The Response of Motorola Ltd.

to the

Consultation on the Spectrum Framework Review: the Public Sector

Motorola is grateful for the opportunity to contribute to the consultation on extending market mechanisms to improve how spectrum is managed and used.

The current Spectrum Framework Review for the Public Sector is strategically crucial and has direct relevance to topics such as Next Generation Access Networks (NGANs) and has implications on the uses of the digital dividend and a variety of bands current under examination by Ofcom. In consequence of the amount of spectrum involved and the consequential improvement in the value and/or importance of the services carried, the deployment of whatever spectrum resource that can be released without prejudicing the effectiveness of National Security is likely to be directly beneficial to economic growth and societal benefit.

Motorola remains conscious of the need to balance the needs of the Government holders and the opportunity the spectrum represents were it to be transferred to other applications.

The complexities and restrictions that might exist in relation to bands that are to be shared (as opposed to being outright transferred) are such as to provoke a much more cautious approach when estimating the value that can be derived from such bands. In the UK we already have experience of residual rights affecting the level of deployment of schemes in a band in the 5.725 to 5.850GHz band. This band has, until recently had DFS[1] mandated. The use of the band in the UK has been limited despite there being long established and very attractively priced equipment for the band and which have been relatively successful in other countries.   This DFS requirement is still applied to the main RLAN band of 5.4 to 5.725GHz. Again, the uptake is at best modest. Moreover, in this band the requirements of DFS are continuously under review with a view to making them ever-tighter. Most recently, the meteorological radar community have started to seek a major tightening of the restrictions applied to the whole band across the entire geography to cater for a wider variety of radars located in part of the band and which operate in certain locations. Such a restriction on the use of the band of course significantly limits the use to which the band can be put and so the value that can be derived from it. The overall effect is that the goal of using the band to derive greater value is lost and the missed opportunity cost (which is already considerable and set to grow still further) could be factored into fees charged to the Government holder under AIP.

An absolute transfer of spectrum of course does not suffer this problem. However, that implies clearing the band. This last point provides the opportunity to use hybrid solutions where government users of a band might in certain circumstances (and where

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[1] DFS - Dynamic frequency Selection. A system whereby commercial broadband equipment continuously tests for the presence of certain signals that are indicative of the presence of military radars. In the event that the unit detects such a signal, it tunes to an alternative channel if there is one. If there is no such channel available, it turns off for 30 minutes thus effectively removing the possibility of commercial investment in the band in a competitive environment.

appropriate) be encouraged to re-organise their spectrum use to occupy less of the band, thus clearing the remainder for other uses. This would be Motorola's preferred approach for any band that is to be shared.

The Band 406.1 to 430MHz
The band is especially important for mobile applications due to the propagation characteristics allowing in-building penetration and wide area coverage. These are important to emergency service users who typically rely on exactly these characteristics in all their operations as, unlike public networks, they are dependent on having excellent geographical coverage whereas a public operator, quite rightly, seeks to maximise their economic benefit and so is primarily concerned with coverage by population.

The Bands between 2.7 and 3.6GHz
These bands are prime candidates for Broadband Wireless Access systems on a technology neutral basis. These are expected to play a very important role in the deployment of high data rate access connectivity and thus will be a significant factor in the deployment of Next Generation Access services.

Due to the nature of the services contemplated and possible architectural changes in the systems delivering the solutions, a high re-use characteristic may prove very useful to carry much more data in total and so the reduced range due to the somewhat elevated frequency may be beneficial rather than a problem. The traditional wide area coverage model of course is potentially problematic for broadband systems. A smaller "locality" approach that provides connectivity over a more restricted area may be best. Whilst this implies a lot more infrastructure, the services that can be delivered are much higher value and so attract higher ARPUs.

Key Points

1. The weighting of spectrum in accordance with an equivalence formula whereby 1MHz bandwidth at a frequency of 100MHz is deemed to be as useful as 10MHz at 1GHz is, we believe, fundamentally flawed and misleading. A bandwidth of 1MHz cannot deliver a HDTV channel whereas a bandwidth of 10MHz can. Additionally, high frequency propagation effects resulting in a fast drop-off with range or due to walls etc. may prove helpful. This means that bandwidth at higher frequencies could prove much more valuable than bandwidth at lower frequencies in certain situations. In turn, this could lead to a re-appraisal of the long-standing perception of the relative value of spectrum above 1GHz compared to that below as the usage paradigm changes.

2. Outright transfers of spectrum are much to be preferred over sharing arrangements as the residual rights may be such as to preclude the effective use of the spectrum rights made available. We prefer an approach of "band re-organisation" to create spectrum sub-blocks in-band ensuring that users have maximum access to the spectrum resources. This may prove vastly superior to any detect and avoid scheme covering the whole band and geography.

3. Some of the bands under discussion offer the opportunity of International harmonization for some market segments. This provides the opportunity to pass to the end user some benefits from the economies of scale which may be significant. An example of potential economic benefit gained through the economies of scale is in relation to the spectrum around 3GHz which is the subject of international harmonization for broadband access which could alleviate some NGA concerns currently under consultation. Next Generation Access discusses services requiring data rates around 20MB/s to the home. This cannot be delivered using wide-area 1MHz bandwidth low-frequency schemes. On the other hand, an example of potential societal benefit could be taken from the band 4.4 to 5.0GHz which includes the range 4.94 to 4.99GHz. Were this to be allocated to broadband services for public safety uses, there would be significant cost savings due to the fact that it aligns with the USA public safety band.

4. The future is expected to see a much higher utilization of the spectrum in general. The setting of a Spectrum Quality Benchmark which is proposed to be taken as a defined limit below which the quality may not go is potentially fraught with difficulty were such a benchmark to be set incorrectly or even without due regard to the potential increases in the utilization of the spectrum. Certainly, benchmarks set in conditions where the spectrum is almost unused (say) would be unsustainable in the future.

5. Taking on the responsibility of assessing whether to permit a trade in the light of impairment of safety appears problematic. It implies that Ofcom undertake to know more about the safety issues associated with operations that the entities directly concerned. This appears to be placing Ofcom in a precarious position.

Detailed Questions

Question 1: do you agree with Ofcom's proposed overall approach to improving the management of public sector spectrum holdings and, in particular, with Ofcom's conclusion that it will generally be preferable for public sector bodies to interact directly with the market?

Motorola agrees with many of the conclusions in the document and encourages this work to continue.

We note that the approach of direct trading with a view to financial benefit for the current incumbents may make re-allocation of spectrum to better uses of a societal nature unlikely. This could prove disadvantageous in the longer term. Nevertheless, mechanisms to promote the review of Government-held spectrum to determine the actual need in any particular band and the subsequent release of spectrum to other uses to the benefit of the country are strongly supported.

We recommend that as part of the proposed review an assessment be made to permit the re-organisation of a band under examination to permit a portion of the band be outright transferred as a first priority, leaving the incumbent with full access to the remainder, rather than undertake discussions on sharing of the whole band. This is because arrangement for sharing may entail retained rights which can significantly undermine the usefulness of the band leading to a failure of the objective of reducing the fees charged under AIP to the incumbent in relation to the whole band. An example of a retained right is the assurance of prime occupancy using Detect and Avoid mechanisms mandated for the whole band. These D&A mechanisms are incompatible with broadband service being delivered to significant numbers of customers in a competitive environment.

This partitioning of the spectrum is expected to be most efficacious when considered in the frequency domain. Partitioning in the time domain may be possible but little real application is currently apparent.

We do not agree with placing relative measures on usefulness in relation to the frequency of the band. A 1MHz bandwidth at 100MHz is not necessarily as useful as a 10MHz bandwidth at 1GHz, much less a 50MHz bandwidth at 5GHz.

Question 2: what factors do you consider Ofcom should take into account in determining the programme of reform in the framework for managing public sector spectrum holdings?

Motorola is confident that Ofcom is fully aware of many factors that could be discussed in response tot his question. However, we take this opportunity to list two particular points which we would seek to elevate the importance of

1. **The band around 3GHz is under discussion internationally in relation to Broadband Wireless Access. This is about to become very important to the UK in the form of the supplementary service connections as we develop Next Generation Access Networks. This band may have a very significant role**

because it could supply connection for early adopters in areas where fibre/cable infrastructure may not be available for months or even years.

2. **The band 406.1 to 430MHz may provide a very important resource to alleviate serious congestion in some areas for public safety communications systems.**

Question 3: do you consider that the proposals should be phased in?

Yes, on a band by band basis with reviews conducted to define which parts of the band can be outright transferred and thus which parts are to be retained by the incumbent.

The details of the arrangements to permit sharing are likely to be extremely complex (if inefficiency is to be kept within tolerable limits) and will lead to serious delays.

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Question 4: do you agree with Ofcom's proposals about the frequency bands that offer the greatest potential benefits from band sharing? Are there other frequency bands where the facility to trade or lease spectrum from public sector bodies would be particularly attractive?

Band sharing with significant retained rights may be inefficient. Deriving benefit from the rights transferred could be extremely difficult and so unattractive. It would be misguided to offer a band under conditions of difficult retained rights, have very little interest in the band expressed and then conclude that there was no market demand and so the offered spectrum resource was not needed.

Question 5: do you agree with Ofcom's proposed approach to awarding public sector licences and RSA?

Motorola has no comment on the general principle. However, we note there may be interest in having a band manager approach for some or all of the offered bands. We request further clarification in due course of how this would be accomplished.

In this regard we would stress that some of the spectrum under consideration is likely to provide better overall benefit were it to be used for societal benefits such as improvements in communications facilities for the emergency services rather than be devoted to more commercial networks. We believe this to be an important consideration in the formulation of any spectrum manager approach for the management of at least some of these bands.

Question 6: should public sector spectrum trading be introduced at this stage in the Channel Islands and Isle of Man?

No comment.

Question 7: should there be additional grounds, eg safety-related, for Ofcom to refuse consent to a proposed trade in certain frequency bands or for certain applications?

No.

As noted above, undertaking a duty to assess the safety aspects of a trade implies that Ofcom needs to be more familiar with the safety aspects of a trade than the entities proposing the trade. In addition, who would be responsible in the event that the decision turned out to be erroneous?