

800 MHz and 2.6 GHz Combined Award

Question and answers on coordination procedures for deployment in the 2.6 GHz band

1. Has Ofcom decided to licence-exempt terminal stations?

We expect to consult in summer 2012 on draft regulations on exemption of 2.6 GHz terminals.

2. When will Ofcom publish its technical licence conditions statement?

Summer 2012

3. How about low power shared access use - has Ofcom made a decision on this yet?

We included in the consultation published on 12 January revised proposals on the packaging of the 2.6 GHz band. We set out a number of options for low power use. We are consulting on whether we should support the use of 2.6GHz spectrum by low power users and, if so, which of the options would be appropriate.

4. When are you going to finalise the co-ordination procedures?

The finalised co-ordination procedures will be published with the IM.

5. How confident are you that the modifications will solve the problem?

All DA's have confirmed they are confident that their designs will meet the required specification.

6. Is the Government programme going to deliver on time?

That is a question for Government. Ofcom is working closely with the Government departments and other agencies involved in the radar remediation programme, and have no reason to believe the Government programme would not deliver on current time lines.

7. What is the fallback if radar operators don't participate in the HMG programme?

Radar licensees will be required by a notice issued under their licence to ensure that their equipment is able to co-exist with 2.6GHz Communication Signals. The notice has not yet been issued in final form but currently it is anticipated that it will require compliance by late 2015.

8. Will there be a block edge mask (as proposed in the TLCs consultation)?

We intend to include our final decisions on technical licence conditions, including BEM, in the statement setting out our decisions on all aspects of the auction that we expect to publish in summer 2012.

- 9. What if a new generation of radar emerges that is much better performing – will you change the protection thresholds?**
Although we consider that it is unlikely that there will be substantial changes to radar susceptibility in the near future, we will review the coordination procedures as appropriate to ensure that they remain relevant, consistent with our statutory duties.
- 10. How will co ordinations procedures apply to radars outside of UK?**
The coordination procedures apply to licences issued by Ofcom for the 2.6 GHz band, in relation to the radars on the protected radar list.
- 11. Will Ofcom be carrying out the co-ordination of Base Stations?**
Ofcom will not be co-ordinating deployment. Network operators will be responsible for complying with the coordination procedures.
- 12. Do the threshold levels take into account the radar antenna patterns?**
Yes. The thresholds assume a horizontal radar antenna pattern.
- 13. Could a 2.6 GHz licensee exceed the thresholds?**
The thresholds will form part of coordination procedures notified to the 2.6 GHz licensee under its licence. They can only be exceeded if that 2.6 licensee has agreed that with the radar operator.
- 14. How will the coordination procedures be enforced?**
The coordination procedures will be notified to 2.6 GHz licensees under their Wireless Telegraphy Act licences. Compliance with the coordination procedure will be a condition of the Licence. Failure to comply with the coordination procedures will be a breach of the licence which Ofcom can enforce.
- 15. What guarantees will 2.6 GHz licensees have that the thresholds Ofcom has set out will be sufficient and that they won't be required to make further adjustments after they have been awarded the spectrum?**
The requirements set out in the coordination procedures represent our judgment, based on the technical work that we have done, of the protection radars will require when networks are deployed in the 2.6 GHz band. But it will be for each potential bidder in the 2.6 GHz spectrum award make its own assessment of any potential impact of these requirements.
- 16. What happens if an existing radar at an airport is replaced, and the new radar is sited at a different location at that airport?**
Ofcom will define a distance around each radar to be protected (to be determined).
- 17. What happens if a new radar is deployed at a location where there is not currently a radar?**
New radars will be added to the protected radar list as appropriate. The 2.6 GHz licensee should refer to the most recent version of the protected radar list when planning its network deployment.

- 18. Ofcom is also working on adjacency issues relevant to the 800 MHz band. Has Ofcom given any thought to coordinating the various requirements to ensure new operators are not overburdened?**

The coordination procedures have to be specific to the adjacency issue they are intended to address. From that point of view, there is little overlap between requirements for the 800 MHz band and the 2.6 GHz band. But we would consider whether there are synergies, perhaps on an administrative level.

- 19. There was an example of a TDD measurement included in the presentation at the 20 January stakeholder event. Was that measurement of a fully loaded cell?**

The measurement included in the presentation [slide 23] shows one UE (user equipment) with one resource block being used, which was increased communications OOB emission in the measured example than a fully loaded cell measurement.

- 20. Is the peaky pattern of the TDD measurement (included in the presentation on 20 January 2012) due to a faster switching product, and could a cumulative effect of that (with many UEs next to a radar) cause a problem of out of band emissions for the radar?**

Yes, that is a possibility. However, we looked at this in the Airport Deployment Study http://www.ofcom.org.uk/static/spectrum/Airport_Deployment_Study.pdf. For the purpose of that study, we used a UE with spurious emissions 27dB above that of the TDD UE we measured (shown in the presentation). We found that this was not a barrier to deployment at airports.

- 21. Is Ofcom planning to do further UE measurements?**

Yes, we will endeavour to do some further measurements, if UEs are available. However to date it has not been possible to source any further UE's.

- 22. Will Ofcom consult formally on the coordination procedures?**

We consulted on the need for coordination procedures in our consultation on Technical Licence Conditions for 800 MHz and 2.6 GHz spectrum (published 2 June 2011, <http://stakeholders.ofcom.org.uk/consultations/technical-licence-conditions/>). We do not intend to consult formally on the detail or wording of the coordination procedures. We have shared our thinking on the coordination procedures as they develop through stakeholder events on 20 January and 17 May 2012.

- 23. What time percentages are you considering for the propagation calculations?**

We are using parameters consistent with the ITU-R P.452 propagation model' with 0.1% probability. This means a time percentage of 0.1%.

- 24. Is Ofcom considering low power use at the top of the 2.6 GHz band, and if so does that mean that coordination requirements could be less stringent for low power base stations?**

The same procedures will apply, however, the impact of them may be different for low power deployment which may be in doors, or have different out of band emissions.

- 25. The 2.6 GHz band has been licensed, and services are operating, in a number of European countries. Has this problem been experienced elsewhere and are there lessons that can be learned from that?**

When setting coordination procedures (and other technical licence conditions) Ofcom has to consider the spectrum management requirements of UK users. We are aware of developments in Europe, and participate in CEPT, SE21 where similar matters are being considered. Ofcom's roll is to set conditions which are appropriate for the UK.

- 26. When will the plan for roll-out of modifications to radars be available?**
We will include information on the roll-out of modifications to radars with the Information Memorandum for the 2.6 GHz spectrum award. Draft information on the roll out was provided by the DfT and MOD at the stakeholder event on 17 May 2012.
- 27. Has any thought been given to the optimum number of radars that the UK needs for its aviation infrastructure?**
No. The decision to deploy primary radar is taken on a case by case basis by the relevant operator. There is no limit imposed by the CAA on the optimum number of primary radar.
- 28. Due to the differing distances associated with the protection thresholds of -45dbm and -70dBm, are the co-ordination procedures likely to be distance based and fine tuned by power?**
The thresholds in the coordination procedures (currently 5 dBm/m² and -131 dBm/MHz/m²) are levels to be met that will be based on a calculation of the field strength at the radar from all 2.6 GHz licensee base stations for both communications in band signals and communication out of band noise. This approach is not based on a set distance around the radar. The 2.6 GHz licensee can take a number of actions to comply with the thresholds, even quite close to the radar (e.g. adjust power, location or filtering of the base station). This approach most accurately reflects the protection required for the radar, and allows more flexible deployment of base stations. The -45dBm/MHz EIRP base station OOB value is the regulatory level of Communications Out of Band emissions across the full 2.6 GHz band regardless of base station location. The -70dBm/MHz EIRP base station OOB value used is an example of the measured emissions from an actual base station (20 MHz bandwidth), to illustrate that the 2.6 GHz licensee may find it easier to comply with the radar noise threshold than indicated in the regulatory level of -45 dBm/MHz EIRP OOB assessment shown in the presentation, depending on the base station performance. Both communication in-band signal level threshold and communications out of band noise thresholds must be met.
- 29. Will there be a simple set of distance based rules, e.g. can't operate within 10km of a radar or outside 10km is fine?**
See 28 above.
- 30. How do multiple MNOs co-ordinate the cumulative threshold deployments to derive the required co-ordination distance?**
The total threshold power level will be allocated in proportion to the fraction of the total 2.6 GHz downlink bandwidth held by any particular 2.6 GHz licensee i.e. if a licensee holds 50% of the total 2.6 GHz downlink bandwidth then they would be allocated 50% of the total threshold level stated in the coordination requirements. The equation that defines the proportion allocation was presented in the stakeholder presentation on 20 January 2012. The pro-rata threshold requirements at the radar must be complied with in all circumstances, including the effects of base station to base station interactions.
- 31. Are radars operating in the lower frequency band (2720MHz) going to be moved?**
The constraints of filter design for the radar modification mean that radars operating very low in the band will have to change frequency. How this applies to individual radars depends on the modifications developed by each radar manufacturer. The CAA has undertaken an initial assessment for alternative frequencies for radars below 2740 MHz. Not all radars below this frequency will need to change frequency. It is likely that, depending on the specification for the relevant radar modification, radars below or around 2720 MHz will need to change frequencies. The CAA will confirm the new

frequencies in due course. The CAA is working closely with the DfT to ensure that where frequency changes are needed that is built in to the timetable and plan for the radar modification.

32. For military naval radar is it expected that these radars will take remedial action to avoid interference rather than imposing restrictions on coastal LTE deployment?

The MOD has undertaken some work to assess potential impact of LTE on its naval radars. This has shown that there is some risk of interference. The MOD is determining how this is to be managed.

33. At present the frequency moves required and necessary component acquisition prior to filter modification are not included in the DfT rollout plan. How will these frequency moves be expedited to meet the rollout plan timeframe?

See 31 above.

34. How will it be ensured that base stations will not be installed that could cause a problem to radar operators?

The constraints of filter design for the radar modification mean that radars operating very low in the band will have to change frequency. How this applies to individual radars depends on the modifications developed by each radar manufacturer. The CAA has undertaken an initial assessment for alternative frequencies for radars below 2740 MHz. Not all radars below this frequency will need to change frequency. It is likely that, depending on the specification for the relevant radar modification, radars below or around 2720 MHz will need to change frequencies. The CAA will confirm the new frequencies in due course. The CAA is working closely with the DfT to ensure that where frequency changes are needed that is built in to the timetable and plan for the radar modification.

35. How will the co-ordination procedure work?

See 34 above.

36. Who will police / arbitrate if there is a clash of views between the MNO(s) and radar operator?

Compliance with the coordination procedures will be a condition of the 2.6 GHz licences, and Ofcom will be able to take enforcement action if a 2.6 GHz licensee does not comply.

37. What will be the timescales for resolving interference issues?

If a radar operator experiences interference, that would be dealt with as per the normal interference resolution procedures. There is an accelerated procedure if safety-of-life services are affected.