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TELEFÓNICA O2 (UK) LIMITED RESPONSE TO:

"CONSULTATION ON THE WAY FORWARD FOR THE FUTURE USE OF THE BAND 872-876MHZ PAIRED WITH 917-921MHZ"

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I. RESPONSE TO QUESTIONS

Question 4: Do you agree with the methods used to assess the potential to interfere with adjacent band services in a full licensed approach?

1. O2 agrees with Ofcom's interpretation of the amended GSM Directive, in that both UMTS900 and GSM900 service need to be protected from undue interference. Such protection should be built into the regulatory scheme that accompanies the award of any licence(s) in this band, or for authorised unlicensed use of this band.

2. In Section 4 of the consultation Ofcom uses a set of technical parameters to determine the appropriate emissions thresholds allowable for any future licensee in 872/917MHz band. O2's particular concerns relate to the awarded spectrum's downlink (917-921MHz) which is only 2MHz away from the O2 uplink at 910-915MHz in the upper P-GSM band.

3. Ofcom's analysis for full licensing, relies on the following assumptions:

    a. that a physical separation of at least 100m is maintained between the award band BTS and the O2UK BTS [§4.15];

    b. interference power (at O2UK's UMTS900 antenna port) must be no higher than 6 dB below the noise floor of the receiver [§A6.39];

    c. O2UK receiver antenna gain is 15 dB [§A6.37];

    d. There is a net 6 dB decrease in BTS to BTS coupling due to antenna down-tilt on both BTS[§A6.37]; and

    e. O2UK benefits from a duplex filter roll-off of 10 dB/MHz.

4. Ofcom consequently concludes [§A6.63] that the maximum allowable transmitted power in the awarded band is 28dBm EIRP (or 631 mW EIRP).

5. ✂…….. O2 notes that Ofcom's assertions[1] regarding the cost benefits of UMTS900 versus UMTS2100 are sensitive to assumptions regarding the uplink and we would wish Ofcom to use a consistent set of assumptions in its analysis of both matters, in accordance with its duties.

6. O2 has serious concerns about some of the assumptions used in this analysis. In particular:

    a. O2 UK receiver antenna gain is typically ✂……..[2];

    b. It is more appropriate to include a net ✂…….. increase in BTS to BTS coupling, ✂……..[3];

[1] Mobile spectrum liberalisation consultation http://www.ofcom.org.uk/consult/condocs/spectrumlib/
[2] ✂……..
[3] ✂……..

7. The net effect of these two corrections is to bring the maximum allowable transmission power in the 917-921MHz downlink to 23dBm EIRP.

8. At §4.25 Ofcom speculates that if improved filtering were employed at UMTS base stations (compared to the filtering that would be used to meet the ETSI Standards) allowable transmit powers might be increased to 50 dBm. The assumption being that adjacent channel selectivity is improved significantly in the UMTS900 receiver chain by deployment of sharper cut-off filters and out-of-band emissions are reduced significantly on the award band transmitter.

9. O2UK has multiple concerns regarding such speculation:

    a. O2UK plans to operate equipment which meets the relevant technical performance requirements for the 900 MHz band. Therefore this equipment will not normally be fitted with the higher performance filters as suggested by Ofcom.

    b. Sharp cut-off filters affect the phase linearity of the transmission chain. O2UK is concerned about the likely overall impact of introducing these additional filters. Ofcom asserts that the work by Isotek Electronics Ltd has shown these filters to be technically feasible. However the Error Vector Magnitude due to the UE plus the additional filtering required as a result of the re-farming of 900 MHz spectrum will push the overall EVM outside acceptable limits if sharp bandpass filters are introduced into the uplink.. This will require further investigation and we would welcome to the opportunity to work with Ofcom on this point, given our unique position as the licensee exposed to interference from the 872/917MHz band.

    c. Even if both transmit and receive filtering were viable, and the transmit power was limited to 50 dBm EIRP in the 917-921 MHz band, the separation of the GSM and interfering BTS would have to be greater than 180m for an interference limited environment and greater than 300m for a noise limited environment.[4] Thus strict coordination between operators would be required to eliminate the possibility of interference to the GSM uplink.

10. In any event, the reduced out-of-band emissions associated with the award band transmitter are generally no longer aligned with standard 3G specification guidelines, indicating that it may not be technically feasible or reasonable for the award band owner to deploy suitable BTS equipment.

Question 5: Do you consider that the proposed technical licence conditions would be justified and appropriate.

11. In light of the assessment above, O2 does not believe that the proposed technical licence conditions are sufficiently restrictive for a full licensing regime. O2 is strongly of the view that transmit power levels in the 917-921MHz band will need to be restricted to 19-23dBm EIRP.

[4] ECC Report 41, Adjacent band compatibility between GSM and CDMA-PAMR at 915 MHz, Granada, Feb. 2004.

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12. Furthermore, Ofcom and Her Majesty's Government place great store on the potential future consumer benefits of deployment of UMTS900 by O2 and Vodafone. Ofcom's consultation suggests that consumers may benefit to the tune of billions of pounds from the deployment of UMTS900.

13. In order to correctly assess the relative benefits to society of introducing a potential interferer in the 910-915MHz band, Ofcom will need to clearly state the societal benefits at risk if this interference restricts the timely deployment of UMTS900. If the benefits of UMTS900 are as large as claimed in the February consultation then there will be a significant hurdle to demonstrating that interference from the 910-915MHz band is proportionate. However, perhaps Ofcom will have revisited the fundamental flaws in its most recent analysis and make this revised analysis available to stakeholders. It is only in this way that stakeholders will be able to take a proper view of the proportionality of any further proposal regarding 910-915MHz. This will itself need to be consulted on in due course.

14. Finally, it is envisaged by Government that Ofcom may need to determine the most appropriate approach to defragmentation of the 900MHz band. It is unclear to O2 how Ofcom will be able to adequately determine where costs should fall (and the consequent proportionality of that decision) unless the future of 910-915MHz is settled.

Question 6: Do you agree with the methods used to assess the likelihood of services interfering with adjacent band services under the light regulatory approach?

15. Ofcom conclude that RFID readers operated in the 917-921 MHz band will interfere with a UMTS900 uplink in the 910-915 MHz band if the separation of the reader and the BTS is:

    a. < 170 m in urban environment;

    b. < 330 m in a suburban environment.

    assuming there is 10 dB of shielding attributable to building penetration loss.

16. If RFID readers are used outdoors there is no shielding. In these circumstances O2UK believes that interference would occur if the separation is approximately[5]:

    a. < 320 m in an urban environment;

    b. < 600 m in a suburban environment.

17. In these circumstances, the required physical separation between BTS and RFID reader is approaching the cell radii.

18. As Ofcom will recall from the recent experience in attempting to remove the former licence exempt anti-theft devices at 888-889MHz, such devices can lead to lengthy and costly interference investigations. In our view it is impractical to introduce a 'light' regulatory

[5] Calculated on assumption that 10 dB building penetration loss omitted and propagation pathloss exponent is -3.5 [i.e. d_outdoor = 10^(log10(d_indoor) + (log10(10)/3.5))].

approach or licence exemption with a coordination mechanism which ensured these geographic restrictions and physical separations.

19. Therefore O2UK concludes that 'light' regulation or licence exempt operation of RFID devices will not provide sufficient protection to the uplink channel in the 910-915 MHz band.

Question 7: We would like stakeholder views on the cost and performance impact of the UMTS900 filters described above.

20. O2 is unable to determine whether the costs assumed at §5.13 are accurate. At §5.14 Ofcom identifies a whole host of reasons why its cost estimates should be treated cautiously. We would welcome working level engagement with Ofcom to work through the complexities of determining:

    a. Whether filters of the specified standard are in fact feasible;

    b. What the cost / performance implications of their deployment might be; and

    c. The total volume of filters that would be required, in light of the site density[6] and sectorisation of those sites.

Question 9: What are your views on the need for and justification of such mitigation measures and how their cost should be borne?

21. The revised GSM Directive, which comes into force on 9th May 2010, clearly requires Ofcom to make the 880-915MHz band available for UMTS systems (Article 1) and at Article 2b the directive requires that this liberalisation allows the use of systems conforming to the relevant ETSI standard. If Ofcom subsequently decides to allow deployment of systems in adjacent bands that would not allow an operator to deploy *"an electronic communications network that complies with the UMTS standards published by ETSI"*, it would be acting unlawfully.

22. Therefore, should Ofcom wish to allow transmission in adjacent bands that would impinge on the legal rights of the licensees in the bands covered by the GSM Directive, it will need to ensure that appropriate compensation is forthcoming from the incoming licensee, both in terms of:

    a. The full cost of deploying any mitigating equipment;

    b. The full cost of mitigating any coverage, quality or capacity loss caused by its network versus the counterfactual of no adjacent interferer; and

[6] We note that Ofcom will need to take a consistent approach to modeling the future site requirements for UMTS900 operators in respect to this decision and any decision it makes with regard to mobile spectrum liberalisation.

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c. The opportunity cost of the use of O2's resources in managing such an implementation. We would, after all, have other priorities that would need to be set aside in order to safeguard any UMTS900 service to our customers.

Question 10: Stakeholders views are sought on whether the spectrum should be awarded as a single lot by frequency, or whether it should be split in to smaller frequency lots.

23. O2 has a preference for a single lot, in order to minimise the co-ordination burden.

Question 11: We would like stakeholder's views on whether the packaging should be split GB/NI or if we should proceed with UK wide packages.

24. As Question 10.

Question 12: Would it be practical for RFID users and adjacent operators (e.g. GSM, UMTS, GSM-R) to co-ordinate locally on a case by case basis? The answers to this will help Ofcom develop its views on whether a database would be required.

25. As we have noted in our response to Question 6, it is in our view impractical to introduce a 'light' regulatory approach or licence exemption with a coordination mechanism that would allow use of such devices with geographic restrictions to try to take the physical separations required into account.

Telefónica O2 UK Limited
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