Vodafone response to Ofcom Consultation:

EE application for licence variations in support of enhanced mobile communications for the emergency services

1 Introduction

Vodafone is supportive of the necessary actions to fulfil the Home Office's requirement to provide Mobile Services for a new Emergency Services Network (ESN). However, licence-variations to implement the ESN should not result in either detriment to other users of spectrum, or distortion to competition. In answering Ofcom's consultation questions, Vodafone has no immediate objections to the liberalisation of the 1900MHz band, but has significant concerns about the implications of using mobile access spectrum for backhaul purposes.

2 Answers to questions

Q1) Do you agree with our proposal to vary EE's Spectrum Access 2100 MHz licence to allow LTE technology? If not, please explain why you think it would not be appropriate to vary the licence?

Co-existence

Vodafone notes the analysis provided both by Ofcom, and the related CEPT Report 39. We are not a holder of 2100MHz TDD spectrum, but have an interest in the licence-variation as an FDD licensee in this band, and as holder of a concurrent licence in the 1800MHz band. Further, our customers will be users of DECT terminals in the immediately adjacent band.

On the whole, Vodafone is comfortable that we are unlikely to experience any adverse effects to our licensed spectrum.

We do have some concerns, however, about the impact on DECT users. By its nature, the analysis in CEPT Report 39 was of a theoretical nature, and did not include empricial evidence. Even with this statistical approach, the Report concluded that a small proportion of DECT terminals would lose connectivity when faced with an adjacent interferer (the predominate model being that of a mobile terminal desensitising DECT base stations, although degradation by the mobile base station is not ruled out).

Prior to authorising this use case, we believe it is incumbent on Ofcom to carry out testing of the likely level of degradation for users of DECT handsets. We would remind Ofcom that a major use case for the ESN application will be at the time of a local emergency, and it would be most unfortunate if the attendance of the emergency authorities in the vicinity prevented a citizen from using their fixed line telephone service. If there is a slight probability of degradation of DECT services, this would not necessarily mean that the

application shouldn't proceed, rather that the users of the ESN capability could be better informed of the implications of using the "bubble", in order that it be deployed sparingly. The test results could, however, inform whether it is appropriate to extend usage of the band for TDD LTE services more widely than the narrow ESN application.

Competition

Vodafone concurs with Ofcom's brief analysis of the competitive effects of the licence change: there should be a presumption of licence terms being the least prescriptive, and EE's usage of the spectrum for LTE does not in and of itself create a competition issue.

However, Ofcom must then take into account this potential usage when carrying out current and future competition analyses. Thus far, the 2100 TDD band has been considered to be of little practical use, and certainly when examining spectrum holdings, Vodafone has excluded it from our analysis. If the spectrum band is to be liberalised (or, in the case of O_2 and Three, is capable of being liberalised on request), then it should be considered as being in mobile operators' spectrum holdings when considering issues of, for example, spectrum asymmetry[1].

[1] We note in this context that Three and O_2's holdings are likely to be considered of relatively lesser use than EE's as they have a more restrictive mask.

Q2) Do you agree with our proposal to authorise the backhaul of ESN Gateway devices at a maximum mean transmit power of 31 dBm e.i.r.p. in the uplink frequencies 837.0 to 842.0 MHz and 1736.7 to 1781.7 MHz in EE's 800 MHz and 1800 MHz licensed spectrum to facilitate the occasional and limited use of higher power uplink transmission? If not, please explain why you think it would not be appropriate to vary the licence?a) Please indicate the applications provided by your use of fixed wireless links and the benefits these provide to citizens and consumers.

Vodafone disagrees with the proposals, in particular for the 800MHz band.

Ofcom's analysis accepts that EE's proposed utilisation could and probably would lead to a desensitisation of Vodafone's base stations[2], but goes on to accept this on the basis that there will "*generally [be] a very low return period to any specific location*"[3].

Firstly, Ofcom's consideration of where interference could occur does not represent a comprehensive analysis of the ESN use case. It is indeed proposed that the "bubble" approach be used in poor coverage rural areas, but another key use case, as set out in Figure 3 of the consultation, is to extend coverage into buildings; this is a scenario that is far more likely to occur in urban and suburban environments, yet the interference analysis in the consultation addresses only rural usage.

Secondly, it is instructive to consider the scenario in which the "bubble" would be deployed. Inherently, it is likely that there will be some form of emergency situation in the vicinity. It will be of precious little comfort for Vodafone's customers to know that they while are unable to communicate at this most critical of times, their service will return to normal after the ESN gateway has been removed and the emergency is no longer present. That the usage is "occasional" and "limited" (to use Ofcom's terms) is no help if that coincides with the very time when being in contact is most important. We would remind Ofcom that Vodafone's customers include Category 1 and 2 Responders, and there is little value, for example, in having MTPAS in place if the radio interface has been compromised via desensitisation by interference from the ESN Gateway.

Moving onto other potential victims, Ofcom does not appear to have given any consideration to the impact on Digital Terrestrial Television (DTT). LTE at 800MHz is known to cause interference to DTT users in the adjacent band, and there is a mitigation programme funded by industry, with DMSL providing triage and

[2] Para 5.33 of the consultation
[3] Para 5.34 of the consultation

where necessary installer visits to remedy the interference. The predominate mode of interference is poor DTT selectivity with respect to the LTE downlink frequencies. However, predicting where this will occur has proven an inexact science; what has become clear is that whether the LTE downlink signal is in the bottom (791-796MHz) or top (811-821MHz) blocks of the downlink band has little correlation with whether interference arises. Against this backdrop, it is far from clear that a higher transmit signal in the uplink frequencies won't similarly result in degradation of DTT performance, particularly in the rural case where DTT signals are likely to be poorer in any case.

It is true that such degradation would be temporary while the ESN gateway is active – albeit this is unfortunate as it is the very time when the police might like the local population to be watching television to keep abreast of events for their own safety. Nevertheless, it is likely that degraded DTT will lead to increased calls to DMSL, and while DMSL has good data about LTE mast rollouts, they will be completely unaware of the transitory ESN usage. The consequence is increased costs for DMSL, and we would remind Ofcom that due to the funding model it has established, Vodafone and O_2 would each pay double the extra contributions required compared to EE, whose arrangements had caused the spike in complaints in the first place.

We note that Ofcom proposes to vary EE's licence by allowing the power increase for ESN gateways, but specifying that all other parameters must meet the requirements of ETSI EN 301 908-13[4]. However, ETSI EN 301 908-13 only covers Class 3 (23dBm) UE, so in effect, if the ESN gateway licence just varies the power, then EE will have a relaxation on the Adjacent Channel Leakage Ratio (ACLR) requirements. This is in contrast to where higher transmit powers have been used in other bands, for example in the 3GPP UE specification 36.101 (from which EN 301 908-13 is derived), a Class 1 UE for Band 14 is specified, but in that case the ACLR was tightened by 8dB so that the noise floor on adjacent bands wasn't increased. In the event that a licence variation is granted, it is Vodafone's position that permission to use increased power must be contingent on the ACLR being constrained such that the noise floor in our licensed frequencies is unchanged.

ESN is by definition a critical capability. All of Vodafone's foregoing concerns would be moot were the proposed usage of the 800MHz band the *only* means of providing the "bubble" capability; transitory issues with mobile and DTT service could arguably be a price worth paying. But usage of the 800MHz band isn't the only solution open to EE, which can hardly be said to be struggling to find suitable spectrum from their reserves. EE should be required to provide evidence of why none of the other 260MHz of spectrum that it

[4] Para 5.5 of the consultation

has at its disposal is suitable for this application, before Ofcom takes action that affects our spectrum usage. In the extreme that none of it is suitable, it is incumbent on Ofcom to field test what coexistence issues arise rather than simply allowing the increased uplink power on the basis that it won't happen very often and probably not in the same place twice.

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