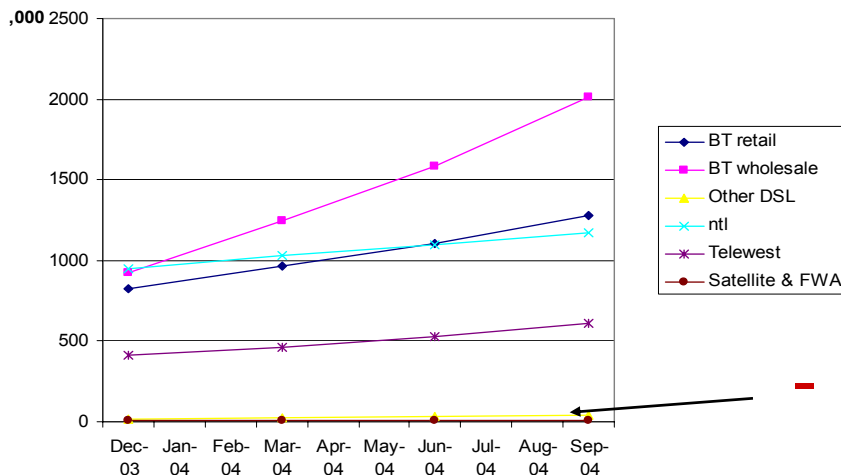
1. Background
2. Regulation and Spectrum
3. Market Activity
4. Case Study - Community Networks
5. Summary

Background

UK Broadband continues to grow



- > 6million subscribers (4m DSL, 2m cable)
- > 38% all connections are now broadband
- No 1 in G7 for ADSL availability: 96%
- Strong competition in the retail market
- BT trialling 8Mb ADSL and ADSL2+



- but limited broadband wireless

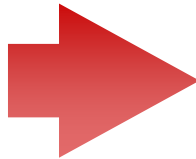
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Regulation and Spectrum - Ofcom

a new regulator for the UK communications industries:

- television, radio, telecommunications and wireless communications service



The vision for spectrum management is for market forces to play an increasingly important role in determining how spectrum is used

This should encourage efficiency in spectrum use, by increasing the likelihood that spectrum will be held by those who can make best use of it, and by creating more freedom for spectrum to be used for more valuable applications.

Result

- ~70% of the spectrum to be freely traded
- Should not be specific regulation aimed at providing advantage for broadband fixed wireless
- Licenses should be awarded on a technology and service neutral basis

Regulation and Spectrum - Broadband Stakeholders Group

Government's key advisory group on promoting the roll-out and take-up of broadband

Task

Examine the commercial and regulatory reasons for the lack of progress in terrestrial wireless broadband

Regulation and Spectrum - Broadband Stakeholders Group

Task

Findings

- there is a lack of a clear strategy for enabling wireless broadband
- regulatory timescales have repeatedly slipped and consultation has not been particularly effective
- a more flexible approach to spectrum management is required

Regulation and Spectrum - Broadband Stakeholders Group

Task

Findings

Results

- FCC's Spectrum Policy Taskforce a good model for Ofcom
- Focus should be to reduce complexity and delays involved in spectrum acquisition
- Apply more stringent conditions surrounding use, including requirements for release of spectrum if it is not used

Regulation and Spectrum - Broadband Stakeholders Group

Key issues:

Task

2.4GHz

- Ofcom should introduce geographically differentiated regulation to increase the EIRP level at 2.4GHz to enable the use of directional antennas in rural areas to achieve greater range

Working on it

Findings

More spectrum

- Ofcom should allocate further spectrum below 10GHz, particularly around 2GHz, to encourage the introduction of new technologies

Market forces

Results

Strategic Plan

- Ofcom should undertake an urgent review of the spectrum requirements for wireless broadband and set out a strategic plan

Market forces

New Management

- Ofcom should undertake a major review of spectrum management

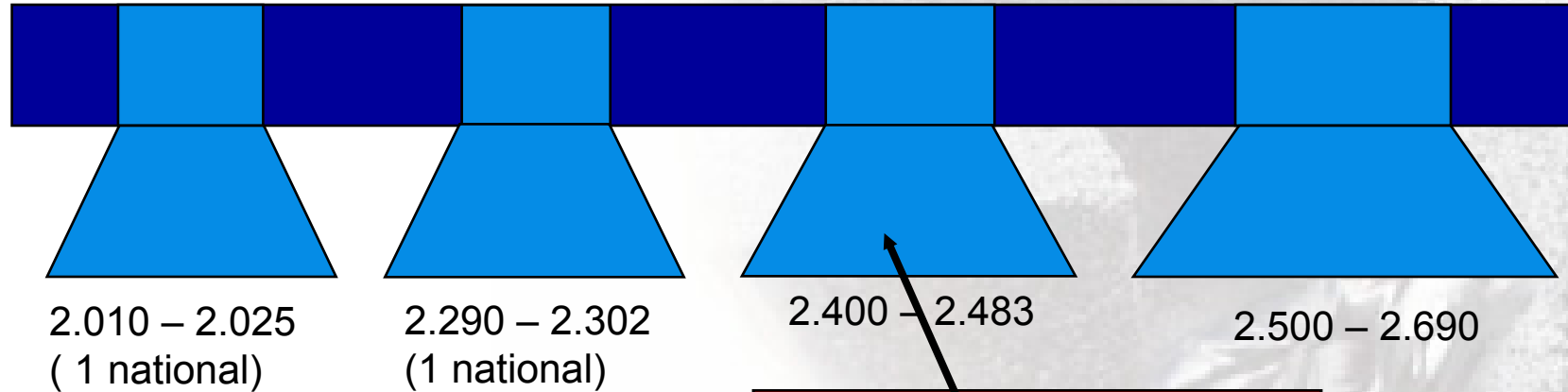
Working on it

Regulation and Spectrum – below 3GHz

A number of new licenses to be issued over the next 3 years :

2 GHz

3 GHz



2.4GHz

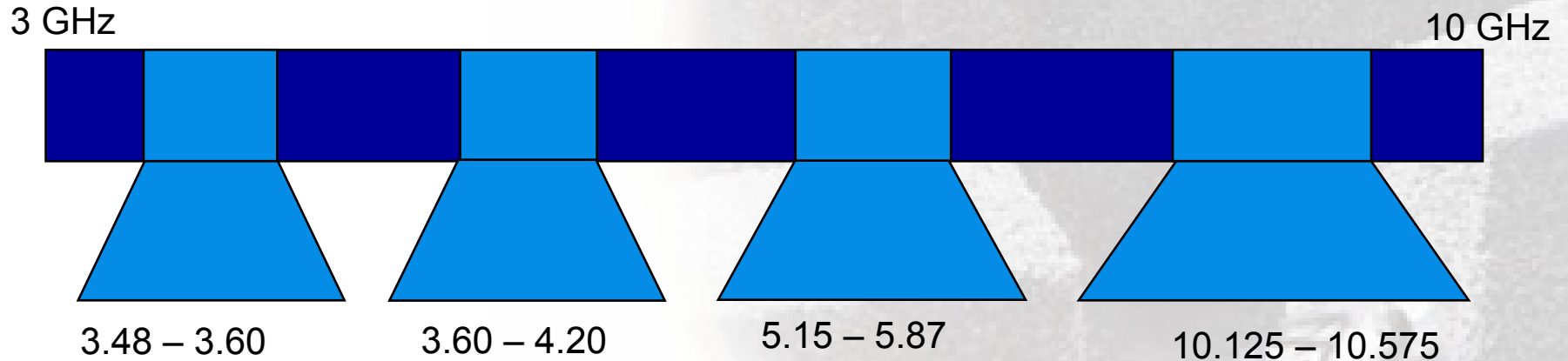
- 2.4GHz extensively used in UK
- but currently limited to 100mW EIRP (US is 1W/4W)

These new bands may be used for WiMax



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Regulation and Spectrum – above 3GHz



3.4 GHz

- 15 licenses auctioned in 2003
- All sold and now all held by UK Broadband
- Ofcom looking to release the fixed access restrictions to allow mobile use

3.6 GHz

- Pipex have a national license
- Ofcom plans to open up more

5.8 GHz

- 'Light-touch licensing'
- Growing in importance
- Requires DFS and TPC (802.11h)

10 GHz

- Existing holders all handed licenses back
- Single UK package to be offered - but tradable allowing spectrum and geographic segmentation through 'partial transfers'



Regulation and Spectrum – above 3GHz, and beyond



28 GHz

- 3 licenses per geographic region
- 42 licenses offered in 2000 auction process, only 15 taken up
- Remaining 27 offered 2001, none taken up
- Re-auction planned in 2006 – but lower reserves
- Spectrum trading would allow each region to be partitioned into smaller areas or allow expansion across the border of a neighbouring region

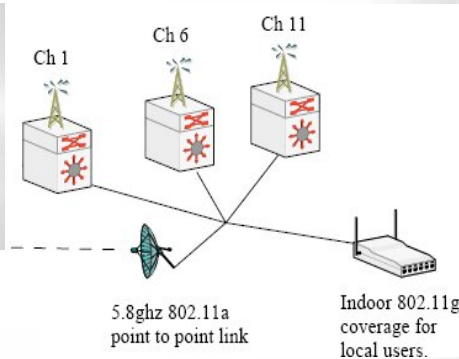
40 GHz

- One for the future?

Format

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Market Activity



- LocustWorld
 - MeshAP software to configure access points into a 2.4GHz mesh
- Telabria
 - first WiMAX network in the UK now under construction, launching mid-05, backhaul only – Skyport for 5.8GHz mesh access
- BT
 - trialled mesh radio – poor results
 - trialled 5.8GHz – good results, now part of DSL reach

Market Activity

The fastest train service in the world!



- First in the world to offer a true bi-directional broadband connection
- Uses 30 trackside radios (utilising IEEE 802.16 technology) spaced at 3km over the 90km route to backhaul wi-fi in the trains



Market Activity

And many, many community wireless schemes...



Technical

- 2.4GHz local access
- Satellite backhaul
- Community server

Funding

- Govt. development grant to set up
- Monthly subs
- Often a constant struggle

Organisation

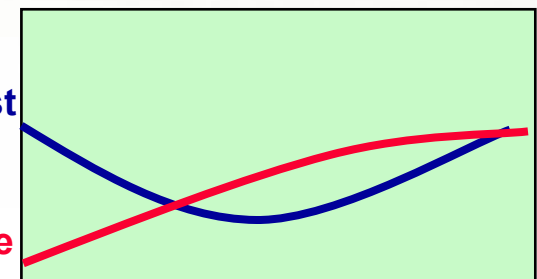
- Local Champion driven
- Support by best efforts

Will they continue?

- ADSL is asynchronous
- All reliant on squeezing copper to the last
- And it's all reliant on BT

Wireless interest

ADSL coverage



time



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Case Study – Broadband wireless communities

Highlands & Islands of Scotland



- Land mass of 40,516 km²
 - 52% of Scotland
 - 17% of UK
- Population of 430,241
 - 8.5% of Scotland
 - ~0.7% of UK
- 10 per km² against EU average of 116 (~16/km² in Colorado)

In Summary

- Low, dispersed population
- Mountainous terrain

↳ Telecoms essential!

The Problem

No broadband and no sign of it coming



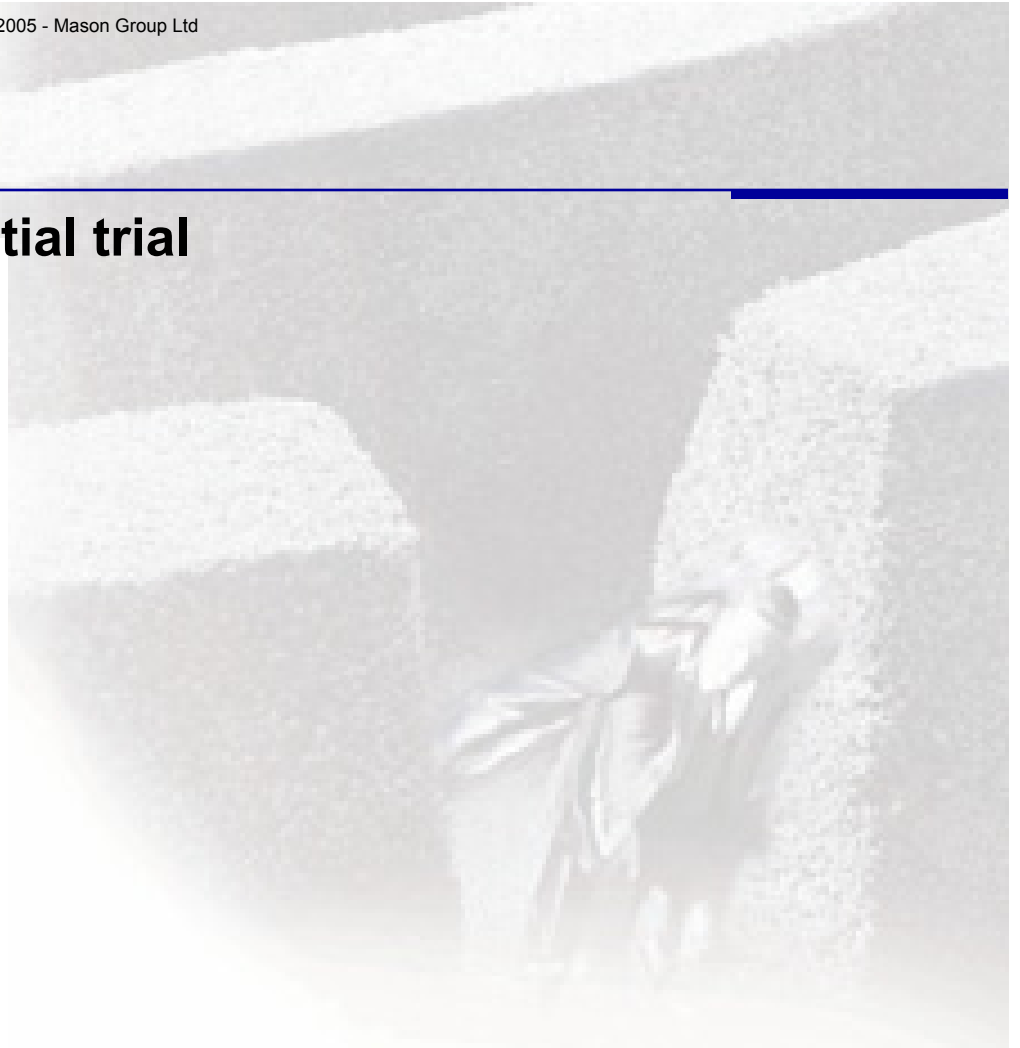
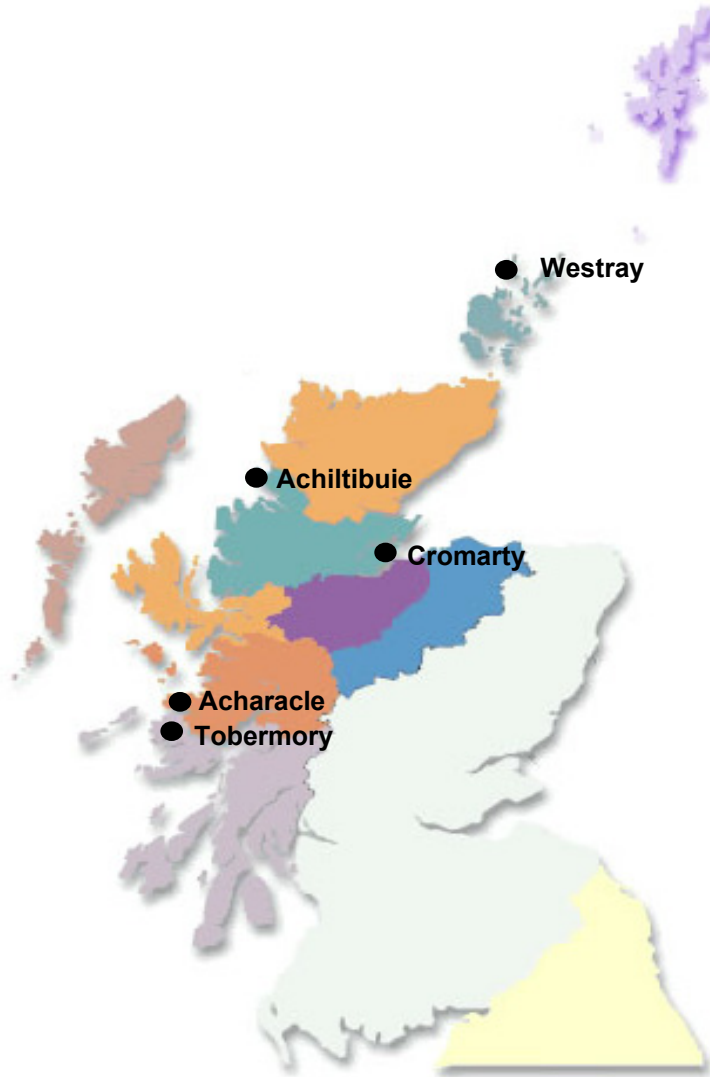
- 380 telephone switches in Highlands & Islands
- ~ 600 lines per exchange
- Uneconomic to upgrade
- No ADSL plans for ~ 230 exchanges
- ↳ No affordable market supply
- but a growing demand for action

Government development body - trial a wireless solution

- Share IP backhaul in communities via wireless technology to individual
- Must be sustainable in the longer term
- Equivalent to ADSL in terms of tariffs and service
- Establish a not-for-profit company to procure equipment, manage installs
- Cover all capital costs

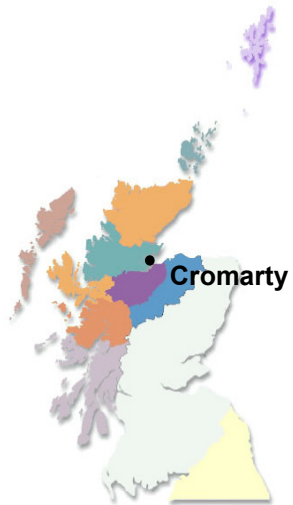
The Pilot

Five communities chosen for initial trial



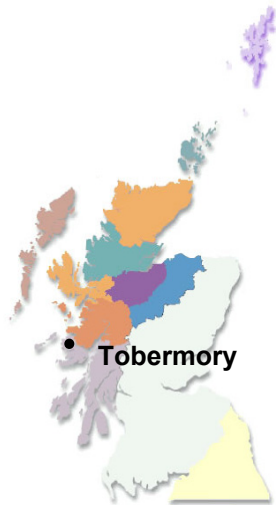
The Pilot Communities

Cromarty - a test for planning and heritage regulations



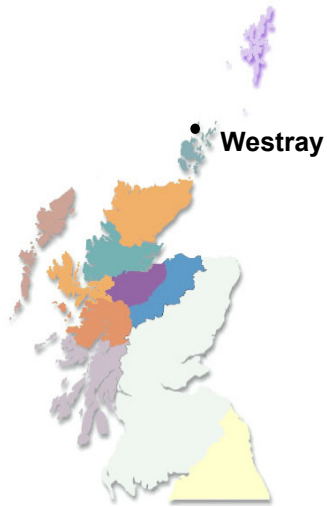
The Pilot Communities

Tobermory – island based, conservation area



The Pilot Communities

Westray – flat, dispersed, lots of water



The Pilot Communities

Acharacle – dispersed, lots of trees



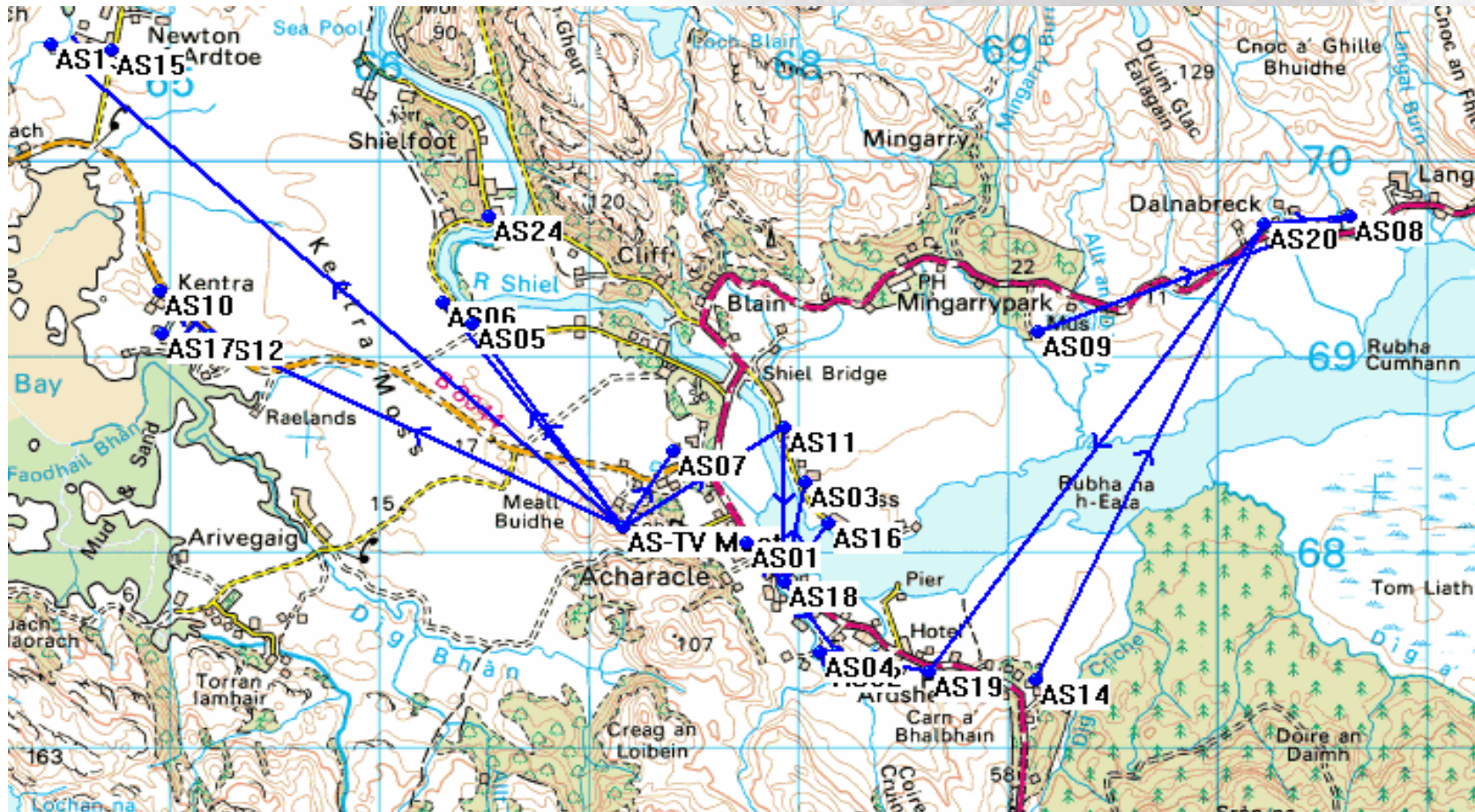
The Pilot Communities

Achiltibuie – strung out crofting community, difficult topography



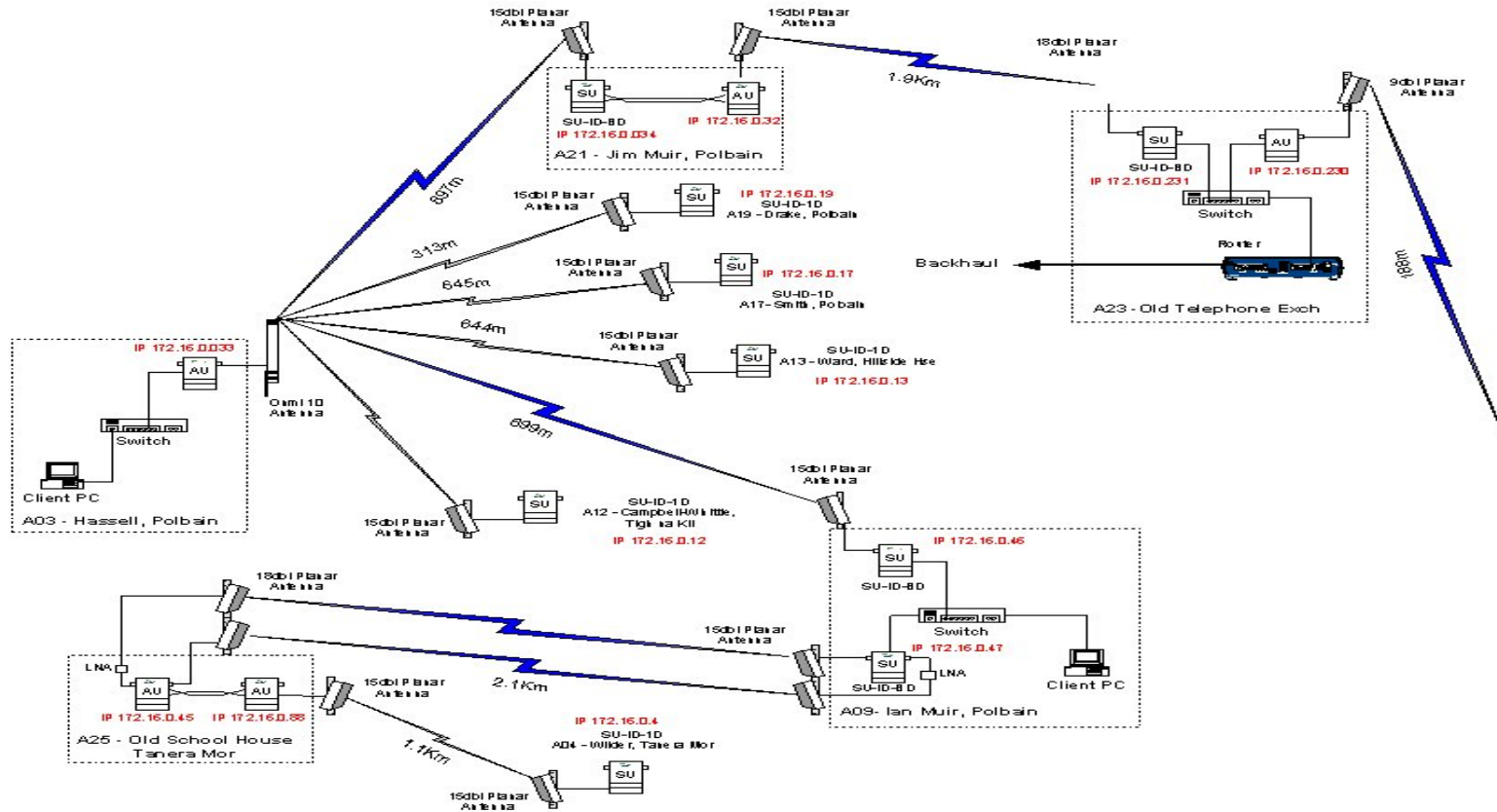
The Pilot

Acharacle wireless network



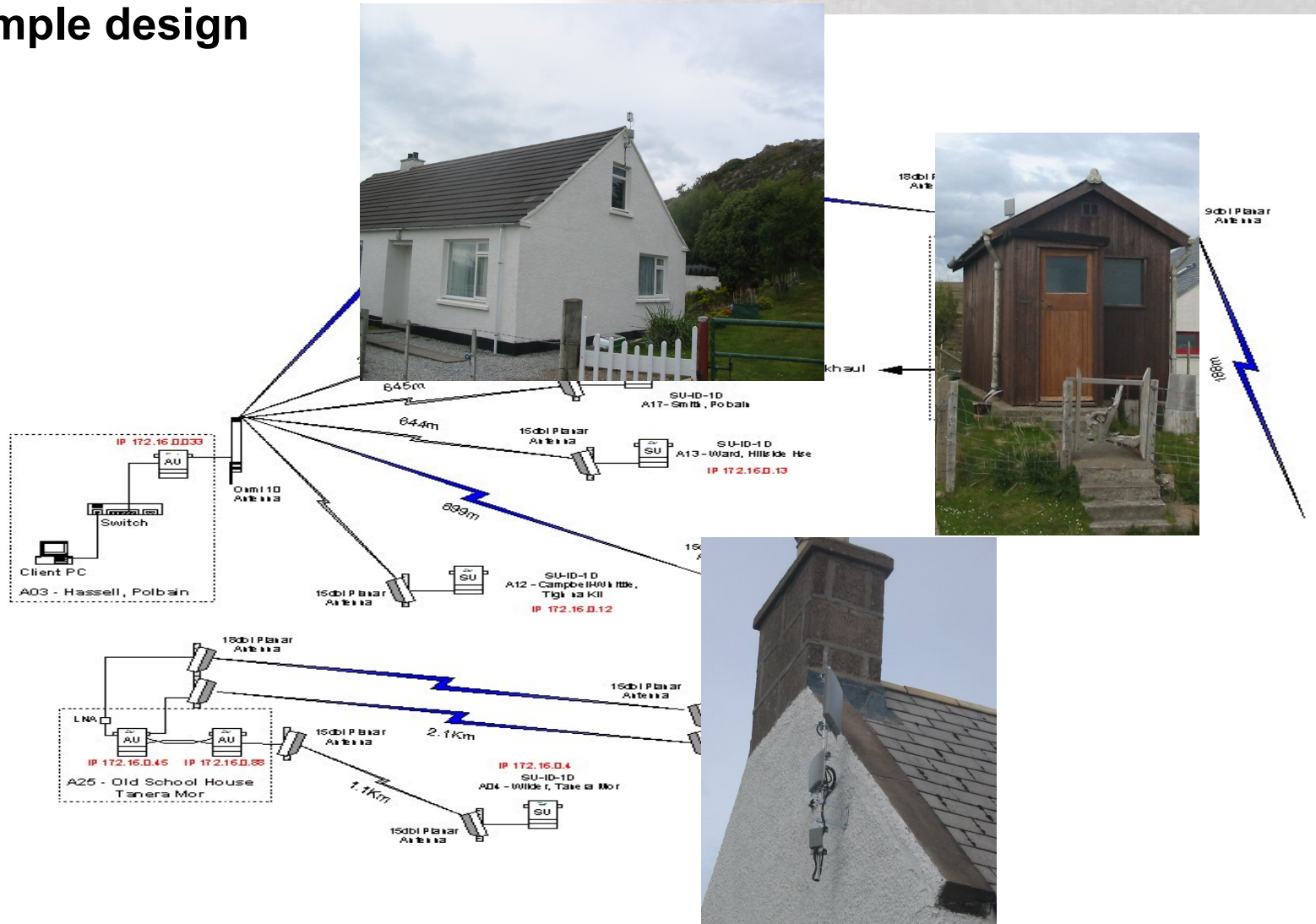
The Pilot

Example design



The Pilot

Example design



The Pilot

WBS - Wireless Broadband Shed



The Pilot

Renewable energy repeater station



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Summary

Wireless Broadband in the UK

- **Broadband has finally caught up in the UK**
 - **market is there**
- **Ofcom measures should free up spectrum**
 - **attract more innovative use**
- **New wireless networks are emerging**
 - **both the technical merits and the business opportunities must be understood**
- **Wireless will play an important role in the UK broadband market**
 - **mobility and rural being the key areas**

Wireless Broadband in the UK

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THANK YOU



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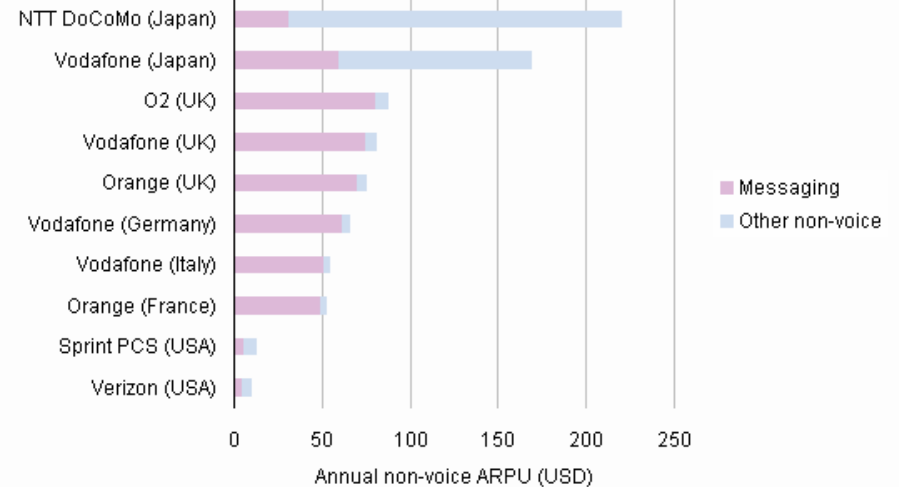
Additional Material

Additional Material

Market Activity – 2G Mobile

Mobile Network Usage Trends

- UK networks evolving:
 - GPRS use now well established
 - Maximising ARPU (average revenue per user) still the main driver in the mobile market
 - ARPU still dominated by voice/SMS
 - Average UK voice ARPU \$800/annum: non-voice traffic ~ 10% total ARPU (Mason estimate)
- Massive market - 58m mobile subscribers in the UK (approx 97% of the UK population), with total turnover for the mobile sector being £15 bn per annum



Source: Analysys Research

Take up of data applications on 2G networks using GPRS is beginning to show real growth

Market Activity – 3G Mobile



Focus in UK now on 3G

- 5 operators
 - cover 99% UK pop, 89% geography
- 384 kbps data rates
 - enhancements such as high speed downlink packet access (HSDPA) should significantly increase this – aim is for 1Mbps
 - early UK trials of HSDPA due in the first half of 2005

