

## Cover sheet for response to an Ofcom consultation

### BASIC DETAILS

Consultation title: Mobile Coverage Enhancers and their use in licensed spectrum

To (Ofcom contact): Robindhra Mangtani

Name of respondent: S C Waldron ACA

Representing (self or organisation/s): Grange Hotels

Address (if not received by email): 58 Rochester Row, London SW1P 1JU

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Name S C Waldron ACA

Signed (if hard copy)

Robindhra Mangtani  
General Counsel  
Ofcom  
3rd Floor  
Riverside House  
2A Southwark Bridge Road  
London  
SE1 9HA

Dear Mr Mangtani

### **Mobile Coverage Enhancers and their use in licensed spectrum**

We note below comments on the relevant sections regarding the above consultation for your information and consideration. Grange Hotels is London's leading Independent hotel group with 16 properties in the Capital. As well as owning and operating them we also construct, refurbish and maintain all of them. We deal with most of the telecoms aspect of this for the group. We make this submission both on its behalf and the Hotel sector in general having discussed this issue often with many of my colleagues in this sector in the UK and internationally.

Hotels are very often the first place in which foreign visitors "experience" the United Kingdom and its infrastructure. We think it is important that first impressions of the UK and of its most important city should reflect the adequacy of its technological infrastructure in relation to mobile telephony and data services.

#### **1. Consumer demand**

Both as a company and in respect of our customers we are significant stakeholders with regard to the quality of mobile signal within our properties. Accommodation customers are heavy users of the spectrum for both voice and data over significant periods of time 24/7. Acceptable coverage is thus more necessary in this environment than some similar concentrations such as shopping malls and sports stadia where use is more casual and transitory.

Hotels have been grappling with coverage issues for a number of years now ever since the arrival of 2G. Ofcom rightly have highlighted the issue of modern building design on coverage with the use of concrete and steel frame buildings together with foil backed cladding and reflective windows. This problem was exacerbated by the arrival of 3G which operates at higher frequencies and therefore weakens building penetration - at the same time as trying to deliver an enhanced service.

The hotel sector, in London in particular, is used by many overseas businessmen and leisure visitors and therefore poor coverage significantly reflects on the status of the country and its services. That this is important and an issue is evidenced by LOCOG having to enhance coverage in many of its Hotel venues and indeed the Olympic Village itself during the 2012 Olympic Games.

This customer requirement is very significantly increased by conference delegates, many international, during the day which at larger properties can number in their hundreds as also can be the case at banqueting events in the evening. This demand is even more challenging as such areas and facilities are traditionally provided in the heart of properties e.g. Grosvenor House or in the lower levels as in Grange. This is also true of Pool and Spa areas generally in these properties.

We therefore require good spectrum coverage and channel availability covering all MNO operators. In the first instance we would have looked to leadership from Ofcom and

support from the MNO's in providing this. Unfortunately up to now the in building effort of the MNO' has been focussed in the single operator PICO cells for major customers by special projects departments, partly driven by the value of that account. As noted below this technology is inappropriate.

A multi operator open femtocell was developed some years ago, but unfortunately the technology was bought up by Vodafone stifling its availability and development in the marketplace.

It can be hardly surprising that in order to meet this demand Hotel operators have thus sought solutions from the repeater market notwithstanding Ofcom's stance on its legality, as have many others in markets abroad. The technology currently remains appropriate and relatively cost effective, but still retains some of the drawbacks discussed below.

## **2. Operation**

The approach of Ofcom and MNOs toward the use of a repeater solution and its appropriateness and indeed legality has been the subject of much discussion and some litigation. This hostility has had the effect of limiting the supply of suitable equipment and suitable installers. We deal below with the legal question. This has also left the quality of installation and operation unregulated and without suitable guidance for operators.

This has also had the effect of this additional demand, which is in our view a perfectly legitimate and legal use of the resource, being unmanaged and subject to surveys and any alleged interference from the carriers sparking action by Ofcom. We are of the opinion that, from our own experience, this is in reality the carriers using this trying to manage local aerial capacity and coverage issues by shutting down what they see, in Wi-Fi parlance, as a bandwidth hog.

Whilst the reduction of interference in operation is a legitimate aim for Ofcom, it would be a far more constructive and effective use of this resource to divert it away from enforcement and more toward working in partnership with suppliers and customers to ensure quality and effectiveness of enhancers in general. They are most certainly going to be a key plank in achieving the 98% indoor coverage requirement for carriers in any event.

In any liberalisation Licensing individual properties or apparatus should be avoided, perhaps as with gas using properly accredited installers to certify safe and secure installations of approved equipment and to maintain a database of them to manage capacity and any local capacity issues.

## **3. Technology evolution**

The provision of both voice and data services for MNO's on property provides challenges. It is helpful to separate the voice and data coverage in considering the technology.

- *Mobile Data.* This is the area of greatest demand growth demand on capacity. This has been anticipated by Ofcom and the carriers and the technology to search for and hand over to local Wi-Fi reception is well used and easy. The hospitality industry has adapted its Wi-Fi offering well providing customers good service and cost savings for BYOD for multiple devices on demand, more so than the office environment currently.

This however is not a panacea for mobile device data coverage issue on

property:-

- a) Many properties charge for the provision of enhanced services requiring a log-in principally to manage demand and service provision. Non resident and casual users for instance in the bars and Spa will require coverage.
- b) The many hundreds of visitors to events and conferences may not have access unless pre-arranged by the event organiser. Even then in house Wi-Fi can struggle with the number of connections and IP addresses thus MNO 3G/4G coverage is still desirable and indeed a specified requirement for many bookers who have already had issues elsewhere. This is often in lower levels of hotels where coverage from outside is often non-existent.
- *Mobile Voice*. There are continuing developments within hospitality which enable hotel guests to pair their device with the hotel Wi-Fi and with the relevant authority hook onto the hotel PBX and utilise landline capacity. This both improves capacity and the requirement for coverage in the accommodation levels. This would usually only be available to in-house guests with a credit line available but not visitors in those levels or indeed staff.

#### **4. Consumer utility and benefits**

##### *1. Deployment*

There is a strong case for the utility value of end-user deployed repeaters or similar technology compared to alternative approaches for enhancing mobile coverage:-

- a) *Speed of design*: hotel operators know their building and the requirements well, with their already extensive experience of Wi-Fi. Many have the spectrum survey technology or easy access to it. They also understand the challenges of provide multi- room coverage as opposed to the traditional technology which is designed for open plan areas. Using external technology providers will inevitably require detailed design and surveys for implementation and a steep learning curve.
- b) *Ease of deployment*: repeater equipment is relatively simple in its design and therefore the bulk of deployment can be achieved by in house resource or existing contractors using of course CE approved units. The quality of joints and splitting can cause issues and would have to be surveyed and snagged accordingly.
- c) *Efficient deployment*: an installation or upgrade can be staged alongside other works in stages minimising impact on a property which operates 24/7. This can also achieve efficient budgetary management as opposed to supplier imposed one off cost.
- d) *Faster evolution*: as new spectrum requirements or more efficient technology comes along an end user deployed installation will be more quickly upgraded as in contrast with waiting for an external contractor or MNO installation, who inevitably will have a lot of work and priorities.

##### *2. Cost*

As has been evidenced by the existing deployments Ofcom are already aware of (and indeed complain about in their presentation) where operators perceive a customer requirement, they have found the repeater technology affordable albeit still expensive (in the tens of thousands). The choice of alternatives up to now were extremely limited and unaffordable. Use of fibre technology always exceeds

six figures.

Obviously single Mobile Operator Pico or Femtocells are not appropriate in the hotel environment and their practicality in office deployments are also questionable. We are aware of a large Financial Services company who moved into a new office development and vent their frustration on the special projects section of a Mobile Operator who installed one and was unable to provide coverage for visiting customers, directors or contractors.

The newer solutions reviewed in 3. above inevitably will cost more. The only practical solution would be an MNO subsidy which inevitably will be uncertain. The current bulk and complexity of the multi-operator pico or femtocells installations are not easily scalable and would not be practical or proposed and subsidised for smaller properties notwithstanding the need. There is also some requirement for an easily deployed solution for temporary facilities e.g. site contractors offices, exhibitions, short term office lettings for which this is inappropriate.

### *3. Lack of alternatives*

Most solutions offered by Carriers often only give coverage for that carrier. Where there is a multi carrier requirement (as in hotels) at present only Vodafone can offer the technology as regards cells and invite other carriers to participate. It is bulky and not appropriate or cost effective for them or the operator at smaller locations

## **5. Impact on networks and other mobile users**

There are 3 potential impacts of repeater (or other technologies) on networks on internally deployed technologies.

- a) *Leakage outside the property*: this can capture users for which the installation was not designed. This impact is normally already minimised as the building design which often dictates the installation actually works in reverse keeping signal and interference in. This has certainly been the experience of Wi-Fi where hoteliers most certainly do not want to broadcast free Wi-Fi to the whole neighbourhood!
- b) *Signal interference*: this could arise from poor equipment or installation. The early generations of repeaters undoubtedly caused carriers issues. Properly installed CE marked apparatus with the use of smart repeaters properly configured, discussed above, has been proven both in the UK and in the US and Australia to eliminate this.
- c) *Increased demand on the aerial network*: the issues and discussion of this is also covered in 7. below and in other sections. Varying uplink power and the aerials utilised can mitigate some of the effects.

The need and requirement for such technology has been building for quite some time now and set out previously, and has been recognised in the US and other international markets. This could have been anticipated. Whilst the impacts above have been undesirable the reaction of both the MNO's and Ofcom here has been different. A lot of effort and focus over a number of years has been in our opinion wasted in trying to resist repeater technology without any constructive alternative offered, whereas co-operation, research and product development on repeater technology might have been the best route. One thing is for sure in the current situation i.e. doing nothing is not an option.

## **6. Solutions that could minimise any impacts on networks and other mobile**



## **users**

In an ideal world the most effective solution landscape we can envisage is the deployment on property of multi carrier Femtocells on property, which feeds into a multi carrier switch bank. This would be connected to the carriers over a fibre pipe with streaming to each carriers POP. It is not practical to have 5 racks of equipment for 5 carriers – we can operate the total infrastructure for a 400 bedroom hotel using less.

This would eliminate the issue with local aerials and adds capacity to the overall network. The infrastructure within property in principle could move away from the co-ax infrastructure used with repeaters onto more modern shielded cabling reducing any potential interference. It would most certainly enhance consumer service.

By the nature of the modern building where the demand for this technology is likely to be highest, the structure of the building and the glass itself will prevent most of the leakage outside its environs, certainly at higher levels of construction.

With the large number of new high rise developments in the pipeline for London the need for new solutions and progress is urgent. We are aware of the considerable difficulties already being experienced in Heron Tower and The Shard currently. Many of these have facilities, venues and attractions even on the roof requiring coverage.

## **7. Spectrum management impacts**

Any increase in coverage requiring signal strength will place extra demands on the MNO infrastructure whichever technology is deployed. Traditionally up to now this has been delivered mainly over their aerial network. Coverage issues already with 3G with carriers not meeting coverage targets together with the new 98% indoor targets would indicate a fundamental rethink of strategy will be required going forward:-

1. *High demand impact of hot spots:* up to now this has wrongly been construed as harmful interference as now confirmed in the High Court. Management of concentrated areas of demand in data technology is not a new issue and Wi-Fi management has developed significantly in both aerial technology and the system tools to manage the issue. There can be no doubt this has to be mirrored in MNO infrastructure moving forward. There is no doubt a major impact of repeater technology has been unregistered sites creating unplanned increases in demand on the spectrum for carriers.
2. *Aerial management:* The impact has been exacerbated by the aerial technology deployed by both the carriers and the installations. Both repeater and other solutions have site aerials that demand bandwidth to cover the installation 24/7 (which can to a certain extent be capped) based on the geographic power requirement over the whole site. This bears no function of the amount of actual traffic demand. Even if such technology was available the MNO carrier aerials are equally unintelligent in being able allocate resource.

There are again parallels with how the wholesale ISP market has had to develop and lessons can be drawn from there going forward.

A major limitation of repeater technology is that is only passing on the signal strength available to its antennae. If it is already in an area of poor reception on some networks this can affect performance. The use of directional antennae using spectrum measurement equipment can assist in picking up not necessarily the nearest access to find the best capacity.

## **8. International developments**

In February 20, 2013, the FCC released a Report & Order, thus establishing two Safe Harbours and defining the use of "network safe" consumer boosters on licensed spectrum. The Safe Harbours represent a compromise solution between Technology Manufacturers and Wireless Operators. It is widely considered a landmark decision which was many years in the making. Only a few companies currently have a product compatible with the new FCC report and order. The FCC has defined two types of repeaters:

1. Wide-band (or broadband) signal boosters are usually repeaters that amplify all frequencies from cell phone carriers. Because interferences can be generated from such boosters, the manufacturers who apply to the FCC must limit their gain (among other things), to 70dB (for the low LTE 700Mhz bands) to 72dB (for higher frequencies such as AWS). By limiting the system gain, such boosters are only useful when the outdoor signal is relatively high, and need a complex outdoor installation of specific antennas.
2. Carrier specific (or provider specific) signal boosters. These boosters are only designed to boost those frequencies (and signal) that belong to a particular carrier. Usually, such carrier specific boosters do not produce interferences on other carrier's frequencies, and are allowed to have much larger system gains (sometimes 100dB). In these conditions, such devices boost signal in a larger coverage area, and can still be efficient when outdoor carrier signals are weak, but are only boosting the signal for the carrier it is designed to operate. The new rules from the FCC commenced on March 1, 2014.

## **9. The legal position**

The advice that we have received is that provided apparatus is marked with a CE mark and complies with the ETSI standard in respect of the technology employed then provided that apparatus is not causing harmful interference it's use should be not just permitted in the United Kingdom but permitted without the need for a specific licence (i.e. should be exempted from the need for a licence).

We think a great deal of unnecessary time and effort has been spent in the United Kingdom with Ofcom seeking to "police" infrastructure provision that simply is not necessary. A problem is clearly that Ofcom and the MNOs have been using a definition of "harmful interference" which included that which causes congestion. That definition of what constitutes harmful interference cannot be said to have been the law in this country since 2006 when it was effectively decided by the Competition Appeal Tribunal in the gateway cases.

The legal position is presently set out in Section 8 of the Wireless Telegraphy Act 2006 which sets out in UK law the duty emanating from the Authorisation Directive not to require specific licensing for that which does not cause harmful interference. Essentially, it would appear to us that for some considerable time the UK has been in breach of this provision of EU law.

Moreover, as the question of authorisation has been satisfactorily dealt with it means that enhancers and repeaters may be subject to the RTTE Directive Regulations in the United Kingdom ensuring that the apparatus can then be connected to the mobile networks.

## **10. Conclusion**

The UK needs to use enhancers and repeaters to satisfy demand particularly in large modern constructed buildings.

European law provides that such apparatus, when it is constructed in accordance with the requirements of various Directives, will enable it to be CE marked and does not cause harmful interference to be exempt from the need for a specific licence. The nonsense pretending that these things are unlawful should be ended and Ofcom should be looking at practical solutions to assist the end-user.

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