



SUBJECT: MOTOROLA RESPONSE TO UK CONSULTATION ON LICENCE EXEMPT SPECTRUM

Motorola is pleased to have the opportunity to respond to the consultation on the use of licence-exempt spectrum for provision of public telecommunication services.

In addressing our comments we have some general points to raise as well as answering the specific questions.

General Points

We note that three possible scenarios are listed. These are portrayed in table 1 below.

Scenario 1

This scenario seems to foresee that new public services can be given a licence providing there is minimal impact on an existing one.

This seems extremely problematical in practice. Two situations could be forecast.

1. Disruption to existing users

In the event that the use of this spectrum provides benefit to a large number of people (which is very much to be hoped – see below), the introduction of a licensed public service could easily be disrupted by the existing services which may be ad-hoc. In this case how would the regulations be applied and what could be done about it? What would be the advantage of having a licence?

2. How many operators?

If the spectrum was in fact lightly used but slowly and continuously increasing. A public service can be licenced, how would the decision be made as to when to stop issuing licences for fear of future congestion?

Motorola is unsure how this scenario would either help the development of the use of radio or actually provide a basis for the management of the spectrum as would be

	Scenario 1	Scenario 2	Scenario 3
Specific Technology	Listed in SI	Subject to Interface Regulation	Subject to Interface Regulation
Public Services – Need for WT Act Licence	Needed – depends whether minimal impact on existing services	Not needed	Not needed
Private Use	Permitted if technology is listed in SI	Subject to Interface Regulation	Subject to Interface Regulation
Limited Applications	Implicit in technology limitation	Different limits for public and private use	No limit
Base Station Registration	Public service only	Presumed to be needed for public service	Public service only

Table 1 – Scenario Comparison

required if licences were issued. Conversely, the uncertainty whether another public operator being allowed into the band would cause an adverse impact on the incumbents might lead to situations in which some operators were disadvantaged over others with little hard evidence to support the decision.

In addition to this there is the difficulty of the right of the public user (having a WT-Act licence) to some degree of protection even though they are operating on spectrum that is licence-exempt for other users.

Scenario 2

The public services being exempt from the need to gain a licence removes any question of rights to protection and thus the service must operate on a non-protected basis. Basing the spectrum regulation on an interface requirement removes the direct dependence on a named technology which allows future upgrades. Furthermore, the applications to which the equipment is put is similarly freed up.

However, the lack of the licence may not remove the need for base station registration. The results of the Stewart report may apply to this new public telecom service for example.

The effect of the difference in limits on the allowed applications between the public and private is difficult to judge until the extent of these differences becomes known. Taking the example in the consultation whereby public services would be limited to indoor applications, would this exclude public places like cafes where some tables are inside and some outside? Situations like this could be difficult to define and police later on.

Were a limitation like the public service could only be accessed from indoors, we would expect that to have quite a significant effect on the usefulness of the public service to the users. It can be assumed that many users will want equipment that connects to the source of the content they want through their own private system at home or in the office otherwise, when traveling, they will want the ability to use it anywhere. If this is not possible, the public service may be difficult to justify to the customer. Certainly, there may be some implications on equipment design that could **introduce significant supply chain complexity in the efforts to ensure the users get the appropriate equipment**. So public users would get equipment that has its use limited to specific bands and power levels whereas private equipment can be used anywhere. We would be grateful for details on how this would be policed in an environment where it might be expected that users will move between public and private use.

Taking the 5GHz band, would such a limitation effectively mean that the public service is limited to the 5 channels in Band A?

Scenario 3

This is the simplest scenario to envisage. It is also the regulatory scenario that provides the greatest user access to the equipment through normal distribution channels as there are no limitations on applications etc.

In this case the service provided is limited only by the commercial model and at some stage in the future possibly by congestion if the service is a great success. As noted in the consultation, it could well be that this point is never really reached as the user density will tend to self-limit.

Motorola supports the adoption of scenario 3

Response to Section 6.2

In response to the request in the consultation in section 6.2 Motorola provides the information in table 2. The following explanations of the conclusions are offered.

Overall Economic Benefit

It is generally accepted that the greatest economic benefit to the Nation occurs with the largest number of users. The recent RA Study (Feb 2001) confirms this.

The experience with GSM of the uptake of the use of radio technologies as tools and convenience aids shows that user access is critical. Other technologies (even those that are free to air) have not shown similar uptake when licensing delays and difficulties are introduced.

Therefore the greatest benefit to the Nation is achieved when the most open regulatory regime is provided. This is scenario 3.

Interference to Existing Users

Motorola assumes that irrespective of the scenario chosen, there will be spectrum regulation applied. At present, the technology allowed in the band is specified in the Statutory Instrument. The other scenarios provide that the traditional interference issues will be resolved through Interface Regulations.

In respect to the interference with other users of the same band it is important to be assured that the service likely to provide the greatest economic benefit is not impeded through excessive regard to existing users who may not be able to provide service to the same number due to choice of technology or business model. For example, concerns over interference to satellite services in sub-band A of the 5GHz band from the RLAN technologies are justified. However, as the satellite services cannot service as large a number of users and also may not provide the range of services the users can benefit from, it is not in the interests of the Nation to restrict the RLAN based services in favour of these technologies in licence exempt spectrum.

Technologies exist that limit the interference through access control algorithms. This provides an instantaneous and dynamic means of ensuring the interference issues are kept under control. For example, Dynamic Frequency Selection (DFS) prevents units from attempting access to channels that are already in use. This provides much better actual interference limitation than any regulation-based scheme could ever hope to achieve. At present, not all proposed bands have requirements for interference mitigation technologies. The 2.4GHz band has no such requirement. Furthermore, there are a

number of different technologies already in the band that might occasionally interfere. It is not clear to what extent this will actually cause a problem and thus it is not proposed that this be considered sufficient reason to exclude the 2.4GHz band from the arrangements of Scenario 3.

Congestion in Licence Exempt Spectrum

It is to be hoped that the spectrum will be very heavily used. This is because the greatest economic benefit is achieved through use. Heavy use is therefore to be expected and not at all to be prevented through regulation. The design of the access control scheme employed is therefore crucial to ensure that heavy use does not translate to destructive congestion. The internet has shown one way of providing for very heavy use for applications that are not time-critical.

Non-broadcast services that are time-critical are much more difficult to keep congestion free. Real-time video may require the entire resources of channels even for ostensibly high data rate transmission systems. Efforts are in progress to look into this further.

Licence exempt spectrum is not considered appropriate for safety critical services of any kind. Equally, priority users on licence exempt spectrum appear to give rise to difficulties to the remainder of the user population while at the same time not necessarily providing the assurance these users may require.

It would appear that scenario 1 will severely limit the number of users of licence-exempt spectrum. At present, the technologies specified do not all have to implement any form of DFS. Thus even with the much lower uptake there is no guarantee of congestion avoidance.

Our conclusion is that which scenario is chosen is irrelevant to congestion. What is more important is that the correct mitigation techniques are deployed. This includes existing users also.

Types of Third-Party Services

Motorola is of the opinion that no limits should be set.

Quality of Service

In consideration of the fact that services will be established for users with no guarantee of the conditions some time later and that there is also no reason to prevent existing users from upgrading their equipment to provide better service, it seems unreasonable to predict the quality of service that will be provided.

We therefore propose that no regulated limit be placed on quality of service. Instead, users should be free to move to better services in the normal manner under market forces.

Implications of Competition with Operators on Licenced Spectrum

As a manufacturer we make no comment.

Timescales for the Introduction of Policy

The UK Broadband Britain policy will be greatly helped by the introduction of high capability, cost-effective solutions such as are possible with these radio applications. At the same time it is clear that the UK is effectively in a race against other Nations to have the benefits of broadband. **We therefore assume that the intention is to introduce Scenario 3 as soon as can be achieved. We strongly support this.**

Table 2 Summary of the above comments.

	Scenario 1	Scenario 2	Scenario 3
Economic benefit	Limited	Good	Best
Interference	No clear advantages and many problems	No clear advantages to the economic benefit	Risk limited by users.
Congestion	No change		
Third-Party	No clear advantages	Limited by location.	Any service permitted
QoS	Not applicable	No Limits	No Limits
Competition	No comment	No comment	No comment
Timescales :-			
446MHz	In place	Remove technology limit	Remove technology limit
2010-2025MHz	TBD	TBD	TBD
2.4GHz	This scenario is not suitable	Location limits could be very difficult	Preferred solution
5GHz	This scenario is not suitable	Location limits could be very difficult	Preferred solution

Responses to Specific Questions

Q1: What are the potential gains and benefits to the UK of allowing commercial services in licence-exempt bands, in terms of new innovative services (business models), promoting competition, and making Britain the best place to do e-business?

It is difficult to answer this question. The advantages of broadband Britain are thought to be well known and accepted. Allowing commercial services are thought to enhance these objectives.

Q2: Will the introduction of public telecommunication services into existing licence-exempt frequency bands, within the conditions of use identified in Appendix B, result in unacceptable levels of interference to existing users, and if so, in what geographic locations might this be expected?

It is to be hoped that the benefit derived from the use of the spectrum will rise substantially with the increase of the number of users that the spectrum will support. The number of users will dictate any possible interference issues. Whether the users are public or private does not seem to affect this argument.

Q3: Would the introduction of public telecommunication services, into existing licence -exempt allocations, and within the current conditions of use identified in Appendix B, result in congestion of the frequency bands?

If the spectrum becomes heavily used (as we hope it will be), it does not matter whether the users are on public or private schemes.

If however, the belief were to be that not introducing public telecommunication services into the band would cause the spectrum to remain lightly used this would be a misuse of the spectrum, not in accordance with maximising the greatest economic benefit to the Nation and not helping the Broadband Britain initiative.

Q4: In bands where channel access techniques have been identified for specific services, will these techniques be sufficient to avoid future congestion? If not, please give information about other techniques that might be applicable.

These techniques greatly improve the likelihood of avoiding congestion. It is not possible to give a guarantee that congestion will be avoided forever into the future.

Q5: What type of public telecommunication services could be offered in licence-exempt spectrum and what is the anticipated market potential?

Any services. There should be no limit.

Q6: Assuming that there would be a lower quality of service available from public telecommunication services using licence-exempt spectrum, compared to those using licensed spectrum, how could potential end users be informed of this?

Several mechanisms exist to advise users of various limitations on products. No difference is seen in this case.

Q7: Which, if any, frequency bands identified in Appendix B are not suitable for the introduction of public telecommunication services and why?

It is important to examine the bands on a case-by-case basis in conjunction with the plans of the operator before concluding on this point. As a manufacturer we cannot comment on the plans of individual operators.

We would make the general comment that bands having a small amount of spectrum could be difficult for public service operators to successfully deploy advantageous services in. For example, PMR446, having neither a lot of spectrum nor allowing infrastructure would appear to present difficulties. Whereas, were a railway operator (say) to request that a public telecommunications operator provide the applications in the band listed as 2-30MHz (SRD) it is not clear why this should not proceed.

Q8: Are there any potential problems associated with allowing commercial services in licence-exempt spectrum?

It is Motorola's belief that the recent advances in technology will provide services of good quality in even heavily used bands to large numbers of people. This is expected to provide a much-needed impetus to the Broadband Britain initiative and is clearly in line with the maximising of the economic benefit to the Nation. However, it also means that the huge fees in the recent 3G auction are much less easy to justify from a business standpoint.

Q9: Assuming that public telecommunication services are permitted in licence-exempt spectrum, what would be considered suitable time scales for making these changes in each of the bands identified in Appendix B?

We assume it will take around one year to achieve the changes necessary were it to be started immediately. This appears to be a suitable timescale.

**Motorola Ltd.
January 2002.**

Questions on this should be directed to Tim Cull in the first instance

