



Band III Information Update

Business Radio

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Section 1

Band III Business Radio Information Update

Purpose of this document

- 1.1 This updated document provides background on why Band III spectrum arrangements will change for some Private Mobile Radio (PMR) systems, what those changes are planned to be and their expected timescales.
- 1.2 This document follows a previous update published on 14 April 2008. Future updates will provide more details as they become available.
- 1.3 This version includes:
 - notification that the three-month migration window may be assigned to an impacted system where the licensee does not express a preference;
 - notification that an assigned migration window could end significantly before the current 12 April 2012 end date;
 - notification that migration windows need to avoid the relevant annual licence renewal date;
 - an overview of the licence variation process;
 - highlighting that it is the responsibility of each licensee to independently assess whether the threat of incoming / outgoing interference is sufficiently low so as to enable them to continue to operate post 2012;
 - a guide to the geographical areas and spectrum potentially impacted by these changes;
 - the required migration dates of radio systems within the potentially affected spectrum and geographical areas;
 - clarification that these changes are for the purpose of securing compliance with an international obligation of the United Kingdom;
 - an explanation of the international co-ordination procedure;
 - a request for an alternative licensee name where the existing name is no longer applicable; and
 - the potential impact to future Trading & Liberalisation within Band III which should be taken into account when deciding whether to enter into a spectrum trade.

Background

- 1.4 Prior to 1985, Band III (174 – 225 MHz) was primarily used for 405-line black & white television broadcasting in the UK. While our neighbours continued to use this spectrum for broadcasting, in 1985 UK television services ceased to use Band III and part of it was subsequently made available for land mobile radio. Television broadcasting continued in neighbouring countries in accordance with a 1961 international agreement (the Stockholm '61 Agreement) and, to enable co-existence with those services, UK mobile radio systems mostly operate on frequencies between our neighbours' TV sound and vision carriers.

- 1.5 The use of this band for mobile radio in the UK has never had equivalent regulatory rights with all our neighbours (in accordance with the International Radio Regulations, mobile radio in the UK is on a "secondary" basis with respect to the Republic of Ireland, but co-primary with broadcasting with respect to our other neighbours). Bilateral agreements were made with some of those neighbours to give our mobile radio services increased certainty. Unique to the UK, there are now a wide variety of private mobile radio (PMR) systems using the lower two (out of three) sub-bands of Band III.
- 1.6 The upper sub-band (sub-band 3) of Band III in the UK was originally intended to provide extra capacity for mobile radio systems, with particular emphasis on those employing new technologies. However with the advent of terrestrial digital audio broadcasting (T-DAB), sub-band 3 (together with some spectrum immediately above Band III) was made available for T-DAB.
- 1.7 The development of digital television broadcasting led European countries, including the UK, to seek a revision of the 1961 Stockholm Agreement with a view to producing a new all-digital international plan for terrestrial broadcasting in Europe. Although the UK's priority was television broadcasting in UHF Bands IV/V, the continued use of Band III for broadcasting in continental Europe meant that the new agreement would have to include Band III.

Regional Radiocommunications Conference (RRC-06)

- 1.8 In May/June 2006 the United Nations International Telecommunication Union (ITU) held a Regional Radiocommunications Conference (RRC-06) of ITU member states to produce a new international agreement for Bands III and Bands IV/V, which covered not only Europe, but also Africa and the Middle East (about 120 countries in total).
- 1.9 The RRC was mandated to produce a legally binding treaty comprising an *Agreement* and associated *Plan* defining rights to use specific frequencies at specific locations for digital broadcasting (or areas for allotments).
 - The *Plan* covers all of VHF Band III (for sound and television broadcasting) and UHF Bands IV/V (for TV broadcasting).
 - The *Agreement* provides the regulatory framework for implementing the Plan as well as co-ordinating any additions or modifications.
 - Although the main RRC focus was on digital broadcasting, other primary allocated radio services within these frequency ranges also had to be taken into account; this included mobile radio in Band III in the UK.
- 1.10 The initial RRC session (May 2004) agreed the planning principles, treatment of non-broadcasting services, the technical bases for planning (albeit with many options left open) and the arrangements for submitting national requirements etc. The concluding RRC session was held over five weeks in May/June 2006.

UK Objectives and the RRC-06 outcome

- 1.11 The UK had a number of overall objectives for RRC-06 covering digital broadcasting (both television and radio), private mobile radio and certain other services, all of which required negotiation with other countries.
- 1.12 The different technical requirements of digital broadcasting meant that the UK's existing approach for mobile radio of making assignments fit around our neighbours' analogue television carriers was no longer appropriate and hence the previous bilateral agreements had to be re-negotiated.
- 1.13 The UK recognised early on that maintaining rights over the whole of sub-bands 1 and 2, together with our digital radio broadcasting requirements, was unlikely to be acceptable to the Conference as it would severely constrain Band III spectrum use in other countries and make it impossible to reach agreement on equitable sharing across Europe. Bearing in mind the intention to relocate some of our major users of sub-band 2 into other frequency bands (outside Band III), it was decided that key Band III objectives for the UK at the RRC would be:
- protect the long-term future of most of sub-band 1;
 - maintain protection for sub-band 2 for as long as possible (at least until the end of 2012);
 - keep the option to use sub-band 2 for mobile radio in the longer term - but in a way that would have minimal impact on other countries.
- 1.14 The UK RRC team achieved these objectives through successful negotiation at the conference.

Impact on Business Radio users

- 1.15 The main changes for Business Radio users include:
- Significantly increased incoming interference levels into the South and South-East from our adjacent neighbours within sub-band 2 after 31 December 2012, and the lower 24 channels of sub-band 1, by the end of 2009. There may also be significantly increased incoming interference levels to the West Coast from the Republic of Ireland. These interference levels are expected to significantly impact the current levels of spectrum quality and qualities of service;
 - An international obligation to protect broadcasting services in other countries in sub-band 2 after 2012;
 - Hence the need to re-assign users in the affected geographical areas from sub-band 2 to sub-band 1 and make some changes within sub-band 1. Ofcom has identified and set aside alternative / migration frequencies for the affected 'assignments' that were licensed before 4 December 2006.

- 1.16 To aid these changes, the UK also negotiated specific bi-lateral agreements with three of our immediate neighbours allowing us to export more interference from sub-band 1 into their territory.
- 1.17 As the RRC outcome is a legally binding international treaty, these changes are for the purpose of securing compliance with an international obligation of the United Kingdom. They enable the continued use of Band III by Business Radio systems and provide long-term certainty with regard to the international regulatory environment.

Sub-band 1 changes

- 1.18 A significant interference increase to mobile radio in the lower 24 channels of sub-band 1 (i.e. 177.20 to 177.50 MHz) can be expected, and has occurred already in some geographical areas, because two T-DAB channels will be implemented by neighbouring countries in 174.00 to 177.50 MHz at or near their coasts. It should be noted that the UK may also need to use the lower T-DAB channel (i.e. CH5A) for broadcasting coverage in the South East of England. If introduced, it is likely to affect the wireless microphone systems¹ within this spectrum, as well as any other users², over a wide area.
- 1.19 An immediate interference impact on most current users was not expected in 2006 because the RRC negotiations took existing usage into account. For the majority of sub-band 1, the UK's rights to transmit and be protected from undue interference are covered by the RRC-06 Agreement and associated bilateral agreements for the foreseeable future.
- 1.20 It has been necessary to re-assign a relatively small number of existing users originally operating within the lower 24 channels of sub-band 1. The timescale for completion of these sub-band 1 transitions was by 13 April 2009.

Sub-band 2 changes

- 1.21 Similar rights exist for sub-band 2 until 31 December 2012. Any development of digital broadcasting in other countries will be obliged to respect the agreements reached at the RRC.
- 1.22 The rights to continue use of sub-band 2 after 2012 will be severely limited and the risk of incoming interference will rise significantly. Hence many users will have to relinquish frequency assignments in this range and be either re-accommodated in sub-band 1 or outside Band III altogether.
- 1.23 These changes will increase the pressure on sub-band 1 which, together with the need to adhere strictly to the international co-ordination agreements on interference for Band III, is likely to limit the ability for Ofcom to liberalise spectrum use in this band to the same degree as some others. For example there may be little scope to agree increases to effective radiated power (ERP) for existing assignments.

1 See Table 3.12 within: http://www.ofcom.org.uk/radiocomms/ifi/tech/interface_req/uk2030.pdf

2 All UK users operating within 174.000 to 177.5 MHz should be aware that they may receive harmful interference from our neighbours' broadcasting services in the future.

- 1.24 Likewise, the potential increase in future levels of incoming interference and restrictions to the long-term outgoing interference levels within Band III should be taken into account before agreeing a Spectrum Trade.

Affected users

- 1.25 Existing users needing to migrate within Band III will be given priority access to the existing UK-wide unassigned spectrum in the band. This prioritisation may result in delays to requests for new Band III assignments.
- 1.26 As scheduled, we completed the transition planning process before April 2007. It has assessed the impact on existing spectrum use, identified potentially affected assignments, and notified the licensees.
- 1.27 Initial investigations suggest that about 20% of long-term Band III assignments could be affected. This figure excludes the assignments of some major users, mainly within sub-band 2, who are already committed to moving out of Band III. The remaining affected assignments are either within sub-band 2 or within the lower 24 channels of sub-band 1. For these users, we have identified and set aside alternative/migration frequencies for 'assignments'³ that were licensed before 4 December 2006. Ofcom met its intention to inform licensees of these changes by 13 April 2007.
- 1.28 Some operators have suggested that, in geographical areas where migration is not compulsory, they may be able to continue to operate beyond 2012 and co-exist with the long-term increased incoming interference levels. In such cases, while we may be able to give general guidance on the likely interference environment (incoming levels and outgoing revised limits), ultimately, it will be the responsibility of each licensee to independently assess whether the threat of incoming / outgoing interference is sufficiently low so as to enable them to continue to operate post 2012.
- 1.29 Also, as countries have the right, under the provisions of the RRC-06 Agreement, to introduce new broadcasting assignments, the future situation cannot be predicted with any accuracy and we cannot provide definitive information about the timescales for the introduction of such services. This is particularly true for potential systems within the Republic of Ireland.
- 1.30 There would thus be a very significant risk associated with continuing to operate a system using assignments in those parts of Band III for which international rights expire at the end of 2012, unless they were sufficiently remote from other countries so as to make the likelihood of unacceptable interference (in both directions) very small. Furthermore, if a licensee accepted such risks, and then later decided to seek alternative assignments, suitable Band III spectrum might not be available.
- 1.31 More importantly, the UK is under an obligation to ensure that the provisions of the international agreements are met. We would not authorise continued use of assignments that would cause unacceptable interference to the reception of authorised broadcasting service in other countries. If such interference was caused, we would be required to stop the interfering station transmitting.

3 NB: please check that your actual assignment frequencies / channels for each radio site are identical to those shown on your licence. Please report any inconsistencies.

Alternative options

- 1.32 In geographical areas where migration is not compulsory, as an alternative to changing frequency, or in any event to minimise the impact of the changing broadcasting environment in other countries, potentially affected licensees may want to consider taking measures to reduce the affect of interference. This could include changing the antenna characteristics, e.g. antenna height or emission pattern in the direction of potential interference.
- 1.33 Any proposed changes would need to be agreed with Ofcom prior to implementation.

Trading & liberalisation

- 1.34 The Band III changes should be taken into consideration when deciding whether to enter into a spectrum trade.
- 1.35 We believe that the main Band III risks are:
- use of some channels may have to cease before 31 December 2012 and could be subject to a notification period significantly shorter than five years, e.g.;
 - many assignments within the lower 24 sub-band 1 channels ceased/migrated by 13 April 2009;
 - many assignments within the sub-band 2 channels will have to cease/migrate by 13 April 2012 and perhaps significantly earlier;
 - significant changes to incoming and/or outgoing interference levels after 31 December 2012;
 - Assignments licensed after 4 December 2006 in the lower 24 sub-band 1 channels and all sub-band 2 channels will have no right of migration to an alternative channel, e.g.;
 - these include assignments that were added to licences issued before 4 December 2006;
 - assignments after 4 December have not been included in the Band III Transition Plan and alternative channels (not necessarily within Band III) will need to be applied for through Ofcom's standard licensing process;
 - except that the licence revocation periods for the affected channels could be significantly shorter than five-years, the provisional Band III changes are not expected to impact our planned Trading & Liberalisation policy.

Keep informed

- 1.36 We intend to give licensees as much notice of required changes as possible and intend to keep stakeholders informed primarily through the Business Radio Unit's Interest Group (BRIG) and its website publications.
- 1.37 We formally notified Band III licensees of the general Band III changes, and the potential changes to their actual licence conditions by the scheduled date of 13 April 2007.
- 1.38 These changes primarily affect Band III licensees within sub-band 2 UK-wide and the lower 24 channels (within 177.2 to 177.5 MHz) of sub-band 1 in geographical areas adjacent to our neighbours, e.g. in the South, South-East and West of England.

- 1.39 Licensees should inform us spectrumlicensing@ofcom.org.uk if they have not received their Band III Transition Information letter and, if impacted, their Annual Notice of Licence Variation Reminder letters.

Do affected users have to implement the changes?

- 1.40 Licensees that are subject to compulsory changes must complete them by the relevant deadline.
- 1.41 It will be the responsibility of each licensee to independently assess whether the threat of incoming / outgoing interference to the non-compulsory transition assignments will be sufficiently low so as to enable them to continue to operate within Band III post 2012:
- We intend to give general guidance on the likely future worst-case (e.g. worst 1% of time) interference environment;
 - An guide to the potentially impacted geographical areas is shown in Section 4;
 - Typically, the further from the coast the lower the risk of interference; and
 - The RRC-06 planned introduction of digital broadcasting services could result in a UK PMR radio assignment that is useable today not being useable in the long-term.

Transition Plan progress

- 1.42 The Band III Transition Phase started on schedule on 13 April 2007 with the following assignments being given notice to migrate:
- all sub-band 2 assignments south of the Bristol-Wash⁴ Transition Line;
 - most⁵ sub-band 2 assignments within the spectrum bounded by DVB-T channel CH8⁶ north of the Transition Line;
 - i.e. assignments within PMR channels 122 to 200 are not currently identified as impacted and are not required⁷ to migrate at this time;
 - all assignments within the lower 24 channels of sub-band 1 south of the Transition Line.
- 1.43 The Notice of Licence Variation Reminder letters are scheduled for circulation annually.
- 1.44 Please can all licensees check that the person named on the licence is still employed by the company and advise us of any changes.
- 1.45 The Final Notice of Variation Reminder will be sent six months before the relevant migration cut-off date.

4 The locations of the Bristol Channel and The Wash are used as an approximation of the position of this line only.

5 A few assignments in the NE of Scotland are not expected to be impacted.

6 Harmful interference from the Republic of Ireland has been predicted in this spectrum.

7 On request, we will try to find additional sub-band 1 channels for the sub-band 2 assignments that are not required to migrate. Any additional sub-band 1 migration channel requirements, e.g. those not included within the Band III Transition Plan will need to be licensed and paid for as soon as possible in order to secure their future use.

Licence variation process

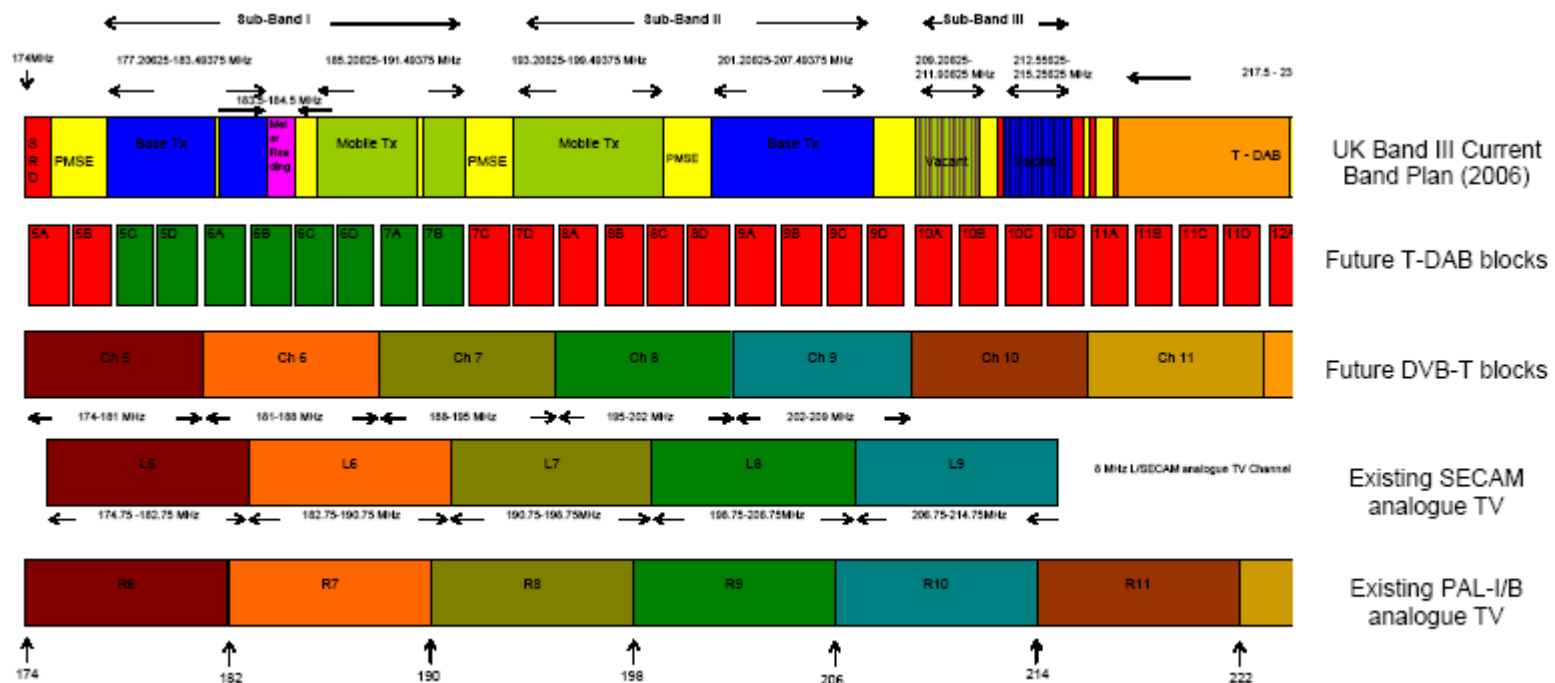
- 1.46 Licensees are requested to designate a three-month migration window to end before 12 April 2012. NB: we ask that this window does not breach one month either side of the Annual Licence Renewal Date.
- 1.46.1 Please note that, where a licensee does not specify a migration window, we may assign a window that could end before the 12 April 2012.
- 1.47 The Notice of Variation Letter will be sent three months before the relevant cut-off date, e.g. at the beginning of the migration window.
- 1.48 This Letter will be accompanied by an interim varied Licence that will include any set-aside migration channels.
- 1.48.1 Please note that there are no set-aside migration channels for any assignments that were licensed after 4 December 2006. You will therefore need to make your own arrangements, perhaps through us, to secure any additional channels required.
- 1.49 The interim licence will be valid for three-months. At this time we will issue you with the Varied Licence. This licence will have the impacted sub-band 2 assignments removed.
- 1.50 Please note that you will be committing an offence if you continue to operate on channels for which you are no longer licensed.
- 1.51 We realise that these migrations can incur a significant cost. We would like to reassure impacted licensees that:
 - 1.51.1 each set-aside migration channel has been chosen because there is no UK licensed base station⁸ use within typically 100km of the impacted base station(s); and
 - 1.51.2 when migrated, the amended licence assignments are expected to revert to the standard Terms and Conditions five-year notice period.

8 NB: as with all systems, interference could occur due to unauthorised use, during periods of unusual weather, and when mobiles of an adjacent system operate near the mutual boundary.

Section 2

Band Plan

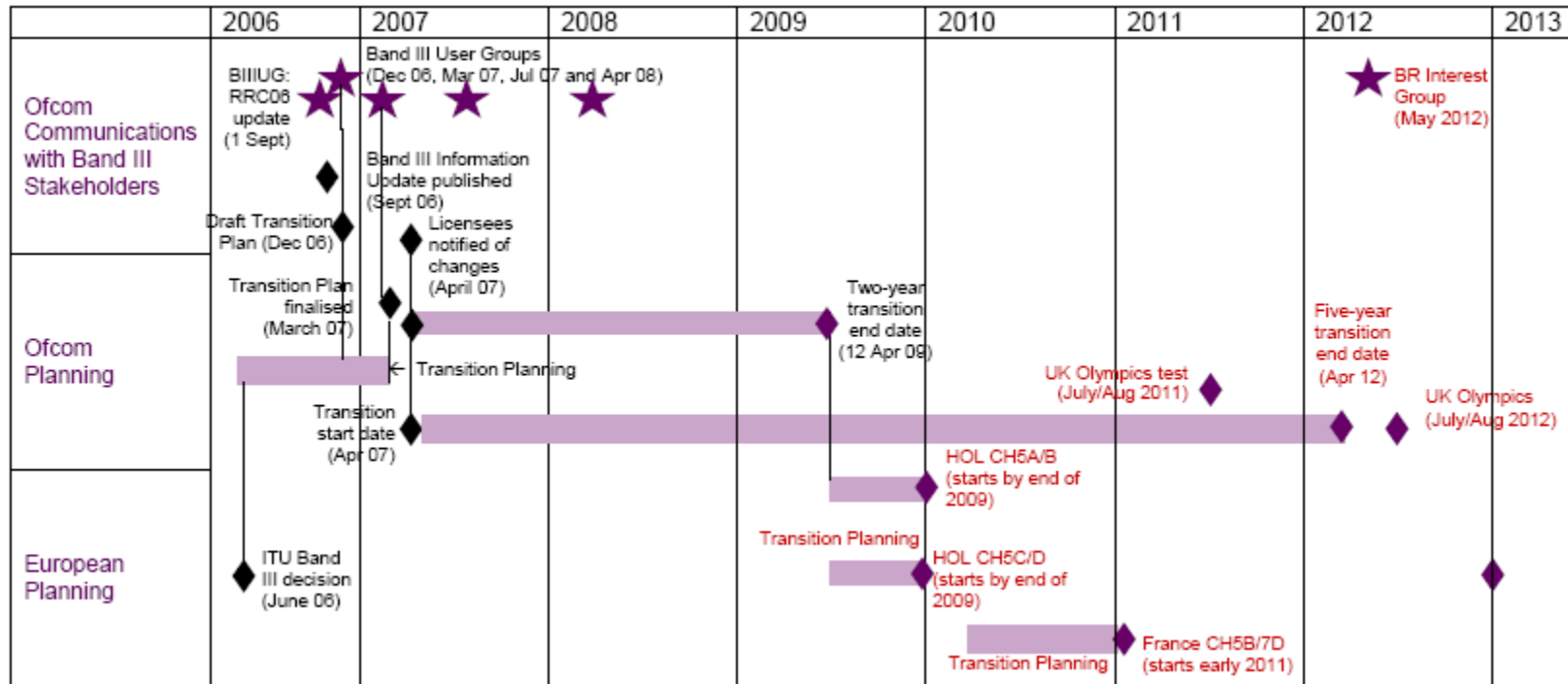
Figure 1: relationship between the existing UK PMR and existing European analogue TV band plans with the new UK / European T- DAB / DVB-T band plans.



Section 3

Timeline – Band III Business Radio Transition Project Plan

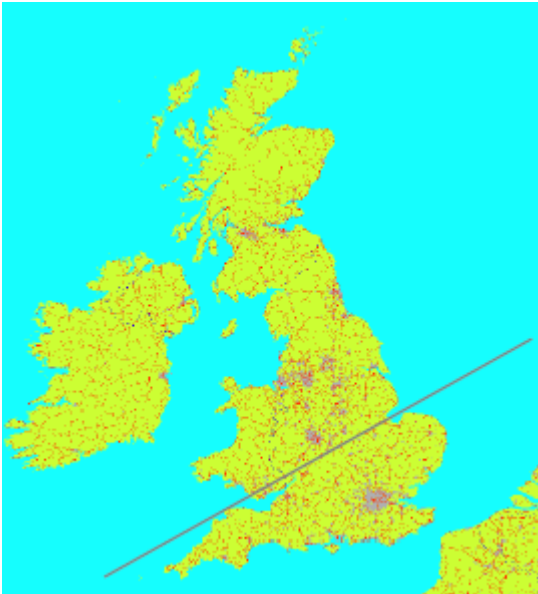
Table 1: major milestones of the Band III Transition Project, e.g. the two- and five-year transition start and end dates (13 April 2009/2012, respectively), and the July/August 2012 Olympics spectrum use dates



Section 4

Guide to the impacted geographical areas

- 4.1 As a guide, we have undertaken a number of incoming and outgoing interference predictions. The results indicate the following migration requirements.
- 4.2 Future updates will provide more details as they become available. Please note that the long-term arrangements of the Republic of Ireland are not finalised.



- 4.3 All assignments south of the above line within the lower 24 channels of sub-band 1 underwent compulsory migration by 13 April 2009.
- 4.4 Most⁹ assignments south of the above line within sub-band 2 should expect to undergo compulsory migration by 13 April 2012 and perhaps earlier.
- 4.5 It will be the responsibility of each licensee to independently assess whether the threat of incoming / outgoing interference to the currently non-compulsory transition assignments will be sufficiently low so as to enable them to continue to operate within Band III post 2009 / 2012.

9 Some cut-off dates have been extended, e.g. for assignments supporting the Olympics.

Figure 3: The predicted worst-case interference boundary from the Republic of Ireland's digital broadcasts within DVB-T channel CH8.



- 4.6 The maximum levels of interference from the Republic of Ireland (RoI) are expected to be from its broadcast stations operating in the DVB-T channel CH8 spectrum. NB: PMR channels 122 to 200 are not within the CH8 spectrum.
- 4.7 Please note that the potential full interference impact, and the timings, from the Republic of Ireland are still not fully determined. The currently (October 2009) assumed interference scenario may therefore change.

Section 5

International Co-ordination

- 5.1 We seek to ensure that its Band III PMR assignments do not cause harmful interference to its neighbours' broadcasting services by ensuring that their emissions do not exceed agreed outgoing levels. These are usually measured at our neighbours' coasts.
- 5.2 These outgoing limits are documented with the pre-RRC-06 Band III MoUs and RRC-06 Band III Agreements. We intend to publish these documents on our website within the Business Radio Unit section.
- 5.3 The Band III MoUs and Agreements also include agreed incoming interference levels from our neighbours; the latter being measured at our coast.
- 5.4 The current PMR assignments are planned to avoid the peaks of MoU agreed incoming interference levels. Partial band re-assignment, e.g. sub-band 2 into sub-band 1, is required in order that PMR is not impacted by potential harmful interference changes in the future as a result of the RRC-06 negotiated Band III Agreements.
- 5.5 We use bespoke software to meet the requirements of the Band III MoUs. An updated version of this software, within Ofcom's spectrum management system (SMS), is being created that will also incorporate the transition to the RRC-06 Band III Agreements requirements.
- 5.6 During the Band III re-assignment / transition phase it is necessary that a combination of the requirements of the MoUs and Agreements will need to be met, e.g. sub-band 1 meets the Band III Agreements (due to the long-term outgoing interference requirements being greater than those detailed within the MoUs) and sub-band 2 continuing to meet the Band III MoUs (necessary due to the potential licensing of temporary short-term assignments prior to the end of the migration phase, that would otherwise fail the Band III Agreement requirements).
- 5.7 Referring to the Band Plan diagram shown within Section 2:
 - the yellow blocks shown in the UK Band III Current Band Plan (2006) row correspond with the blocks of spectrum that are subject to the MoU agreed higher levels of interference from our neighbours. These blocks are typically used for on-site programme making and special events (PMSE) and remote meter reading services within the UK;
 - the lower blue and green blocks (i.e. sub-bands 1 & 2) shown in the UK Band III Current Band Plan (2006) row correspond with the blocks of spectrum that are subject to the MoU agreed lower levels of interference from our neighbours. These blocks are currently used for PMR services within the UK;
 - the red blocks shown in the Future T-DAB blocks row correspond with the blocks of spectrum that are subject to the RRC-06 Agreement higher levels of interference from our neighbours. It is these blocks (e.g. CH7D to CH9D) that are also subject to greatly decreased UK outgoing interference levels in the long-term;

- the green blocks shown in the Future T-DAB blocks row correspond with the blocks of spectrum that are subject to the RRC-06 Agreement lower levels of interference from our neighbours. It is intended that the long-term PMR assignments will be concentrated within these blocks. It is these blocks that are also subject to agreed increased UK outgoing interference levels so as to accommodate the concentration of migrated PMR assignments in the long-term.

Section 6

Further information

Please note that these Band III changes are for the purpose of securing compliance with an international obligation of the United Kingdom.

In most cases the migration end dates, e.g. 13 April 2009 and 13 April 2012, are fixed. So, if you are a Band III licensee, especially if your assignments are within sub-band 2 (193.2 to 207.5 MHz) or within the 177.2 to 177.5 MHz section of sub-band 1 (177.2 to 191.5 MHz), and you have not received a Notification Letter then please contact us at the email address above. We will be able to confirm whether all / part / none of your systems are included within the Band III Transition Plan.

Additionally, please check whether the person named on your licence still works for your organisation. If not, please supply us with an alternative licensee name. Further, it would be most helpful if you would let us have a provisional three-month migration window for each of your systems and then let us know when you are about to begin and have completed the migration of those systems.

Please note that we are expecting a very high volume of licence processing during the run-up to the Olympics. It may therefore be necessary to bring some of the Band III migration end-dates forward into 2011.

You can register for automatic Radio Spectrum Ofcom Updates.
<http://www.ofcom.org.uk/static/subscribe/radiospectrum.htm>

Further details regarding Spectrum Trading & Liberalisation can be found at:
<http://stakeholders.ofcom.org.uk/spectrum/spectrum-trading/>

General Band III enquiries should be sent to:
spectrumlicensing@ofcom.org.uk.