

ROAM

A response to the RA consultation:

“Use of the 1781.7-1785.0 / 1876.7-1880.0 MHz Bands for the Provision of GSM 1800 Telecommunications”[4]

July 2003, Julian Priest , Informal

Introduction

This response has been compiled by Julian Priest of Informal [1] with input from a number of UK community wireless groups[2, 3], commentators from Denmark [12] and the US, as well as network operators and hardware vendors. While the response is made from the point of view of the community wireless network groups the views expressed here are those of the author.

Informal is a UK based non-profit research and implementation group focusing on social impacts of technology. The author Julian Priest has been involved with community wireless networks for 7 years and was co-founder of consume.net[2], Europe's first community wireless network group. He has participated in previous spectrum consultation processes and other regulatory processes.

Broadly the response is in support of the proposal [4] to make license-exempt the two bands 1781.7 to 1785.0 MHz and 1876.7 to 1880.0 Mhz.

A definitive online version of this response can be found at <http://www.informal.org.uk/roam/response.html>

Question 1

Given the other potential uses outlined in this document, do you consider it most appropriate to make the spectrum available for wide-area public use?

No.

Two of the stated aims of the new regulator Ofcom as laid out in the communications bill are:

"1.(a) to further the interests of consumers in relevant markets, where appropriate by promoting competition;" [5]

"1.(b) to secure the optimal use for wireless telegraphy of the electromagnetic spectrum;"

There are two options presented in the consultation document [4], namely 3.4 to award the spectrum to one of the incumbent operators or 3.5 encourage the implementation of a stand-alone wide-area macro-cellular network.

Neither of these options either promotes consumer interests and competition or optimal use of electromagnetic spectrum.

It is suggested that the first option would give financial benefits for existing operators in regions of high demand for their services where the extra spectrum could be used to avoid increasing the number of cells.

The potential benefits are likely to be small. The new bands would provide only a marginal 5%

increase in spectrum available per cell especially if it is shared between the four network operators. The strategy would be therefore suitable only in the limited number of cases where a sub 5% increase in capacity would suffice to ease congestion.

This approach does not promote efficient use of the spectrum as the frequency band is allocated nationally so that a local difficulty might be avoided in a limited number of situations.

Further by awarding the spectrum to the incumbents no new actor is introduced into the market and hence no further competition or development of other strategies in the GSM sector would be encouraged.

The second option to establish one or more new national or regional operators would introduce a little competition into the market, however it is unlikely that a new entrant would be successful in competing with the incumbents.

The existing operators are entrenched and have had many years of revenue with which to develop and pay for the installation costs of their networks. This would make the position of a potential new entrant into the market weak.

In addition to costs of spectrum acquisition and telecoms legislation compliance, a new entrant would face an expensive roll out, difficulties in locating suitable masts and would be making a large investment into a technology that is already technically superseded.

Furthermore using the band for a wide area macro-cellular style network is only just technically feasible and the resulting network would not perform well in congested urban areas or be able to approach the performance of the existing networks, whilst having a similar cost base, at a later stage in the market's evolution.

Given the current state of telecoms investment it is unlikely that a viable competitor to the existing networks could emerge as an alternative market actor to the incumbents, under these circumstances.

Allocating the bands for wide area use to a single or small number of operators, either existing or new is unlikely to be practicable. It is suggested that the bands be allocated in a way that allow for the existence of many small local network operators.

Question 2

If your answer to question 1 is yes, do you consider it most appropriate for the spectrum to be used to supplement the spectrum of the existing GSM operators, or to be made available for potential new GSM operators on a regional or national basis?

N/A

Question 3

If your answers to questions 1 and 2 are yes, do you consider it most appropriate for the spectrum to be awarded via an auction process?

N/A

Question 4

Given the other potential uses outlined in this document, do you consider it most appropriate to make the spectrum available for short-range, low-power GSM use on a licence-exempt basis?

Yes.

Short-range low power GSM use on a license-exempt basis would promote both the efficient

use of spectrum, the consumers interest and competition.

License exemption would allow the entry into the market of a great number of niche operators each with a local network requirement. In the context of simple regulatory compliance, zero spectrum cost and capital costs directly related to network needs, the conditions for a flourishing industry could be created.

The examples given in the consultation document focus on indoor usages. While these are valuable uses it is important that no distinction be made between indoor and outdoor use. The distinction is hard to make in practice due to the variable absorption characteristics of materials or legally due to grey areas or enclosure such as atria and carports.

Furthermore such a distinction would restrict urban community uptake and usage in campuses and rural areas.

Power restrictions as proposed are a simple and effective way of limiting cell size and interference as has been demonstrated with the 802.11b EIRP requirements.

In general a more efficient way to allocate spectrum is to have variable power and co-operative networking protocol which adjusts cell size in congested areas, whilst handing traffic off to neighbour networks.

If this cheaply implementable within the GSM framework it could provide another regulatory approach that would result in more efficient and flexible spectrum use than a simple power restriction.

Question 5

If your answer to question 4 is yes, what kinds of application do you anticipate will develop? Estimates of potential market size and anticipated penetration would also be useful.

It is likely that community or local GSM services would develop. Over the last years there has been a rapid uptake of 802.11 technology and self provision of wireless data networks in the license exempt 2.4 Ghz band. This has led to an enormous installed user base of wireless network nodes, both within the community networking movement and within SME's which share many of the same concerns. The growth of this style of networking has been impressive and continues.

In addition these types of network have appeared where there is need, including in 'areas of market failure' or regions where telecoms operators are unable or unwilling to provide network access such as much of rural Britain [6].

The ability to self provide in these situations has proved a powerful alternative to having Universal Service Obligation legislation for broadband. It is noted that rural groups unsuccessfully called for inclusion of mobile telephony in the USO in the September 2000 consultation [7] as a core service in rural areas. It is suggested that support for this license exemption proposal would offer an alternative strategy for meeting that need.

The existing community wireless networks are typically connected to high speed Internet back haul, have access to roofs or suitable high points and serve existing user communities with network services.

A likely service then is the addition of a GSM network interface to existing community wireless networks. When within range of a community GSM network that network could be used in preference to the existing wide area GSM networks. Network traffic would be back hauled over Internet using VOIP and calls would terminate at a third party VOIP to PSTN gateway.

GSM back end services such as HLR, SMSE and MSC are expensive to install and operate and are probably out of range of individual community network operators. These services could be set up nationally or regionally as third party services and accessed remotely over the

network. In this way the GSM infrastructure costs could be shared, allowing for the economically feasible creation of many pico-cells.

The addition of GSM capabilities to community network nodes would be of great benefit to the network users as it would provide a convenient voice interface to their networks using existing GSM handsets. Many of these networks currently have non-profit or flat rate cost structures for participation to cover back haul and equipment costs, so there would be a considerable cost saving over existing GSM access to encourage the uptake of such a system.

Potential users of such a system could include, community networks, SME's, public bodies such as councils (Anglesey and Westminster are for instance rolling out 802.11 networks currently), campuses, and public spaces. Additionally as has been seen with 802.11 hotspot provision, owners of public places often use free network access as a way of attracting custom. A simple open GSM access network could prove a valuable differentiator to a bar or supermarket for instance.

The size of this potential market is most dependent on the cost and availability of suitable equipment. Luckily GSM is a mature technology, though available solutions have in the past been geared towards carrier solutions rather than individual ownership.

The way that the GSM spectrum has been regulated in the past has favoured a small number of large companies who are the market for GSM hardware developers. This has meant that the solutions developed have tended to be large and expensive. It is reportedly possible to build a cheap GSM micro cell for around GBP 350,000 [8] but this is out of reach of community networkers or other self providers.

There are however pico-cell offerings from companies such as Ipaccess [9] who provide base stations for around GBP 2000. While such systems require back end systems to operate, the interface cost is comparable to the costs of 802.11 equipment in 1996 when we created our first community WLAN.

There are already products such as those from Radio Frame Networks [10] which provide converged 802.11 GSM nodes, which are currently targeted at mobile operators wishing to create hotspots but which could equally serve community networkers or SME's.

Assuming that shared back end systems could be developed, and that costs would fall with an expanded market, it is likely that the market size for community GSM could become a mass market around the same size as the community 802.11b market.

A license exempt spectrum for GSM has the potential to stimulate the development of new products, and as GSM technology is already widely deployed the fact that this band would only be license-exempt in one national jurisdiction is unlikely to be a hindrance.

Question 6

If your answer to question 4 is yes, should the use of this spectrum for the provision of public services be allowed?

No.

The term public services here refers to the by way of business restriction historically present in license-exempt spectrum. This was recently lifted for specific equipment in 2.4 Ghz, so it is worth examining the similarities between the bands.

As we found when creating wireless community networks we were able to operate publicly accessible though non-commercial networks under the self provision rules and within the by way of business exclusion.

The effect of this was that during the years that the restriction was in place there was a valuable breathing space free from commercial competition in which to create our community networks. During the by way of business consultation process I argued for the removal of the

clause on the grounds that the community network strategy could happily co-exist with commercial networks, although this argument was not supported by all community networkers.

The creation of a license-exempt regulatory framework would create a very different network ownership distribution pattern from the national one that currently exists in GSM bands. Rather than having four national operators with co-existing spectrum, the creation of a very large number of local network each using the same spectrum would be enabled.

In the current GSM bands the 4 network operators that form the market for mobile telephony each compete for customers. In a narrow band commercial license-exempt world competition between networks would be encouraged. This is neither practical or desirable. Rather efficient use of spectrum would be promoted through co-operation between network neighbours or network sharing.

In the current situation in the UK it is not necessary to roam between networks as competing GSM networks have similar coverage. Indeed it is often not possible to do so within the UK. In a publicly accessible license-exempt GSM environment, roaming between networks would be important, either between the self provided access networks and someone else's similar network or the existing wide area GSM networks.

Open Roaming could provide a mechanism for network sharing in the GSM access network.

Current GSM network sharing as governed by roaming agreements between networks results in very high call charges as anyone who has faced a post holiday or international business trip mobile bill will tell.

These high charges do not reflect actual costs but can be levied by local network operators because the service (telephony) is tied to the access network which means that any tariff can be charged.

A by way of business restricted license-exempt framework would separated services from the access network which would result in affordable roaming.

Services running over the network such as telephony could on the other hand be operated by way of business and the open access network would encourage a viable and competitive market for services in which competition would be appropriate.

One might say that competition is an appropriate means of promoting consumer interest in services whereas cooperation is an appropriate means of promoting consumer interests in access networks [5].

Question 7

If your answer to question 6 is yes, specifically what kinds of public-service offerings do you anticipate will develop? Estimates of potential market size and anticipated penetration would also be useful.

N/A

Question 8

Do you consider it prudent not to release the spectrum at this stage but to keep it unassigned, thus assisting future migration to 3G and facilitating T&D work?

No.

3G operators have other spectrum available to them and the structural economic difficulties that they face have slowed the system roll out. It is not prudent to penalise GSM users where there is manifest demand at the expense of 3G users where there is an uncertain demand.

One of the concerns expressed was that dealing with a large number of network operators would be onerous in facilitating spectrum migration. This could be alleviated by the use of node databases for network registration. It is already a requirement of GSM operators that they register the sites of their masts with the RA siterfinder service [11] and there is an existing database of GSM sites. This could easily be extended to act as a contact database for license-exempt GSM users.

Question 9

Do you consider it necessary to limit future use of the spectrum for a set period, to ensure that future migration to 3G is not hindered?

No.

Such a limitation would be a strong disincentive for those wishing to deploy new GSM networks in the bands.

Question 10

If your answer to question 9 is yes, what period do you consider is appropriate?

N/A

Question 11

Is it desirable and practical to make the spectrum available in a technology-neutral way, either for wide-area public use or for short-range, low-power, licence-exempt use?

In general technology neutrality in spectrum licensing fosters novel design approaches and innovation. However in this case much of the value of the spectrum currently accrues from its proximity to the current GSM bands and interoperability with that equipment, so the desire to stimulate technological innovation must be balanced against possible degrading of the opportunity to reliably provision GSM in the spectrum.

Notes

[1] Informal - <http://www.informal.org.uk> <julian at informal dot org dot uk>

[2] Consume - <http://www.consume.net>

[3] Free2Air - <http://www.free2air.net>

[4] Consultation Document - <http://www.radio.gov.uk/topics/pmc/consult/gsm1800/index.htm>

[5] Communications Bill - <http://www.parliament.the-stationery-office.co.uk/pa/cm200203/cmbills/055/03055.1-6.html#j3011>

[6] Access to Broadband Campaign - <http://www.abcampaign.org.uk/>

[7] Oftel Universal Service Obligation consultation - <http://www.oftel.gov.uk/publications/consumer/uso0801.htm>

"4.7 Operators and most other respondents considered that there was no need to extend the obligation to mobile services. However, some consumer groups, mainly representing rural areas, argued for the inclusion of mobile in the obligation to ensure that the service was available in these areas."

[8] Interwave - <http://www.iwv.com>

[9] Ip access - <http://www.ipaccess.com>

[10] Radio Frame Networks - <http://www.radioframenetworks.com/products/>

[11] RA GSM sitefinder database - <http://www.sitefinder.radio.gov.uk/>

[12] WireLess – <http://wire.less.dk>