Simplifying Spectrum Trading

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Background to Transfinite

Transfinite is an independent UK company, with an excellent track record of consultancy support, study work and software development. We specialise in products and services to analyse compatibility between radiocommunications systems and their use of the radio spectrum. Our tools have a particular emphasis on interference analysis, spectrum management and frequency co-ordination. Our study work has encompassed a wide range of communications systems including both terrestrial and satellite services.

Recently we were involved in the auction of spectrum in the 10 – 40 GHz bands and were successful, gaining a licence in the 28 GHz band. We intend to operate as a band manager providing access to our spectrum via a web based software solution called Visualyse Spectrum Manager (SM).

Visualyse SM provides all the necessary features to support issuing of licences including:

- Licence application
- Licence processing
- Licence search and display
- Technical analysis
- Management and reporting
- Engineering

Visualyse SM can offer users the ability to apply for licences via a web based portal as shown in the figure below.
General Comments

Transfinite welcomes the publication by Ofcom of the consultation on simplifying spectrum trading and introduction of spectrum leasing. We strongly support measures to reduce the administrative overhead of spectrum trading and introduce spectrum leasing.

In particular we strongly suggest that the framework that permits spectrum leasing would greatly facilitate the ability of band managers to operate, both providing PMSE related services but also more generally. We suggest that a band manager can not provide low cost transactions under a regime that is based upon spectrum trades.

Question 1: Are there any features of the present spectrum trading regime that need to be changed in order to encourage or facilitate spectrum market developments? If so, have we correctly identified the features that need changing? What features, in addition to those described in following sections, would be advantageous to change? It would be helpful if you would explain the reasons for your suggestions with evidence of practical difficulties being caused at present and estimates of the costs that these impose and the savings that your suggestion would gain.

Yes, changes are required to the current spectrum trading regime. In particular the framework does not facilitate operation of band managers due to the complexity that arises when using a legal framework devised for one purpose (trading) for another (band management).

We feel that trading and band management have different requirements and characteristics.

A spectrum trade typically involves change in ownership of all spectrum rights or division of the rights to use the spectrum in dimensions such as geography and frequency. Examples of this include:

- Outright trade of a UK wide licence for 2 x N MHz of spectrum from organisation A to organisation B
- Partial trade, in which a UK wide licence for 2 x N MHz of spectrum is divided so organisation A transfers full rights to organisation B to part of its spectrum block (e.g. all of 2 x N MHz for a region within the UK or a UK wide right to use part of the N MHz)
- Transfer of ownership: ownership of a point to point link is transferred from a local council to a systems integration house providing an overall service to the council

For the first two cases there is also the transfer of responsibilities to manage the spectrum in terms of undertaking planning and checking deployments meet licence constraints.

The key point is that the terms of the licence conditions are likely to be either identical or very similar before and after the trade.
Band management however typically involves offering access to the licensed spectrum that provides rights that are in a different form to that in the licence but will be compatible with its constraints. Hence the band manager’s licence will typically involve:

- Frequency range within which transmission is permitted
- Geographic range over which transmitters can be located
- Block edge masks
- Coordination triggers on boundary

The spectrum access rights issued by the band manager are more likely to be of the form:

- Transmit permitted on frequencies = f1, f2
- Geographic locations of transmitters = (lat-1, long-1) (lat-2, long-2)
- Antenna using = defined gain pattern
- etc

The band manager would be undertaking planning, interference assessment and coordination tasks to ensure the spectrum user gets the required quality of service. The band manager provides by shared but controlled access to their spectrum in order to maximise spectrum efficiency, retaining at all times management rights and responsibilities.

There are a number of other differences including:

- Band management is likely to involve larger numbers of lower value trades than spectrum trades
- Band management is likely to require contractual and commercial interactions with organisations that are not as aware of spectrum technicalities and legal issues as those involved in spectrum trades

The current spectrum trading framework is not designed to support band management style activities, though as noted in Ofcom documentation there are ways in which it can be made to achieve similar ends.

However the procedure is complicated and involves additional legal measures which should not necessary. One such approach involves the band manager undergoing a concurrent total transfer with each of its clients, so that each has the legal right to transmit under the spectrum licence, with controls and commercial terms managed via a contract.

The contract then has to take account a number of additional topics including:

- Definition of two sets of spectrum rights, the generic licence conditions and the specifics of the links authorised

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1 Partial concurrent trades could also be used, with one trade per assignment issued, but a separate trade would have to be notified to Ofcom in each case which would involve in most cases an even greater administrative overhead.
• Mechanisms to ensure the band manager has the right to approve future concurrent total trades on behalf of all organisations named on the licence
• Mechanisms to ensure the band manager has the right to remove existing names on the licence if specific contractual terms are met (e.g. non-payment)
• Clauses to ensure that the band manager undertakes specific tasks identified in the licence on behalf of all names on the licence (e.g. keep records)
• Clauses giving the band manager rights to apply for licence variations on behalf of all names on the licence

The result is that the band manager’s contract has additional complexities above and beyond that required to provide spectrum access in order to meet the framework for spectrum trading.

While framework agreements can be created and would ultimately be well understood by the band manager, one of the differences with trading is that there will be a significant number of customers who have little familiarity with the legal framework for spectrum trades.

These customers will also be familiar with alternative methods of accessing the radio spectrum such as getting licences directly from Ofcom or under contract from JFMG which are much more straightforward.

The need to agree overly complex contracts of an unfamiliar and untested legal nature, which introduces additional risks due to the concurrent nature of the licence, is likely to be a serious burden and severely restrict the ability of band managers to operate.

A separate legal framework that is fit for the purpose of operating as a band manager is urgently required, and we feel that this would be best achieved using the legal instrument of a spectrum lease.

The adoption by the EU parliament of the revision to the Framework Agreement to permit spectrum leases on the 24th of November removes one potential hurdle on its introduction within the UK.

We strongly recommend that Ofcom work with the BER as a matter of urgency to undertake the necessary regulatory steps that would permit spectrum leases within the UK.

The remainder of the questions have been approached primarily from the view point of a band manager rather than spectrum trader.

**Question 2: Do you agree with our targeted approach to deciding which trades need to be subject to more rigorous procedures and our specific proposals? Are there other factors that we should take into consideration or particular licence sectors or types of transaction that should be subject to additional procedural requirements?**

We are unclear how a partial trade could give rise to a risk of interference into third parties, as the deployment of transmitters that would be legal would be the same with or
without a partial trade. It is true that most spectrum usage rights for current spectrum licences (rather than site based licences) within the UK are defined using block edge masks rather than area PFD measures\(^2\) and hence are potentially susceptible to interference if the density of transmitters exceeds a threshold. However this is true whether a trade happens or not. Licence variation that could lead to higher levels of interference of course would be subject to consultation with potentially affected parties. Further clarification of the interference issue here from Ofcom would be useful.

Transfinite supports a targeted approach but suggests that most transfers should not require prior consent in order to reduce the administrative burden and facilitate a flexible spectrum market.

**Question 3a:** Do you agree that the requirement for Ofcom’s consent to proposed transfers should be dispensed with for the generality of tradable licences subject to justified exceptions?

We agree that most if not all transfers should not require consent by Ofcom.

As noted elsewhere, operation of a band manager would be most facilitated by a framework involving spectrum leasing rather than trades. However if there were to be difficulties in introducing this then trades undertaken as part of band manager operation should not require prior consent by Ofcom.

**Question 3b:** If the need for prior consent was removed, do you consider that Ofcom should continue to have a power to give ex-post directions?

In theory yes, but if it was clear what the exceptions would be that might require ex-post direction then this could be covered by being a condition for which Ofcom would not automatically give consent.

**Question 3c:** Do you agree with our proposal to introduce single-transaction time limited transfers?

Yes, this would facilitate introduction of time limited trades.

**Question 4a:** Would our proposal for TWLI offer a worthwhile reduction in regulatory burden compared to the status quo? Please provide as much quantitative and qualitative evidence as possible of the benefits and the practical seriousness of any drawbacks.

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\(^2\) The exception is the 1.4 GHz L-band spectrum: however all blocks were purchased by the same organisation and hence the area PFD spectrum usage rights specified to control interference between blocks are not used
We do not feel that the introduction of TWLI would reduce the regulatory burden sufficiently to facilitate the development of band managers within the UK.

The principle reason is the contract necessary to manage the process would remain very complex and be a burden not so much for the band manager as for each of its customers, greatly increasing the cost for them of accessing spectrum and hence reducing the value achievable by the band manager.

There would also be significant concerns about Ofcom publishing information about each transaction as that would involve commercially sensitive information such as a band manager’s client list.

These concerns apply to all scenarios involving band managers, both PMSE and other applications.

As noted elsewhere, we do not feel that introducing a 24 month time constraint into the leasing framework is suitable, and that would also apply to TWLI if used to support band management activities.

If however there were unforeseen problems with the introduction of spectrum leasing then TWLI would bring some reduction in overheads. However the lack of a documented licence would also introduce a lack of transparency that could also represent a burden to a band manager’s clients.

An additional issue would be the increasing complexity of the legal status of the licence should the regime change in the future to permit leasing. It is foreseeable that some customers could be named on the spectrum licence as a concurrent owner while others are on leases. This would be less transparent for a band manager than it remaining the sole owner and leasing to its customers.

There could be benefits in a spectrum owner remaining the sole owner for legal clarify and ensuring an organisation can clearly state what its assets are without requiring a complex explanation of how shared ownership of a licence is mitigated by contractual terms.

**Question 4b: Would TWLI streamline the trading process sufficiently for the band manager with PMSE obligations to operate?**

While a PMSE band manager could operate under TWLI it would introduce a very significant burden that could have extremely serious consequences to PMSE users.

We strongly recommend the alternative framework of spectrum leases is introduced as rapidly as possible and is available at the start of operation of the band manager with PMSE obligations.

**Question 4c: Would TWLI generate worthwhile benefits for other licence classes, frequency bands or types of transaction despite the drawbacks? If so, in which other categories should it be introduced and how might the drawbacks be mitigated in practice?**
TWLI would bring some benefits and so in the eventuality that spectrum leasing was not feasible it should be introduced into other frequency bands.

We suggest it should be available in any bands where there could be operation as a band manager.

Question 5a: Do you agree with our proposal to create a regime for spectrum leases? What do you see as the advantages and disadvantages?

Transfinite strongly supports the introduction of spectrum leases.

Unlike use of spectrum trades, with in current form or use of TWLI, spectrum leasing is an instrument that fits the requirements of operating as a band manager rather than trying to use one framework (trading) for another purpose.

The key advantage is simplification of the basis of the agreement between the band manager and its clients. It allows the contract to be based upon the nature of the agreement between the two parties rather than the need to meet the convolved requirements of a spectrum trade.

Hence the contract can be based upon specification of the necessary information, namely:

- What spectrum access rights the client will gain (i.e. frequencies, locations, e.i.r.p.s etc)
- In return what commercial terms will be provided

Leasing also ensures that the risks and complexities involved in having to undergo concurrent trades and having multiple names on the licence are avoided.

Leasing would therefore reduce the regulatory burden, costs and risks involved in accessing the radio spectrum through a band manager.

We can see no disadvantages with the introduction of spectrum leases.

Question 5b: What advantages would spectrum leasing offer over TWLI? Please provide as much quantitative and qualitative evidence as possible to support your view.

As noted above use of trades including TWLI introduces additional complexities in the contract in order to manage the concurrent trade and multiple names on the head licence (even if not documented).

Question 5c: Do you agree with our proposal to limit the simpler leasing procedure without reference to Ofcom to shorter leases of up to 24 months? Would you suggest a different cut-off or a parameter other than lease length? If you suggest an alternative, it would be helpful if you would describe how this would work in practice.
We strongly disagree with the proposal that leases over 24 months should be referred to Ofcom and published.

The length of a contract is not a good indicator of impact of spectrum usage, in particular when operating as a band manager. An example could be the provision of a single point to point fixed link for an infrastructure project. This could involve a 5 or 10 year lease but only have a very small impact on the availability of spectrum in the UK.

However should an organisation enter into a 23 month lease in September 2010 for the entire spectrum owned by one or more other organisation that would have significant impact on availability of spectrum for the Olympics.

Again the oversight requirements on owners of blocks of spectrum are being imposed on another scenario, which is band management, in a way that is not appropriate. A trigger of 24 months would be extremely low for these forms of contract and result in an administrative burden on band managers.

There are also issues of commercial confidentiality if a band manager knows that the names of all clients with long term contracts would be published at Ofcom. This could lead to market distortions as band managers arrange all contracts to be less than the 24 month period. Some clients could also have confidentiality issues and not wish the details of their assignments be published.

Our preferred approach is for there to be no requirements for spectrum lease information to be made available to Ofcom.

Should Ofcom feel that there is a need for spectrum lease information to be notified, a more acceptable approach would to register leases that would have a significant in terms of spectrum made unavailable to other parties. This could be of the form that any leases should be notified to Ofcom if they involve more than 20% of the frequency or geographic range of the licence.

Should a time limit be used it should be at least 7 years and Ofcom should clarify what time period should be used cases for contracts with lease breaks. For comparison, our understanding is that property leases need only be registered for periods longer than 7 years.

**Question 5d:** Do you agree with our proposal (i) for longer leases to be subject to similar procedural requirements as licence transfers and (ii) to allow partial leasing but not sub-leasing?

(i) We do not agree that longer lease should have similar procedural requirements transfers as it is mixing two very different activities, namely trading with band management

(ii) We agree that sub-leases should not be allowed
**Question 5e:** Do you agree that spectrum leasing should be available for all tradable licence classes? If not, which should be omitted and why?

Spectrum leasing should at least be available for all licences that could be used for band management.

**Question 6:** What capital and operational costs would automated trading impose on band managers and their customers? Do you agree with our assessment that automated trading would be second-best to leasing but would provide a workable alternative?

While there are benefits in automation we do not feel that it would solve the key issue which is complexity of contract and burden on users wishing to gain access to spectrum through a band manager.

Hence we suggest that leasing is the preferred approach to facilitate a band manager providing access to its spectrum to its customers.

The cost of introducing automation into our spectrum management software would depend upon the complexity of the task. However if it was a standard web based service then we can foresee no major obstacles.

**Question 7a:** Are there other options we should consider?

We have no suggestion for additional options.

**Question 7b:** Do you have further evidence on the benefits, costs or risks of the options?

We would be prepared to discuss with Ofcom in more detail some of the contractual difficulties in using spectrum trading mechanisms including TWLI to undertake band management.

**Question 7c:** Do you agree with the conclusions of this impact assessment, in particular on the preferred options?

In section 7.17 it states that "present trading procedures may be overly burdensome" with respect to band managers. We suggest that there is no doubt: they are overly burdensome.

The analysis of costs with respect to the band manager with PMSE obligations does not look at the impact on demand of forcing all customers to understand complex contracts involving spectrum trading regulations - an unnecessary complexity compared to spectrum leases.
Similarly under option 2 and 3 we feel that to use spectrum trades as a mechanism to provide access to a band manager’s spectrum introduces significant burdens.

Under Option 4: spectrum leasing is described as a new form of spectrum trading: again it is suggested that the activity of a band manager is different from that of a spectrum trader.

This section does not include the main benefit of spectrum leasing, which is the reduction in complexity of contract and hence administrative burden.

There are also significant costs involved in the requirement to register all leases over 24 months, particularly for services where there are significant equipment capital costs that are likely to require operation over a 5 – 10 year period to give the required ROI.

For these types of applications the result of this rule would be that most assignments made by a band manager would have to be recorded to Ofcom, which would represent an unnecessary overhead. There could also be confidentiality issues involved for both the band manager and the end client if the details of all such links were to be published.

This is particularly the case in those band providing Business Radio and Fixed Service systems, and we strongly recommend that Ofcom does not introduce a 24 month threshold for registration of leases.

Under Option 5, section 7.58, we do not agree that the qualitative and quantitative benefits of option 5 are the same as option 4 due to the complexity of contracts and hence administrative burden involved.