Ofcom
OFFICE OF COMMUNICATIONS

Business Radio Spectrum Reform 2007

Proposals for Liberalisation and Simplification for Business Radio Licensing and pricing

Contents

Purpose of the presentation

- To provide an overview of the liberalisation and simplification of Business Radio licensing proposals.
- Overview of the changes to WT Act licence fees for Business Radio.
- Consultation documents published in July 2006 and are available at:
  - http://www.ofcom.org.uk/consult/condocs/brtrading/
  - http://www.ofcom.org.uk/consult/condocs/pricing06/
- The closing date for responses is 15th September 2006.

Background - Business Radio liberalisation phased approach

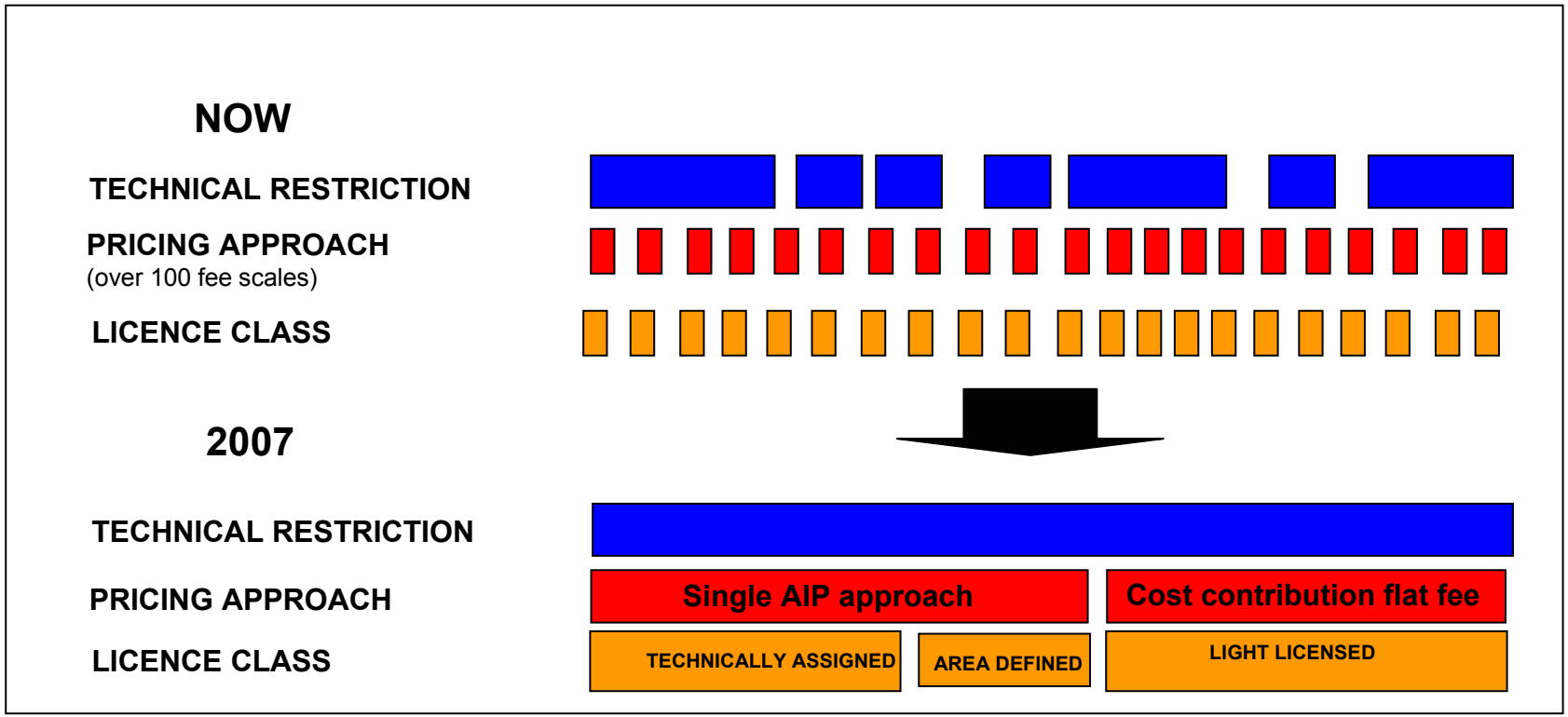
- **Phase1 - 2004/early 2005**
  - Trading introduced to BR national and regional licence types;
  - Frequency partitioning and greater technology neutrality for Business Radio;
  - Use restrictions relaxed by ability to interchange between classes;
  - Removal of non-spectrum licence conditions for CBS.

- **Phase 2 - 2007**
  - Introduction of trading to wide area type licences (with MASTS) – Over 40 thousand assignments;
  - Introduction of geographical partitioning to national and regional licence types;
  - Greater flexibility of use intrinsic to licence through introduction of new licensing paradigm.

Current Authorisation Approach

- **Assigned**: Ofcom plan and micro-manage assignments and interference environment;
- **National & Regional**: Users operate in a large geographical area (National/regional) and exclusive access to spectrum. Licensees are allowed to deploy transmitters anywhere in their area with prior to Ofcom clearance;
- **Pre-packaged**: Ofcom set aside spectrum channels where users have ready access. Limited interference checks.

Business Radio Change Vision



Proposals for Business Radio Sector

- introduce significant additional liberalisation possibilities to the sector through the adoption of more flexible licences and spectrum management techniques;
- extend the ability to trade spectrum to a considerably increased range of licensees;
- simplify and rationalise our licensing arrangements to make them simpler and more flexible, adopting more deregulatory approaches to authorisation where appropriate;
- update our approach to setting fees to reflect a liberalised Business Radio environment;
- Licence is an asset.

Key benefits to end users

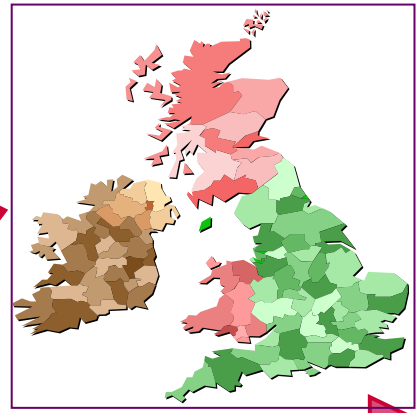
- Replacing 21 different types of licence with three simple licence categories – Removing current restriction on the type of business use and technology – Minimum technical restriction will remain to protect against harmful interference.
- Moving 15,000 licences to 5 year licence term, low flat fee, simple process and online application.
- 35,000 licences to be tradable and flexible.
- Improved assignment process to over 45,000 assignments - Moving to online application.
- Moving from over 100 fee scales to 3 – 1 simple and other 2 retain AIP – over 95 % of licences fees will reduces or stay the same.

Area Defined Licence

Current arrangements

National and Regional licences

- National paging;
- Data networks;
- National and Regional PBR;
- Tetra digital PAMR;
- CDMA asset tracker.
- Remote Meter Reading – Exclusive channels



Proposal - Future

Area Defined Licence

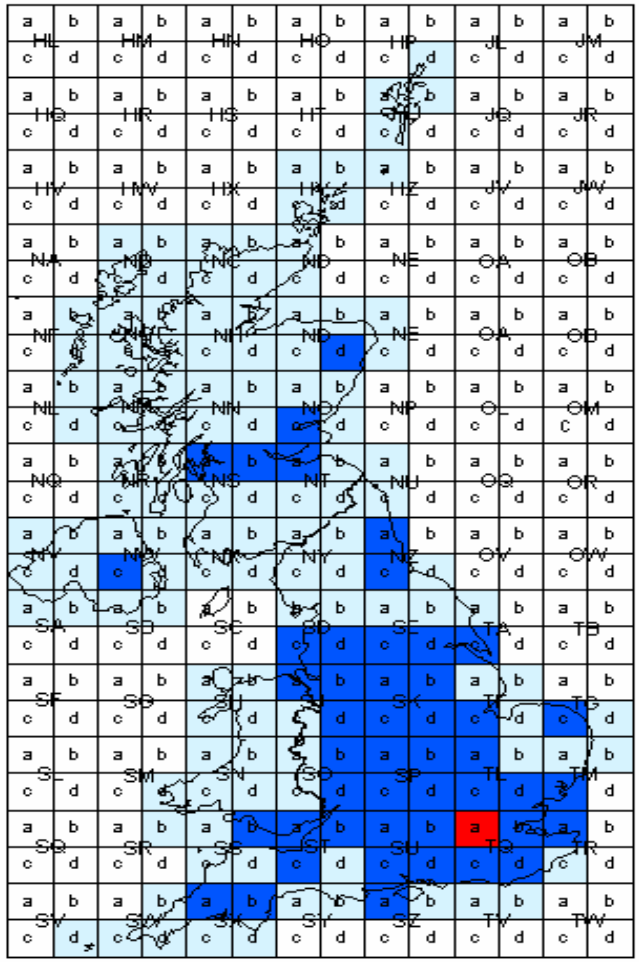
- Large exclusive geographical area UK/Countries
- Not explicitly defined in the licence
- Ofcom micromanage – deployment required Ofcom approval
- Different incentive pricing rates
- Inconsistent with Ofcom liberalisation approach
- Some are Tradable

- Rationalisation to a single flexible licence
- Geographical boundaries well defined
- Clear definition of emission rights
- Geographical partitioning to a minimum 50 km grid square– Partial trade
- Remove Ofcom micromanagement – Licensee freedom
- Single, simple and transparent fees
- Simple business process
- Improve spectrum efficiency

"Trading units"

We proposed dividing national licences into pre-defined "trading units" based on National Grid Reference Squares

- Licensee can partially trade this;
- These pre-defined area can be easily communicated to Ofcom and remove the complexity, ambiguity, and confusion that arises from complex geographical boundaries;
- Each unit has a pre-defined licence fee (based on population);
- 3 Population categories
  - High population (Red) – above 3 M
  - Medium population (Dark blue) – between 300,000 and 3 M
  - Low population (Light blue) – up to 300,000



Technically Assigned Licence - MASTS

Current arrangements

- Analogue PAMR;
- IR2008 PMR;
- On Site speech and Data;
- On site hospital paging;
- Wide Area PBR (Speech and Data);
- Wide Area PBR (One way paging and speech);
- Wide Area PBR (Distress Alarms);
- Common Base Stations (CBS);
- Sub band 1 of Band III (CBS);
- Remote Meter Reading – Shared channels

- 10 licence classes with over 50 business types – Segmentation of available spectrum;
- Assignments process relies on local knowledge and engineering judgement than scientific modelling;
- Inconsistencies and uncertainties in assignment quality;
- Different incentive pricing;
- Not tradable

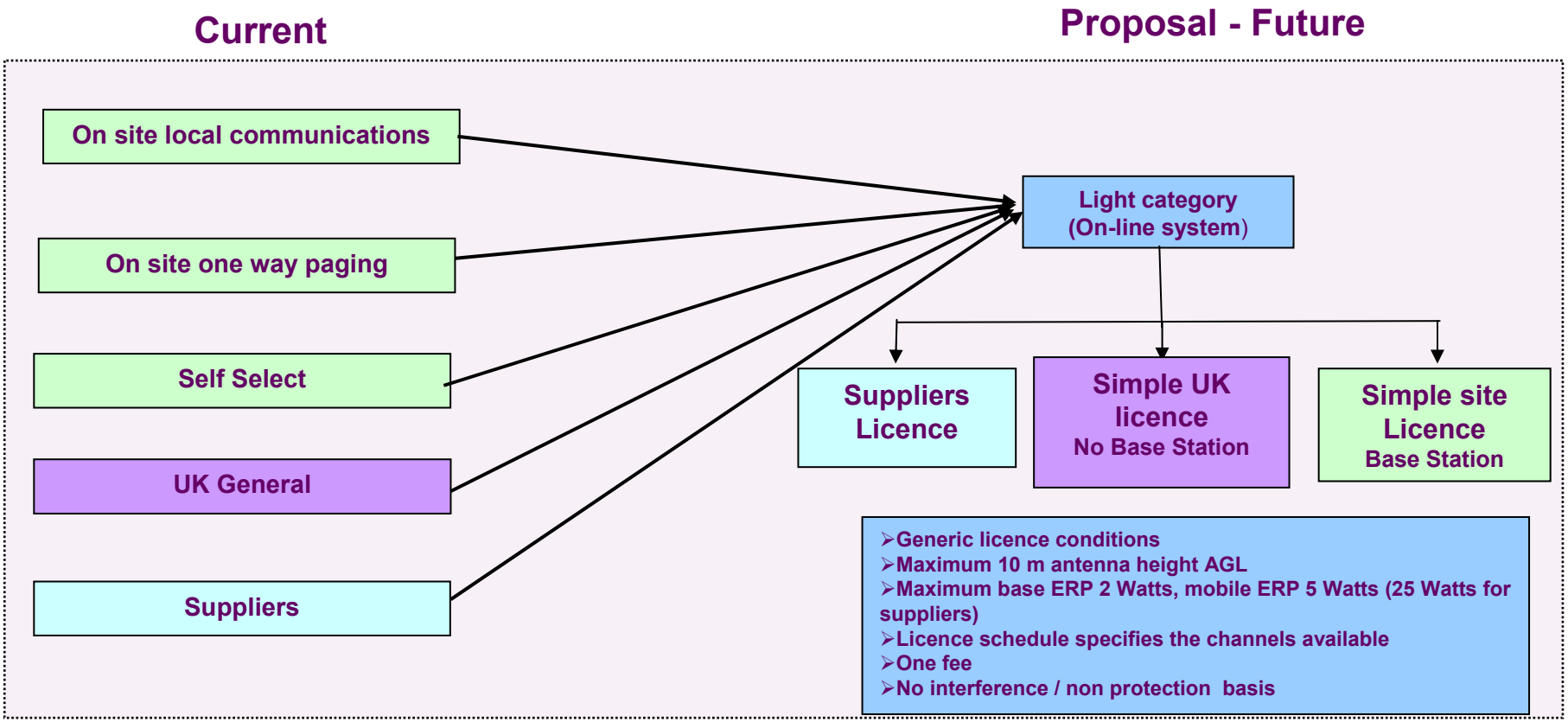
Proposal - Future

Technically Assigned Licence

- Rationalisation to one simple and flexible licence.
- Scientific assignments process supported by MASTS
- Rationalisation and simplified process
- Liberalised – for exclusive assignment
- Ofcom consent for shared assignment
- Tradable

Light Licence category

Proposals for collapsing on site and pre-packaged licence classes



Pricing - Licence Fee Approach

Area Defined Licence:

- AIP will remain at £ 9,900 per 2 x 12.5 kHz national channel
- Fees will be apportioned to the national channel rate in proportion to the population within the nations (Wales, England, Scotland and Northern Ireland)
- UK to be divided into pre-defined "trading units" of 50 km × 50 km - Population within trading unit measured and categorised into three categories (high, medium and low population) with a fee for each category of trading unit applied based on an apportionment of national rate.
- Use of band factor (0.83333) for less popular bands – excluding High band, UHF1 and UHF2.

Technically Assigned Licence

- Specified three categories of population – High, Medium and Low – Same are area licence
- Technical proxies to be used (power and antenna height) for coverage (6,30 and 60 km Radius).
  - Power (high power generally denies service to others over a greater area).
  - Antenna height (higher antenna usually sterilises a large area.)
- Band factor – less popular bands will attract a 0.83333 of the most popular bands full rate for mid and low population but 0.5 factor for high populated area
- Shared use – shared assignments will attract a 0.5 of the exclusive assignment full rate.

Light Licence

- Fees will be charged at a much simpler rate to reflect new on-demand regime. Our fee proposal is £ 75 per 5 years - per site or per licence (for non base station deployment).

Area Defined Licence

Fees proposal for Area Defined Licence for a 2 x 12.5 kHz channel

Area	Fee (£) for most popular bands	Fee (£) for less popular bands
UK	9900	8250
England	8275	6895
Wales	490	410
Scotland	855	710
Northern Ireland	280	235
GB (England, Wales and Scotland)	9620	8015
Trading unit within high population category	1185	990
Trading unit within medium population category	150	125
Trading unit within low population category	14*	12*

* minimum £ 75 licence fee

- Most popular bands (High band, UHF1 and UHF2)
- 0.83333 band factor for less popular bands

Technically Assigned Licence

Fees proposal for Technically Assigned licence (£) for a 2 x 12.5 kHz channel

Coverage categorisation	Category 1 (6 km coverage)				Category 2 (30 km coverage)				Category 3 (60 km coverage)			
Assignment type	Exclusive		Shared		Exclusive		Shared		Exclusive		Shared	
Band categorisations	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB
Location – High population	200	100	100	75	740	370	370	185	1480	740	740	370
Location - Medium population	100	85	75	75	200	170	100	85	300	250	150	125
Location - Low population	75	75	75	75	95	80	75	75	110	90	75	75

Coverage categorisation	Radius in Km	Power (Watts) and Antenna (m)
Category 1	6	P ≤ 5 and Ah ≤ 10
Category 2	30	P ≤ 5 and 10< Ah ≤ 30 P> 5 and Ah ≤ 10m
Category 3	60	P> 5 and Ah > 10 P ≤ 5 and Ah > 30

Example of a fee calculation for a Technically Assigned - 1

Technical parameters - (Licence document)	Fee calculation – Categorisation
Bandwidth: 2 x 12.5 kHz channel	Spectrum quantity
Base frequency: 164 MHz	Band categorisation
ERP power: 25 Watts Antenna height above ground level: 4 metres	Coverage categorisation
Location of base station: TQ 300 800	Location categorisation (Population)
Currently a CBS licence class	Assignment type

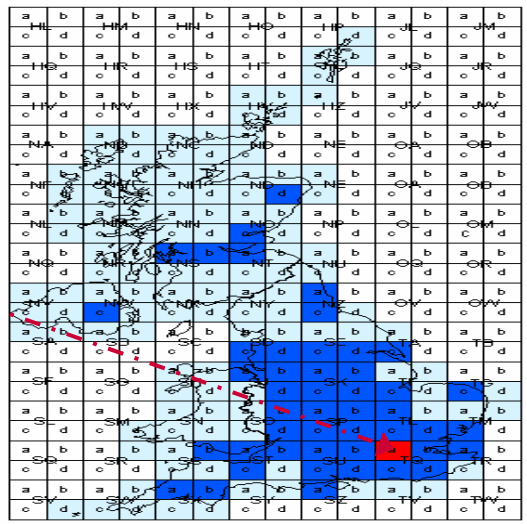
Example of a fee calculation for a Technically Assigned - 2

Band categorisations	Bands
Most popular bands	High band; UHF1 and UHF2
Less popular bands	Paging; Band1; Low Band; **Mid Band** and Band III

Coverage categorisation	Radius in Km	Power (Watts) and Antenna (m)
Category 1	6	P ≤ 5 and Ah ≤ 10
Category 2	30	P ≤ 5 and 10< Ah ≤ 30 **P> 5 and Ah ≤ 10m**
Category 3	60	P> 5 and Ah > 10 P ≤ 5 and Ah > 30

Current product	Exclusive or shared
Analogue PAMR	Exclusive
Common Base Stations	
Band 1 and Band III CBS	
IR2008 Data	
Wide Area One-Way Paging and Speech Systems	Shared
Remote Meter Reading Operator-Shared channels	
Wide Area Distress Alarms	
On Site Hospital Paging / Emergency Speech Systems	
Wide Area Speech and Data Systems	Shared*
On-Site Speech and Data Systems	

Example



Example of a fee calculation for Technically Assigned - 3

Coverage categorisation	Category 1				Category 2				Category 3			
Assignment type	Exclusive		Shared		Exclusive		Shared		Exclusive		Shared	
Band categorisations	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB	MPB	LPB
Category A – High population	200	100	100	75	740	370	370	185	1480	740	740	370
Category B - Medium population	100	85	75	75	200	170	100	85	300	250	150	125
Category C - Low population	75	75	75	75	95	80	75	75	110	90	75	75

Indicative Timeline for BR Liberalisation Phase 2 – 2007

	June 06	July /Aug 06	Sept/Oct 06	Nov/Dec 06	Jan/Feb 07	Mar/Ap 07	May/Jun 06	July/Aug 07	Sep/Oct 07	Nov/Dec 07
IS - Unify						▪▪▪▪▪▪▪				
Condoc/Statement (BR trading & liberalisation and pricing)	Release ▲	Con doc	Consultation close ▲	Statement ▲						
Statutory notices				Statutory Notice ▲		Final regulation ▲				
Regulation come into force								▪▪▪▪▪	▪▪▪▪▪	▪▪▪
Variation process								▪▪▪▪▪	▪▪▪▪▪	▪▪▪
Go live								▪▪▪▪▪	▪▪▪▪▪	▪▪▪

MASTS - Objectives

- To support and enable new Technically Assigned Licence Class.

- It has the following objectives for Business Radio Licence Classes:
  - Improve existing assignment process:
    - By using technical propagation/assignment algorithms.
    - Ensuring process is transparent and consistent throughout;
    - Potential to increase spectrum efficiency (subject to demand and current occupancy).

  - Support E-Licensing and eventually enable E-Assignment.
    - Semi-/Fully automated assignment system.
    - Improve time efficiency by reducing time to get a licence.

  - Facilitate Spectrum Trading and Liberalisation.
  - Define assignments in enough detail (through coverage and QoS) to support a trading environment.
    - Enable the modelling of liberalisation requests (reconfiguration) to quickly assess the impact on existing users as well as the new request.

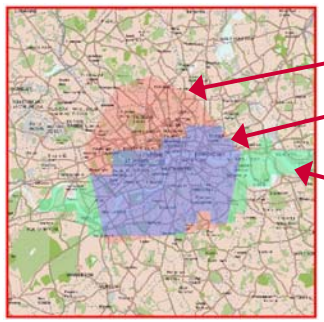
MASTS - Background

- Project began in Radiocommunications Agency
- Project divided into three phases originally
  - Phase 1: Definition of scope, requirements
    - Development of QoS Algorithm
    - Peer Review at IET and by independent radio planning consultancy
  - Phase 2: Development of prototype to demonstrate new concept to Stakeholders
    - Presentation to various groups and roadshows
    - Activity Factor review
    - Propagation Model review
    - Planning for next phase – IS Strategic Review
  - Phase 3: Development of working “off-line” MASTS system that uses real assignment data via import process
    - Identified further enhancements and implemented them
    - Configure to get process working with existing assignments
  - Phase 4: Develop final MASTS process and integrate with Ofcom-wide Unify Programme

MASTS - Concepts

- Customer Requested Service Area (CRSA) – *"the area over which radio operation is desired"*

- Designated Service Area (DSA) – *"the achievable coverage over the CRSA"*



Pink: CRSA

Blue: DSA

Green: Pollution

MASTS - Concepts

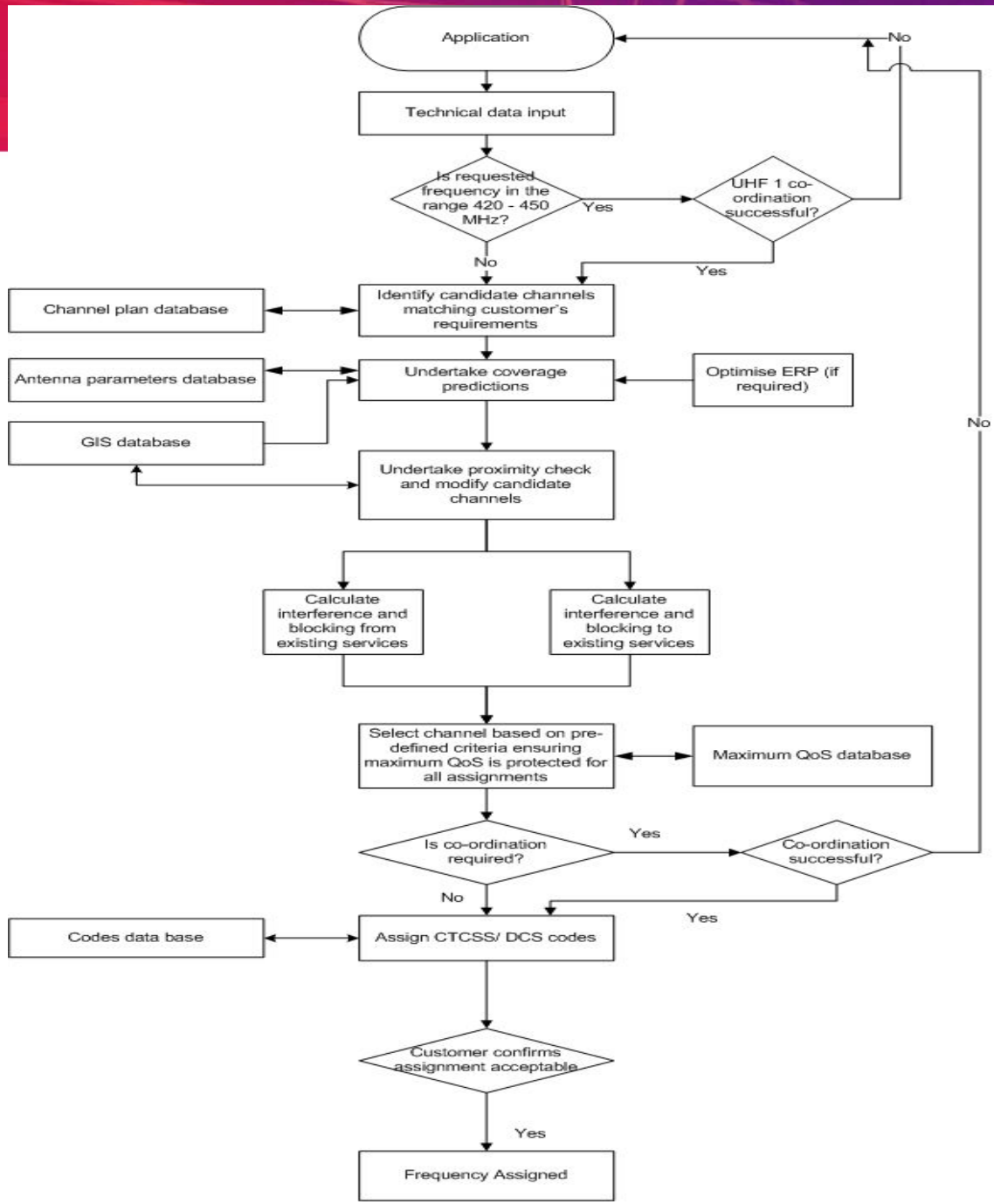
- Activity Factor (AF)
  - Amount of time the base station and mobile transmit over a defined period
    - Ranges from 0-100%
  - Review carried out:
    - Initial analysis highlighted number of mobiles was not accurate/reliable enough
    - Two main categories identified and can be related to current distance protection methodology – i.e. Shared (typically 50%) or Exclusive (100%)
  - Activity Factor will be based on current licence class/business class configuration with some exceptions where there are Safety Critical Services or special services/requirements such as heavy data, trunked, talkthrough, remote control points etc.
  - The AF is allocated to every pixel over the DSA and when adding further assignments it will ensure that the 50%/100% is protected for each of the users.

MASTS - Concepts

- Propagation Model
  - Uses an enhanced version of ITU-R P.1546-2
  - For 50% time and 50% locations

- Quality of Service Algorithm
  - Developed by Dr. David Bacon (ex.Ofcom)
  - Reviewed by Independent radio planning consultancy
  - Peer reviewed at Institution of Engineering and Technology (formerly IEE)
  - Details to be published with the Technical Frequency Assignment Criteria
  - It is defined as the measure of the ability of the local station under assignment to use a given frequency.
  - The QoS is then an area (DSA) showing the probability of the user not being able to use the frequency at that location.
  - Evaluates blocking between assignments and ensures that the Activity Factors can be maintained across their Designated Service Areas

MASTS Process



MASTS – Existing Assignments

- Data Validation Exercise Underway
  - Identify anomalies in the data
  - Populate missing data
  - Business transformation rules for new system
- New Data
  - CRSA: This will be equal to the predicted coverage area that the assignment is currently enjoying
  - DSA: This will be based upon the CRSA
  - Activity Factor: Defined as Exclusive / Shared based on:
    - Type of licence class
    - Additional services used: e.g. Trunked, talkthrough, remote control points
    - Safety critical requirement for exclusive use
  - Current QoS: This will be calculated based on the MASTS algorithm

MASTS – Technically Assigned Licence Design

- Current parameters:
  - Station location
  - Antenna Height, Type, Azimuth, Tilt
  - Frequency (and timeslot)
  - Bandwidth
  - Signalling Tones

- Two new additional licensing parameters
  - Activity/Exclusivity Factor will be additional Licence Parameter
  - Designated Service Area is an indication of the achievable coverage area over which the Activity Factor will be protected (through the use of the Quality of Service algorithm)
    - » Available by request initially to provide information before a Spectrum Trade.
    - » It is intended eventually that this will be available On-Line

Unify

- A programme within Ofcom with objectives to bring together and replace the existing Finance, CRM and Licensing systems.

- SAP – Providing the Finance System
- Siebel – Customer Relationship System and Administrative Licensing
- LS Telcom – Spectrum Management System (Technical Algorithms)
- CapGemini – Integration of the above systems

- Phase 1: Autumn 2006 – Finance, CRM and Delivery of RLC, Ships Licensing

- Phase 2: Anticipated - April 2007 - Delivery of remainder of WT Act Licensing from April 2007

Blackfriars signal levels on 18th January 2006