

Implementing Spectrum Trading: T-Mobile (UK) Response

Summary

T-Mobile (UK) welcomes the opportunity to comment on the Radiocommunications Agency's consultation document *Implementing Spectrum Trading*.

T-Mobile (UK) supports the phased testing and introduction of spectrum trading. T-Mobile (UK) considers that spectrum trading should be implemented so as to give users the greatest flexibility possible to change their spectrum use (i.e. Modes 3, 5 and 6) and to keep OFCOM's role to the minimum required for the efficient operation of a spectrum market. Experience elsewhere (referred to in the consultation document) suggests such an approach would be workable for many licence sectors, including public mobile services and fixed terrestrial services.

For trading to be successful it is important to have a stable framework of pricing and regulation and due notice of spectrum release plans and policies. It must also be clear how the regulatory regime will handle new technologies which are outside the existing regime, e.g. ultra-wide broadband.

T-Mobile (UK) suggests that in the near term trading would be most beneficial in those bands where market mechanisms have had limited application so far (e.g. military, aeronautical and maritime bands) and where there is flexibility to innovate and interference constraints are not severe (e.g. at higher frequencies).

Spectrum Trading and Public Wireless Networks

T-Mobile (UK) supports the consultation document's proposal that in the case of 3G licences trading should not be introduced earlier than three years after the first licensee's substantive launch of services. Specifically, we do not believe spectrum trading for either 3G or 2G spectrum should be introduced before 2006-2008, when the situation in respect of the supply of spectrum for 3G at 2.5 GHz and 2G/3G refarming has been clarified. Regulatory and market uncertainty are likely to distort trading before this time.

Spectrum Trading and Terrestrial Fixed Links

T-Mobile (UK) does not see this as a high priority area for trading, as the RA is currently able to meet demand with new assignments and the current approach to licensing and interference management works well.

Approach to Implementation

T-Mobile (UK) strongly believes that there should be a multi-stage approach to implementing spectrum trading that brings in different licence classes and sectors in succession, as trading arrangements and their supporting systems are found to work successfully. The process should be started with a monitored trial testing one complex form of trading and one simple mode in bands where there are likely to be considerable benefits from trading. For example, we suggest that trials in the following cases could usefully test the trading framework and supporting systems

- Maritime or private mobile radio bands for Mode 1 trading.
- Military radar at 3GHz for Modes 5 or 6 trading.

These trials should then be followed by application of these and other modes of trading to uses where this could yield some immediate benefits.

Definition of Spectrum Rights

The efficiency of any market regime is highly dependent on the form of the underlying property rights. Property rights should be defined so as to provide certainty and minimise transaction and enforcement costs (as well as the costs of third parties), otherwise trading could be costly (e.g. if rights are unduly complex or ambiguously defined) and these costs could unnecessarily block trades from occurring. The consultation document refers to some aspects of property rights (e.g. packaging and licence duration) but does not offer a complete definition. Importantly, nothing is said about the insolvency of licensees. T-Mobile (UK) believes strongly that these issues must be consulted on before Trading Regulations are developed.

In respect of the packaging of spectrum, T-Mobile (UK) agrees with the view expressed in the consultation document that spectrum should be packaged based on geographical and spectrum boundaries that are of the most value to users and that these boundaries should be negotiable between users. T-Mobile (UK) is opposed to a system of frequency trading units.

In respect of licence duration, T-Mobile (UK) believes that spectrum trading will be facilitated by issuing licences of longer rather than shorter duration, subject to there being arrangements for OFCOM to recover spectrum in the event of a change in international allocations. T-Mobile (UK) considers that perpetual licences for mobile spectrum offer the greatest benefits in terms of investment and trading incentives.

For other applications requiring less investment and/or where allocations and assignments may change more frequently (e.g. fixed links), licence durations should be extended from one year to, say, five years with five year rolling notice periods to give sufficient certainty to encourage trading.

Interference management

T-Mobile (UK) is in favour of users trying to resolve interference problems between themselves and would expect OFCOM to assist in this process, given its spectrum engineering expertise. We do not think that OFCOM should act as an arbitrator, and strongly feel that there should be an independent panel or tribunal set up to resolve such problems. OFCOM is not an appropriate adjudicator in domestic disputes given its other duties in relation to spectrum and the valuable role it can perform informally. The appeal mechanism under the remainder of the draft Communications Bill is inappropriate as this is an issue calling for technical expertise and not economic or legal expertise.

OFCEM would continue to be the conduit for disputes between a UK licensee and a spectrum user outside the UK, until such time as international rules are changed to give standing to individual licensees.

Information

T-Mobile recognises that some information on spectrum assignments must be publicly available so that buyers and sellers can find each other and users can identify those potentially responsible for harmful interference.

In considering the information that should be released, objectives in respect of trading need to be balanced against security and commercial confidentiality considerations. These considerations differ across uses, however, as a general rule we consider that the following arrangements should apply in respect of the publication of information

- There should be a public register that lists the names of licensees, the frequency band in which they are licensed and a nominated responsible individual and their contact details. The nominated responsible individual would be responsible for dealing with all queries in respect of trading and interference issues. If there is concurrent use of spectrum this should be noted on the register and appropriate contact details given.
- OFCOM should hold a secure confidential register giving details of all assignments as a trusted third party. This register would contain the identity of licensees, licence details (e.g. type, duration etc), the details of frequency assignments (e.g. frequency, location, technical constraints on use) and the nominated responsible individual and their contact details. This register should not be publicly accessible. Different levels of pre-cleared access to the register could be authorised by OFCOM if particular users need more detailed information, for example, to make progress on resolving interference disputes or to identify potential trading opportunities.
- Both the public register and the secure confidential register should be electronic and any access to them should be by electronic means.

Licensees should not be required to provide OFCOM with any information other than that listed above, such as the price of trades or the value of rentals under leasing agreements.

Role of OFCOM

OFCOM can assist the development of successful trading markets by publishing high level assignment information and putting in place market rules and associated procedures that result in low transaction costs for trading parties. In particular OFCOM should

- Provide high level information on licensees and assignments in a public register (see the answer to question 20).
- Maintain a secure, confidential register of assignment details that could only be accessed by parties authorised by OFCOM (see the answer to question 20).
- Put in place a timely and effective process for independent resolution of interference disputes, involving an independent panel or tribunal (see the answer to question 2).
- Put in place efficient procedures for administering trades including electronic submission of information.
- Provide clear and timely policy guidance on the future release of spectrum and regulations concerning spectrum use (see the answer to question 22).

OFCOM could also be responsible for confirming that no harmful interference is likely to be caused as a result of a change in use and generally to be a source of informal expert advice to licensees, for example, in relation to interference disputes.

As indicated in our answers to questions 10, 11, and 13, we do not envisage a significant role for OFCOM in checking or approving trades not involving any change in use.

Licence Fees

Spectrum trading removes the need for administrative spectrum pricing to provide incentives for efficient use of spectrum. Hence when licensees opt to have their existing licences replaced by a tradable licence they should no longer pay administratively determined spectrum prices. Licence fees will still be required however to cover OFCOM's administrative costs.

Windfall Taxes

T-Mobile (UK) endorses the Independent Spectrum Review's recommendations that trading rights should be granted free and any windfall gains should not be taxed.

Detailed Response to Questions

There are many detailed implementation issues to be addressed in developing the trading regime that are outside the scope of the current consultation. T-Mobile (UK) looks forward to participating fully in the consultation process on the detailed Trading Regulations. Below we give detailed responses to the questions from the viewpoint of a cellular operator using fixed radio transmission links.

Question 1 Do you have any comments on the proposed modes of trade? Are there others that should be considered?

T-Mobile (UK) operates with GSM 1800 and UMTS technology on a nationwide basis and does not see scope for spectrum trading by it in the near term. The potential types which might occur in the long term include:

- change of use (Mode 3) e.g. transmission links in cellular bands;
- change of ownership (Mode 1) e.g. sale of cellular spectrum on a regional basis
- reconfiguration of spectrum (Mode 2) e.g. change of boundary conditions to enable more efficient use of spectrum

We support the use of Modes 1-3 and anticipate that their use will vary depending on the nature of the spectrum use under consideration. Consistent with the objective of retaining maximum possible flexibility, T-Mobile (UK) considers that Mode 3 is a good simple mechanism and should be implemented unless there are strong practical or legal reasons to do otherwise.

Modes 5 and 6, whilst essentially an extension of Mode 3, are more complex and involve special administrative rules in addition to the basic trading framework implied by Mode 3. Such modes could be appropriate in the case of major changes in spectrum use, such as might

occur with analogue to digital TV switchover or if military spectrum is released for civil use. In the case of Mode 6, incumbents' licences should have a fixed term otherwise "hold-up" problems will occur when new entrants seek to clear the band.

We see limited value from Mode 4, as many changes of use will also require some reconfiguration of the spectrum if it is to continue to be used efficiently.

Question 2 How should interference disputes be resolved? How far should OFCOM become involved and what should its role be in relation to interference?

Efforts should be made, prior to trading taking effect, to limit the likelihood of harmful interference. In cases where spectrum is reconfigured and/or there is a change in the allocated use of the spectrum (e.g. switch from fixed to mobile use), users of spectrum, say up to the third harmonic away from the changed band, should be consulted on the changes. For example, in the case of a change at 1800 MHz this would mean consultation with users in the frequency range 600MHz to 6 GHz. Responsibility for undertaking this consultation should lie with the user seeking the change and this should be mandatory. In the light of the answer to Question 21 below, the optimal means of achieving this with trades involving a change in use would be to make the trade conditional until such time as the consultation has taken place and all objections resolved. OFCOM would have the task of ensuring that this was done prior to the trade becoming unconditional.

We suggest (see also the answer to question 20) that all licensees and lessees have an obligation to nominate an individual with authority to deal with interference disputes on their behalf. This individual would be identified on the OFCOM register. The user seeking spectrum reconfiguration or a change of spectrum use would use the public register of assignments to identify the relevant organisations and persons to contact.

Reasonable objections on the grounds that a change of use may cause harmful interference or interference with existing property rights should be grounds for rejecting a change. Any objections would be made to the user initiating the consultation and should also be lodged with OFCOM. This is analogous to both land planning applications and the allocation of satellite slots where neighbouring properties are consulted. In the case of land different parts of government may overrule objections. This would not seem appropriate in the case of spectrum. For this reason, the approach used to co-ordinate and register satellite slots provides a model that may be more appropriate, even if not exactly what will be required.

The satellite slot allocation process involves

- Consultation with other users over any proposals for a new satellite or a change in spectrum use by an existing satellite. In principle, the consultation is undertaken by respective governments though in practice it is done by the users.
- Any objections are made to the ITU.
- Officially objections are dealt with by the proposer through the ITU. In practice the proposer negotiates with the objecting parties.
- Registration of the new satellite allocation at the ITU once all objections have been withdrawn or resolved. Only at this stage is the slot protected.

T-Mobile (UK) is in favour of users trying to resolve interference problems between themselves and would expect OFCOM to assist in this process, given its spectrum engineering expertise. An example of the interference issues that might arise between two 3G operators, potential solutions and the ground rules that operators would need to agree on to resolve problems are described in the Confidential Annex A.

We do not think that OFCOM should act as an arbitrator, and strongly feel that there should be an independent panel or tribunal set up to resolve such problems. There is one exception to this, as indicated above in relation to trades involving change of use. As the potential for unforeseen problems is high, and use of an independent panel may involve unacceptable delay to those suffering harmful interference, we think that such trades should all be conditional on OFCOM confirming that there will be no harmful interference if the proposed change of use is implemented.

OFCCOM is not an appropriate adjudicator in domestic disputes given its other duties in relation to spectrum and the valuable role it can perform informally. The appeal mechanism under the remainder of the draft Communications Bill is inappropriate as this is an issue calling for technical expertise and not economic or legal expertise.

The tribunal or panel may never be called on to assist, but its existence should help to incentivise the parties to resolve disputes. The rules of the tribunal or panel should contain strict time limits to ensure that problems are resolved as expeditiously as possible, particularly where the dispute affects large numbers of end customers. The tribunal or panel would not be a judicial body and should not be bound by its previous decisions, as technology change may invalidate previous decisions and mistakes may be made. As interference problems could cause adverse financial consequences there should be a further appeal to the courts on the merits from any finding of the tribunal or panel, as with appeals from OFCCOM decisions.

In the case of leasing, responsibility for resolving interference issues should be dealt with in the lease. If it does not do so the lessor would remain accountable. OFCCOM's database must contain information on the identity of the lessee and, where relevant, its nominated person responsible for dealing with interference issues. Only in the situation where there are concurrent rights would there be two persons nominated as responsible for dealing with interference issues.

OFCCOM would continue to be the conduit for disputes between a UK licensee and a spectrum user outside the UK, until such time as international rules are changed to give standing to individual licensees.

In all cases, it is important that OFCCOM retains knowledge of both the licensed owner and the lessee of the spectrum and has the ability to terminate transmissions if a licensee (or its lessees) is in breach of its licence.

Question 3 It is proposed to give scope for trades with as wide as possible a variety of time period and opportunities for reversion. Which combinations do you think will deliver greatest benefits?

As it is impossible to foresee many opportunities for trade at this stage, it is desirable to allow users the maximum flexibility in terms of the duration and extent of trades so that all opportunities for trade can be exercised in future.

Question 4 It is proposed to give scope for trades where the extent of transfer of rights and obligations is complete or concurrent. What is your view on this proposal?

T-Mobile (UK) supports the proposal to allow trades where the extent of transfer of rights and obligations is complete or concurrent.

Concurrent rights should be feasible so long as leases make it clear who is responsible for any interference issues that may arise. The parties to a concurrent trade must comply with their obligations to nominate a responsible person. If it is felt that this does not provide a sufficient safeguard against an ambiguous allocation of rights and obligations, then the default should be that the lessor is responsible.

Users should not be obliged to create new licences in the case of partial trades, though should be permitted to have new licences issued by OFCOM if they wish.

Question 5 Licence classes from the following sectors are proposed for a first wave of the introduction of spectrum trading: public wireless networks; broadband fixed wireless access, private business systems and terrestrial fixed links. Additionally for the first wave the simplest mode of trading (change of ownership only) is proposed for all other licence sectors and licence classes (with a few exceptions). a) What is your view of these proposals? b) What is your view on the appropriate timing of the introduction of trading for particular licence classes within sectors, and in particular for Third Generation Mobile (3G) licences?

Question 6 Licence classes from the following sectors are proposed for a second wave of the introduction of spectrum trading: sound broadcasting (analogue and digital), television broadcasting (analogue and digital), programme making and special events, and aeronautical and maritime. What is your view of these proposals?

Question 7 In your view, what is the best approach for introducing more complex forms of trading?

Question 8 What is your view on the overall timing of the introduction of spectrum trading?

The Consultation Document proposes a two stage approach to the introduction of spectrum trading starting with the simplest mode of trading for all licence sectors and classes (Mode 1) and more complex forms of trading for public wireless networks, broadband fixed wireless networks, private business systems and terrestrial fixed links. T-Mobile (UK) disagrees with this approach.

We are concerned that opening up trading for so many different licence classes at once is an unnecessarily risky strategy. The trading regime will require changes to licences and IT systems and new administrative processes will need to be put in place. There is considerable scope for things to go wrong and, as the consultation document notes, a certain amount of fine-tuning is likely to be required in the early stages of trading.

Hence, we strongly believe that there should be a multi-stage approach that brings in different licence classes and sectors in succession as trading arrangements and their supporting systems have been found to work successfully. The process should be started with a monitored trial testing one complex form of trading and one simple mode in bands where there are likely to be considerable benefits from trading. For example, we suggest that trials in the following cases could usefully test the trading framework and supporting systems

- Maritime or private mobile radio bands for Mode 1
- Military radar at 3GHz for Modes 5 or 6

This will also give the military an incentive to replan and enable the introduction of spectrum rights for military spectrum. These trials should then be followed by application of these and other modes of trading to uses where this could yield some immediate benefits.

With regard to particular licence classes T-Mobile (UK)

- agrees with the consultation document's recommendation that trading for 3G spectrum should be delayed until at least 3 years after the first licensee's substantive launch of service within the UK. More specifically, T-Mobile (UK) strongly believes that implementation of spectrum trading should be delayed until 2006-2008, when the situation in respect of the supply of spectrum for 3G at 2.5 GHz and 2G/3G refarming has been clarified and demand for 3G is better understood. Annex B (confidential) gives more detailed reasoning supporting this position.
- considers that spectrum trading for 2G services should not be introduced in advance of decisions concerning the refarming of 2G spectrum. Refarming decisions could have a major impact on the value of the spectrum and the introduction of trading could be very disruptive in these circumstances. It would be inappropriate for operators or other parties to be taking "bets" on the outcome of refarming decisions and/or seeking to influence decisions through their trading activity.
- considers there could be value in bringing forward trading for TV broadcasting spectrum to assist in facilitating digital switchover.
- considers early introduction of leasing arrangements for military spectrum would be valuable, given the considerable amount of spectrum currently allocated for military use. The timetable for the introduction of spectrum trading should make explicit provision for this, given that the draft Communications Bill would enable leasing arrangements for Crown bodies such as the military.
- understands that maritime users would find Mode 1 trading beneficial so that boats and licences can be sold together.
- does not regard fixed links as a high priority area for trading, as the current approach works well in meeting our needs. However, in time trading is likely to be useful to facilitate changes of use in fixed link spectrum.

While more complex forms of trading (i.e. Modes 2-6) require new arrangements to ensure the risk of harmful interference is not increased, T-Mobile (UK) does not consider this to be a good reason for delaying the testing and eventual introduction of these modes as they could offer the greatest trading benefits. Rather work should begin soon on the detailed

specification of property rights and other arrangements required to support these modes of trading.

Question 9 In planning for the introduction of spectrum trading, it would be helpful to have an estimate of the likely volume of trading. For each licence sector and licence class on which you can express a view, what volume of trades would you expect? Would you expect a different volume depending on the modes of trade available?

This question is hypothetical given T-Mobile (UK)'s strong view that spectrum trading for 3G or 2G spectrum should not be introduced before 2006-2008, however at that stage, our view is that

- For 2G (900MHz and 1800MHz) spectrum occasional but potentially high value trades could occur involving leasing or sale of spectrum and also potentially changing boundary conditions in order to improve spectral efficiency.
- While all operators have "spare" spectrum (for 2G and 3G) in remote parts of the country, it seems unlikely there would be any demand for this spectrum from other users.
- In the case of fixed links, trading could assist in refarming the spectrum to a new use or technology more quickly than happens under current administrative procedures. Otherwise we do not expect there to be significant volumes of trades of fixed link spectrum. This is because in our experience the RA is able to meet demands for new assignments in a timely and efficient manner. We would expect that the one-week turnaround time now achieved by the RA would continue after trading is introduced.

Question 10 For the proposed licence sectors from which licence classes will be selected for the first wave of the introduction of spectrum trading with more complex trading modes (i.e. for the sectors: public wireless networks, broadband fixed wireless access, private business systems and terrestrial fixed links) do you have any views on how extensively change of use or reconfiguration should be permitted?

Our views on the process for introducing spectrum trading are given in response to Questions 5-8.

T-Mobile (UK) considers that the trading arrangements should allow Mode 3 and Modes 5 and 6, where these permit change in ownership, reconfiguration of the spectrum, mutually agreed changes in boundary conditions and any changes of use consistent with international allocations, EC legislation, interference constraints and international co-ordination constraints. We believe that this degree of flexibility is required to allow users to respond to unanticipated technology and market developments. If such flexibility is not granted then opportunities for innovation are likely to be forgone and/or changes to the regime will have to be sought whenever greater flexibility is required. The latter could be a slow and costly process.

Paragraph 9.3 of the consultation document lists factors which it is proposed should be taken into account when deciding the degree to which change of use and reconfiguration will be permitted and the extent of any *ex ante* checks by OFCOM. Paragraph 9.3 e) refers to OFCOM intervention to maintain a diversity of radio services and the example of a diversity of mobile radio services is given. However, under the draft Communications Bill OFCOM is only required to maintain a diversity of broadcasting services. It is not therefore appropriate

that decisions about change of use and reconfiguration take account of the diversity of radio services in general.

Paragraph 9.3 f) refers to OFCOM intervention taking account of “any relevant public policy requirements”. T-Mobile (UK) believes strongly that these requirements should be set out in Ministerial Directions to OFCOM concerning spectrum matters which are on the public record, so that users are in no doubt as to the constraints on their use of spectrum and to avoid excessive intervention by OFCOM.

Question 11 For the proposed licence sectors from which licence classes will be selected for the second wave of spectrum trading, do you have any views on how extensively change of use or reconfiguration should be permitted?

See response to Question 10.

Question 12 Would having different trading rules for different licence sectors and licence classes have any undesirable impact?

It is possible that different trading rules for different licence sectors and classes could be difficult to sustain over time and/or could distort competition between services because, for example, different licence sectors may converge over time and/or trades involving changes of use may lessen distinctions between different licence sectors. Alternatively, new technology developments might mean that new trading rules will be required. For example, the advent of ultra-wideband radio could have unexpected consequences for other users and new trading rules may need to be developed to deal with such innovations.

No-one knows with any certainty how technology and markets may develop and so trading rules for different licence sectors and classes will need to be addressed on a case by case basis, albeit starting from a common basic framework. The development of trading rules would also need to take into account OFCOM’s general duties (under Clause 3 of the draft Communications Bill) to encourage optimal use of the spectrum and to act in a proportionate and consistent manner.

Question 13 In what circumstances do you consider it would be appropriate for OFCOM to a) require prior clearance or consent (*ex ante*) for competition purposes for a proposed trade and b) withhold consent on competition grounds?

T-Mobile (UK) believes that competition policy legislation together with appropriate and proportionate *ex ante* regulation of telecom operators and broadcasters, as already contemplated by the draft Communications Bill, provide sufficient protection against market abuse. Competition policy provides an effective approach to competition issues for other key input markets and we do not see why spectrum should be an exception in this regard, particularly given OFCOM’s powers to impose *ex ante* controls on licensed communications operators deemed to have significant market power in particular markets and to control ownership of TV and radio licences. T-Mobile (UK) considers OFCOM’s role in clearing or consenting (or not) to trades on competition grounds should be limited to objective checks in respect of operators with significant market power in a relevant market or broadcasters’ compliance with sector specific ownership controls.

If there is government policy in respect of market structure, for example that there should be at least a certain number of operators in a given market, then this must be made explicit in a Ministerial Direction to OFCOM. OFCOM will have powers to block trades that contravene this (and any other) Ministerial Direction. Otherwise market structure will be dealt with by generally applicable competition law.

Question 14 How should tradable licences be structured? Views on all aspects of structuring the licences would be appreciated including on the technical construction of boundary conditions.

Question 15 Are there licence classes, or licence sectors, for which division of spectrum into predefined frequency trading units with fixed boundary conditions would facilitate trading?

Question 16 Are there licence classes, or licence sectors, for which user-negotiable boundaries would facilitate trading?

Question 17 Are there licence classes, or licence sectors, for which spectrum reconfiguration on demand would facilitate trading?

The efficiency of any market regime is highly dependent on the form of the underlying property rights. Property rights should be defined so as to provide certainty and to minimise transaction and enforcement costs, otherwise trading could be costly (e.g. if rights are unduly complex or ambiguously defined) and these costs could unnecessarily block trades from occurring. The consultation document refers to some aspects of property rights (e.g. packaging and licence duration) but does not offer a complete definition. Importantly, issues like insolvency of licensees are not raised. T-Mobile (UK) believes strongly that these issues must be consulted on before Trading Regulations are developed.

The consultation document proposes three ways in which spectrum might be packaged (paragraph 12.1), namely

1. Reconfiguration on request to OFCOM followed by individual consideration by OFCOM
2. Reconfiguration on request to OFCOM within limits predefined by OFCOM
3. Packaging of spectrum in frequency trading units, defined by geographical coverage, bandwidth and boundary limits for incoming and outgoing emissions

T-Mobile (UK) agrees with view expressed in paragraph 12.5 of the consultation document that the best approach to reconfiguration would be for parties to the transaction to negotiate variations to boundary conditions and to notify them to OFCOM.

T-Mobile (UK) is opposed to the introduction of a system of frequency trading units (ftus). Experience in Australia (where ftus have been introduced) as compared with that in New Zealand (where users negotiate reconfigurations) does not indicate any particular advantages from ftus. The radiocommunications review undertaken by the Australian Productivity Commission noted that one of the biggest problems with introducing spectrum licensing in Australia was in implementing the boundary conditions for spectrum property rights. It proved impractical to implement technology neutral boundary conditions and enforce them and a system of device registration had to be introduced for interference control purposes¹.

¹ Radiocommunications, draft Report, Productivity Commission, February 2002.

The New Zealand government also indirectly commented on the Australian approach in its ten year review of the spectrum management regime

*“ The concept of allowing the market to assemble functional blocks of spectrum from very small parcels that have limited individual utility may appear attractive in terms of technology neutrality. However, markets generally work better when products are available in a variety of models that have immediate utility.”*²

Further to this there is a risk of inefficient use of spectrum if areas near boundaries become unusable and there is not yet enough practical experience of packaging spectrum like this to do so efficiently. Efficiency concerns are more acute in the UK than in Australia, because of the higher population densities and the proximity of other countries.

As a general matter to facilitate the introduction of spectrum trading, we suggest that the RA should initiate a project, under the spectrum efficiency fund, to examine in more detail the options for structuring tradable licences. This project should involve tests simulating the constraints on actual spectrum use that would be implied by different licence structures and should consider the extent to which different approaches are likely to accommodate imminent new technologies and ways of using spectrum (e.g. dynamic sharing of spectrum). It could also look at ways of minimising the potential costs of third parties in responding to consultations as to the effect of a change in use.

The consultation document suggests (paragraph 12.6) that, where licences are partitioned, licensees would need to gain *ex ante* OFCOM approval of proposed post-partition licences. We think that this process should largely be a formality and OFCOM should reach decisions within a short time period – no more than a week. We believe licensees have sufficient incentives to be compliant with their licence conditions, including for example any predefined limits set by OFCOM, for if they cause harmful interference to others as a result of licence non-compliance then OFCOM will revoke the licence.

Question 18 What changes, if any, do you consider are needed to licence term and security of tenure to promote the successful introduction of spectrum trading? Please be as specific as possible about the licence sector(s) and licence class(es) to which you are referring.

In respect of licence duration, T-Mobile (UK) believes that spectrum trading will be facilitated by issuing licences of longer rather than shorter duration, subject to there being arrangements for OFCOM to recover spectrum in the event of a change in international allocations. Longer licences are more important for spectrum used to provide services to end users rather than spectrum used for infrastructure. This is because provision of services to end-users involves much higher levels of investment by operators (in service development, marketing and receiver subsidies as well as infrastructure) and by consumers (in receivers) than is the case with spectrum used only for infrastructure.

Licences for public wireless networks should be perpetual so as to give licensees incentives to continue to invest in network and service development and to make trading worthwhile. If perpetual licences are not acceptable to government, then 10 year rolling notice periods should be put in place so that trading is not inhibited as licensees near the end of the licence

² p107 *NZ Spectrum Management – A Decade in Review: 1989-1999*, Ministry of Economic Development, PIB 35, June 2000.

term. Short-term (say, less than 5 year) licences or leases for spectrum for public mobile networks are unlikely to be traded without some assurance about the future use of the spectrum.

For licence sectors where spectrum is used for infrastructure, such as fixed links, and annual licences are currently assigned the certainty of much longer tenure would be required before T-Mobile (UK) would be confident of buying or leasing such spectrum. We suggest that initial licence durations of at least five years together with five year rolling notice periods should be adopted³. Our fixed link equipment is depreciated over ten years. The combination of an initial five year term with a five year rolling notice period thereafter would give sufficient time to amortise the investment in fixed link equipment and to provide incentives for trade at any point in time.

Question 19 What are your views on continuation of annual licence fees for traded licences?

There are two reasons for setting annual licence fees: 1) to recoup the RA's administrative costs and 2) to provide incentives for efficient spectrum use. Spectrum trading removes the need for administrative spectrum pricing to provide incentives for efficient use of spectrum, as the potential gains from trade provide a strong incentive for efficient spectrum use. Trading will provide economically more efficient price signals than administratively determined prices, as the latter are necessarily a crude approximation to market prices. The continuation of administrative spectrum pricing under tradable licences might also be contrary to the requirements in the Authorisation Directive that the charges relate to OFCOM's costs and that usage fees for radio frequencies should be proportionate and levied to ensure the optimal use of spectrum. For these reasons, T-Mobile (UK) considers that the advent of spectrum trading should be associated with the removal of administrative spectrum pricing.

Licence fees will still be required to cover the RA's administrative costs incurred in managing spectrum for different user groups. Once spectrum trading is introduced for 2G services, after 2006-2008, we would expect to see annual licence fees reduced to the level of administrative costs associated with mobile network operators' use of spectrum. Similar arguments apply to other licence sectors and so we would expect to see administrative spectrum pricing phased out over a transitional period as spectrum trading is introduced. T-Mobile (UK) also objects strongly to any suggestion of licence conversion payments.

Spectrum licensees should have a choice as to whether they wish to retain their existing licences and continue to pay spectrum prices or move to a tradable licence and only pay only charges that cover OFCOM's relevant administrative costs. Such fees should be on an annual basis.

Question 20 a) OFCOM could provide only a minimum level of information for spectrum trading (identification and some description of licensed spectrum, and ability to send a message to the licensee) and leave further information provision to the market, or OFCOM could provide higher levels of information. What is your view on the optimum level for spectrum trading of information by OFCOM?

b) What type of information would assist or encourage you to trade?

³ We note that the Australian review of radiocommunications has concluded that the maximum duration of apparatus licences (which include fixed links) should be extended from 5 years to 10 years. See *Report of the Radiocommunications Review*, Department of Communications, Information and Arts, June 2001.

c) Should OFCOM have power to compel disclosure of market information?

Some information concerning spectrum assignments must be publicly available so that buyers and sellers can find each other and so that users can identify potential sources of harmful interference that they may experience.

The Consultation Document lists the following four high level types of information that could be provided by OFCOM

- Identities of current licensees
- Details above the minimum of licences held by current licensees
- Indications of which current licensees would positively welcome offers to trade (and on which spectrum)
- Details of licences that have been traded which could include the price (possibly in aggregated and/or time delayed format)

In considering the information that should be released objectives in respect of trading need to be balanced against security and commercial confidentiality considerations. For example, in the case of mobile spectrum if network topology is revealed this could facilitate criminal attacks on base stations and would allow competitors to see areas of low and high capacity and market services accordingly. These issues, in particular the security concerns, are discussed further in T-Mobile (UK)'s confidential response to the RA consultation on *Disclosure of Wireless Telegraphy Licence Information on Radio Frequency and Assignment*.

Security and commercial confidentiality considerations differ across frequency bands and uses. However, as a general rule we consider that the following arrangements should apply in respect of the publication of information

- There should be a public register available that lists the names of licensees, the frequency band in which they are licensed and a nominated responsible individual and their contact details. The nominated responsible individual would be responsible for dealing with all queries in respect of trading and interference issues. If there is concurrent use of spectrum this should be noted on the register and appropriate contact details given.
- OFCOM should hold a secure confidential register giving details of all assignments as a trusted third party. This register would contain the identity of licensees, licence details (e.g. type, duration etc), the details of frequency assignments (e.g. frequency, location, technical constraints on use) and the nominated responsible individual and their contact details. This register should not be publicly accessible. Different levels of pre-cleared access to the register could be authorised by OFCOM, if particular users need more detailed information, for example, to make progress on resolving interference disputes or to identify potential trading opportunities.
- Both the public register and the secure confidential register would be electronic and any access to them would be by electronic means.

Licensees should not be required to provide OFCOM any other information, such as the price of trades or the value of rentals under leasing agreements. This information is commercially sensitive and so its provision should be voluntary. Furthermore, the development of a market does not depend on the availability of price information relating to trades. The land registry

analogy supports this, for whilst the register has some price information most leases are not registered and the gaps and scarcity of information does not inhibit trading.

OFCOM might however wish to publish the volume of trades in different categories, suitably aggregated, as an indicator of activity in the market. This would seem unlikely to cause any problems in terms of commercial confidentiality as major trades are likely to be required to be declared in annual accounts for publicly owned companies.

All other arrangements under which OFCOM may supply information should be voluntary. For example, OFCOM could provide a notice-board on which parties could post their interest in trading but this would be voluntary. T-Mobile (UK) would not like to see any requirements which could lead to abuse of the market by creating false demand for spectrum.

Question 21 Should OFCOM publish details of potential trades before they take place?

T-Mobile (UK) believes that OFCOM should not publish details of potential trades before they take place as this will distort the market. Publication of such information would discourage parties from entering into trades, as they would be aware that sellers could solicit other offers and competitors could imitate their ideas once these were known publicly. The upfront costs of finding a buyer/seller and undertaking the necessary detailed legal and engineering work required to put together a deal can be considerable and could all be lost if others were able to access information about the potential trade in advance of a deal being concluded.

As discussed in response to Question 2, T-Mobile (UK) foresees a requirement for trades involving a change in use to be conditional on consultation with neighbouring users. Given the potential for loss if harmful interference were to occur and the need for certainty we believe that OFCOM should be part of this process and ensure that all material concerns are resolved before the trade becomes unconditional. We do not envisage that this would require publication of details of potential trades, but rather the parties to the trade would consult with all affected users and OFCOM informing them of technical aspects of a planned change of use. Effectively this would be part of OFCOM's obligations in relation to advice on interference under Clause 114 of the draft Communications Bill.

Question 22 Are there topics other than those listed in table two paragraph 17.1 that will need to be considered before Trading Regulations are finalised and trading is introduced for particular licence sectors and classes?

Topics not mentioned in Table 2 which should be considered before trading is introduced include

- The definition of spectrum rights
- The terms and conditions under which existing licences will be transferred into spectrum rights
- The consequences of licensee insolvency for spectrum licences
- The information on future spectrum plans that would be released

Definition of spectrum rights

Issues concerning the geographic and spectrum coverage of licences, transmission quality standards, propagation characteristics and technical standards for out-of-band emissions need to be considered. Options need to be assessed and a general framework developed.

Terms of transfer to tradable licences

As noted in our response to question 19, we believe licensees should have a choice as to whether they transfer to a tradable licence or not and that there should not be licence conversion fees. Other terms and conditions which need to be considered include any changes in licence duration and technical parameters that may be contingent on conversion to a tradable licence.

Licensee insolvency

At present Telecommunications Act licences specify that a licence is revocable by the Secretary of State if a licensee becomes insolvent. These conditions will no longer apply after July 2003 and so there must be specific provision for insolvency in Wireless Telegraphy Act licences to provide certainty to licensees. For consistency we suggest that tradable licences should continue notwithstanding any insolvency event and that liquidators be entitled to dispose of spectrum like any other asset of a company. In addition, liquidators and administrative receivers should not be able to disclaim any spectrum lease to which the company concerned is a party.

Plans for spectrum release

OFCOM's plans for future spectrum release and changes in spectrum policy relevant to the licence sectors/classes in question should be published when licences for a given sector or class is made tradable. This would include not only information directly concerning the sectors in question but also information about other relevant spectrum, such as that which may be used by competing technologies or uses. Such information can have a major effect on the value of spectrum and hence on the willingness or otherwise of parties to trade spectrum.

Question 23 For licence sectors and licence classes in which you have an interest how would you like to see trading start?

The following table sets out our views on how we would expect trading to start, using the parameters given in paragraph 18.2, in the licence sectors in which T-Mobile (UK) has an interest.

	Type of introduction	Term of tradable licences	How spectrum packaged
3G spectrum	Auction	Introduce perpetual licences with a compulsory purchase provision	Keep technical parameters as at present
2G spectrum	Depends on approach adopted for 2G/3G refarming	Introduce perpetual licences with a compulsory purchase provision	Modify technical parameters to accommodate 3G refarming

PUBLIC VERSION

Fixed links	Simple introduction	Five year initial duration and five year rolling notice period	Keep technical parameters as at present
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In the case of fixed links, we suggest that simple introduction is most appropriate given that OFCOM will continue to assign these licences on a first come, first served basis and running an auction would not be practical because of the many small assignments. T-Mobile (UK) is pleased with the current “band management” service provided by the RA in respect of fixed links. Turnaround times for applications are short, and the RA has been responsive to our needs and effective in dealing with interference disputes. Hence, T-Mobile (UK) does not see any benefit in moving to auctioning fixed link spectrum to potential private sector band managers.

For 2G spectrum, trading should only be introduced after plans for the next allocation of 3G spectrum has been decided.

Question 24 What steps if any, should the Government take to recoup capital gains realised as a consequence of the introduction of spectrum trading?

T-Mobile (UK) endorses the Independent Spectrum Review’s recommendations that trading rights should be granted free and any windfall gains should not be taxed.

T-Mobile (UK) believes that if trading gains are taxed then the likelihood of such gains materialising will be low. Either trades will be deterred, because the post-tax gain will not be sufficient to warrant the costs of undertaking the trade, or parties to the trade will engage in swaps or make other non-financial payments to acquire spectrum and so avoid the tax.

Question 25 a) What steps, if any should OFCOM take to facilitate the start of spectrum trading markets?

b) How can OFCOM assist the development of successful trading markets?

c) Do you consider that intermediaries are likely to emerge through the market if there is demand, or will OFCOM need to assist, and if so how?

OFCOM can assist the development of successful trading markets by publishing high level assignment information and putting in place market rules and associated procedures that result in low transaction costs and certainty for trading parties. In particular OFCOM should

- Provide high level information on licensees and assignments (see the answer to question 20).
- Put in place a timely and effective process for independent resolution of interference disputes, involving an independent panel or tribunal (see the answer to question 2).
- Put in place efficient procedures for administering trades including electronic submission of information. As indicated in our answers to questions 10, 11, and 13, we do not envisage a significant role for OFCOM in checking or approving trades not involving a change of use.
- Provide clear and timely policy guidance on the future release of spectrum and regulations concerning spectrum use (see the answer to question 22). The value of

spectrum trades can be affected (both positively and negatively) through opening up new spectrum bands and changes in regulation.

OFCOM could also be responsible for confirming that no harmful interference is likely to be caused as a result of a change in use and generally to be a source of informal expert advice to licensees, for example, in relation to interference disputes.

We do not believe that OFCOM has a role to play in assist the development of market intermediaries, as such entities are likely to develop of their own accord (as has happened in Australia for example) and such interventions risk distorting market development.

Question 26 Do you agree with the analysis in the draft Regulatory Impact Assessment? Is there additional information or data you can provide to help assess either costs or benefits?

The benefits of trading are highly uncertain and there is no obvious way they can be measured without precedents from elsewhere for which the value of trading has been estimated. We are not aware of any such precedents. The approach taken in the Regulatory Impact Assessment would appear to be based more on rough guesstimates than solid evidence, however, we agree with the general conclusion that the benefits of trading are likely to outweigh the costs.

**T-Mobile
October 2002**