

Terms of reference for 2010-
2025 MHz, 2290-2302 MHz &
2500-2690 MHz engineering
consultancy work

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Section 1

Introduction

1. Ofcom is currently considering options for the award of spectrum in the bands 2010 – 2025 MHz, 2290 -2302 MHz and 2500 – 2690 MHz.
2. Ofcom expects its objectives for this award to be to contribute to securing the optimal use for wireless telegraphy of the electro-magnetic spectrum, bearing in mind the desirability of promoting:
 - the efficient management and use of the spectrum for wireless telegraphy;
 - the economic and other benefits that may arise from use of the spectrum for wireless telegraphy;
 - the development of innovative services; and
 - competition in the provision of electronic communications services.
3. Ofcom has commissioned two related studies: one primarily an engineering study exploring the spectrum rights from Mason; and the other primarily an economic study comprising a market assessment of different possible uses and detailed auction design and packaging from Analysys Consulting and DotEcon. A key objective of both studies is to assess what is likely to be the optimal way to award the three bands. The interaction between the two studies is described further below.

Background on the spectrum bands

4. The sub-sections below on particular frequency bands provide background information. Where these describe frequency arrangements and usage, this is for information purposes only and does not imply that Ofcom endorses or necessarily intends to follow this approach. Ofcom's vision for spectrum management, as set out in the SFR¹ is:
 - Spectrum should be free of technology and usage constraints as far as possible. Policy constraints should only be used where they can be justified;
 - It should be simple and transparent for licence holders to change the ownership and use of spectrum; and
 - Rights of spectrum users should be clearly defined and users should feel comfortable that they will not be changed without good cause.
5. Ofcom expects its approach to the award of these bands to be guided by this vision.

2010 – 2025 MHz

6. At the time of the UK 3G auction in 2000, the 2010 – 2025 MHz band was set aside for self-provided self-coordinating 3G use. However, more than 5 years on, no market demand has materialised for the band to be used in this way. Following a UK submission to the RSC² in mid 2004, ECC PT1³ was asked to

¹ Spectrum Framework Review: Consulted on in November 2004; Statement issued in June 2005

² Radio Spectrum Committee

reconsider the use of the band. This resulted in a revision to the CEPT's regulatory framework for the core 3G bands at 2GHz which removes the self-provided self-coordinating designation for this band and which allows a potential pairing with parts of the band 2570 – 2620 MHz. This new framework is enshrined in the draft ECC Decision(06)BB which is due to be approved at the ECC meeting in March 2006.

7. The draft ECC Decision(06)BB designates the band for IMT-2000/UMTS use and allows either FDD uplink (with a pairing to parts of 2570 – 2620 MHz) or TDD use. This Decision also allows either FDD uplink (also with a pairing to parts of 2570 – 2620 MHz) or TDD use in the band 1900 – 1920 MHz, which is currently licensed for TDD use to four UK 3G licensees.

2290 – 2302 MHz

8. This band is spectrum which has been released by the MoD. It is not harmonised across Europe for any use. It is potentially suitable for fixed and mobile uses including those which could be used in the other bands described above. The spectrum is un-paired so suitable for TDD based equipment, although it may be possible to pair it with other bands such as 2010 – 2025 MHz to allow FDD technologies to be used.

2500 – 2690 MHz

9. The band 2500 – 2690 MHz was identified at WRC-2000⁴ for IMT-2000⁵. Following two mandates from the European Commission, CEPT⁶ has designated the band in ECC⁷ Decision(05)05 for terrestrial IMT-2000/UMTS⁸ use to be made available by 1 January 2008 subject to market demand and national licensing schemes. ECC Decision(05)05 provides a basic set of frequency arrangements that specifies the outer 2 x 70 MHz of the band for FDD⁹ use with the centre 50 MHz portion for either TDD¹⁰ or FDD external use. The UK has not adopted this Decision.
10. The band is currently used for TV Outside Broadcast use in the UK but current users have been served notice and their licences will be subject to a rolling 3 month notice period from 1 January 2007 onwards. Accordingly the spectrum is available for other use in the UK from the beginning of 2007.

³ ECC Project Team 1 (on IMT-2000)

⁴ World Radiocommunications Conference-2000

⁵ International Mobile Telecommunication-2000

⁶ Conference of European Posts and Telecommunications administrations

⁷ Electronic Communications Committee (a committee of CEPT)

⁸ Universal Mobile Telecommunications System

⁹ Frequency Division Duplex

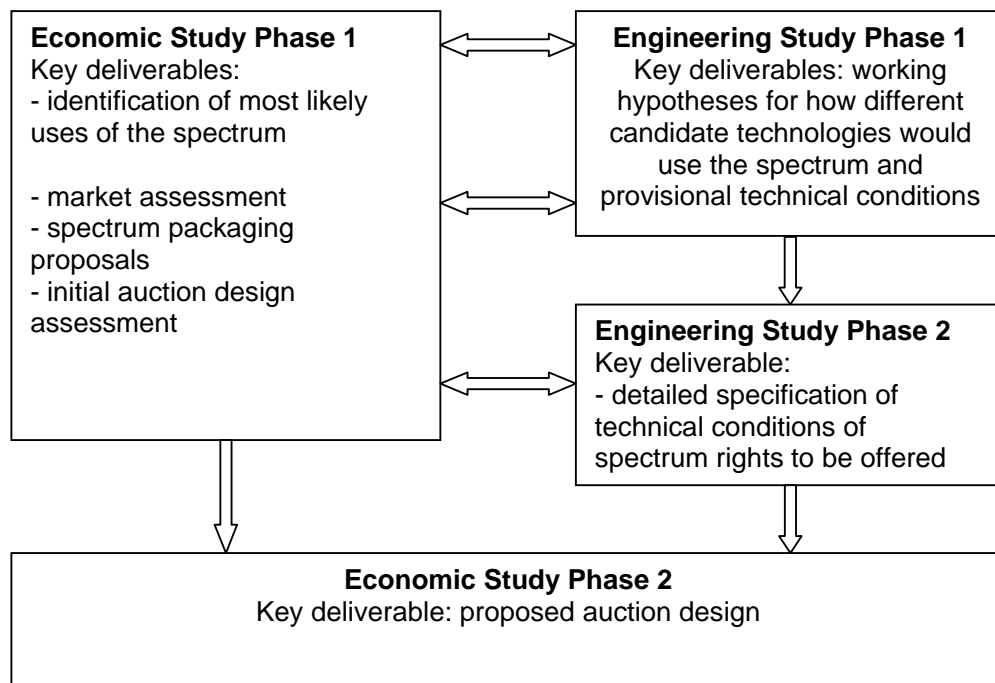
¹⁰ Time Division Duplex

Section 2

Terms of reference

Overall approach to the studies

11. The engineering and economic studies will be two separate but closely related pieces of work. Accordingly, there will need to be a high degree of co-ordination required between the consultants on each study. Ofcom will manage this co-ordination but will expect there to be direct co-ordination as well.
12. The diagram below sets out at a high level the sequencing of the work between the two studies.



13. Overall the studies will fall into 2 parts. The first part will be an initial period of joint working for both the Phase 1 of the Engineering and Economic Studies. The aim will be to identify the most likely uses of the spectrum. The purpose of this is not to limit the uses of the spectrum to the uses considered most likely, but to inform the design of the spectrum rights and award process to facilitate an efficient assignment in the primary market. Phase 1 of the Engineering study will continue to establish the likely technical constraints which will define use of the bands. This will largely consist of analysing existing studies to draw out the main implications for the award. In particular the boundary conditions between different uses / technologies will need to be explored. This will derive a set of working hypotheses.
14. The working hypotheses will be explored further and refined to prepare detailed proposals for technical conditions in Phase 2 of the Engineering Study. They will also provide the basis for the conclusions of Phase 1 of the Economic Study. This

part of the study will conclude with a set of spectrum packaging proposals and associated technical conditions.

15. The second part of the Economic Study will develop detailed auction design proposals.
16. Further details of the requirements for the Engineering Study and the timing are set out below. Details of the Economic Study are set out on the Ofcom website.

Objectives of the Engineering Study

17. To provide specialist technical/engineering advice to assist Ofcom in planning the award process for the spectrum bands 2500-2690MHz and 2010-2025MHz (and potentially the band 2290 – 2302 MHz). In particular the boundary conditions between different uses / technologies will be explored. The objective is to assist in defining spectrum packages and appropriate spectrum masks to minimise the risk of harmful interference between different users within the bands and with users in adjacent bands.

Engineering Study requirements

Phase 1

18. This phase will focus on the following areas:

- An assessment of the potential uses, applications and technologies that could make use of the bands – in conjunction with the Economic Study;
- A review of existing studies, completed and underway, in relevant international fora such as ECC PT1, WP 8F, 3GPP and 3GPP2, etc. The aim is to provide a comprehensive overview of these studies and draw out the conclusions and implications that are relevant for the award of this spectrum.
- Based upon the above review, an initial analysis of the boundary conditions that may be necessary between different modes of use such as FDD/TDD and different technologies such as IMT-2000/WiMAX noting:
 - Ofcom's objective of maximising freedom for the market to determine how the bands are used (both at the primary assignment level and subsequently);
 - Ofcom's preference not to specify guard bands whenever possible but to allow the market to deal with the issue (the auction design may need to take this into account); and
- To identify areas where there are gaps in the technical understanding and where additional study may be required

Phase 2

19. Following on from Phase 1, the aim of this phase is to assist Ofcom in defining the detailed technical provisions of the spectrum licences and will cover the following elements:
 - To conduct additional detailed sharing and compatibility analysis as identified in Phase 1;

- To assess specific spectrum packaging options and to identify the technically viable set; and
- To assist with the definition of the detailed options for the technical constraints necessary to avoid harmful interference (both within the band and between the bands to be awarded and with neighbouring users)

Timescales

20. The work will begin in mid-March and is expected to conclude in the summer of 2006.