

## **The CAI Response to the Ofcom Document “Coexistence of new services in the 800 MHz bandwidth digital terrestrial television”**

In preparing this document the Confederation of Aerial Industries has drawn upon a number of its members to share their experience and expertise.

This document has utilised the information provided by Ofcom within the above Document and also that which was produced by Mandercom for Ofcom entitled “The impact of LTE on Commercial Aerial Systems”.

In order to arrive at our estimates certain assumptions were made, as follows:

- The LTE output EIRP over 30 MHz is 64 dBm (2.5 kW).
- The receiving antenna gain, based on a Standard 2 CAI benchmarked aerial, is 12 dB.
- Cell size is taken as 2 km radius with an even distribution of households at a density of 25 homes per hectare.

Our findings showed that:-

25% of households showed high levels of LTE between 86 and 92 dB $\mu$ V.

No mention has been made in any OFCOM document regarding the cost of training in this area. The Confederation of Aerial Industries has an extensive training programme for installers covering aspects of installation and maintenance of all facets of the aerial industry. The CAI would be pleased to create a training programme for installers based on the proposed mitigation options.

### ***Consultation Question 1. Do you have any comments on our modelling approach and assessment of numbers of households affected?***

**Answer: Yes** – for the following reasons:

- The LTE base station transmitters, covering the 30 MHz band from 791 MHz through to 821 MHz, represents a total power level of 64 dBm (2.511 kW). In urban conurbations there will be many cells spaced at 4km centres in a honeycomb type approach to cover all the houses and roads in the area. Many of these transmitters will have an additive effect on the levels present on outside TV aerials. It must also be borne in mind that the positions of LTE transmitters reference to outside house antennas will be in the majority of cases very close to line of sight with little impediment en route to reduce these interfering levels. Whereas the appropriate DTT transmitter may be tens of kilometres away with no line of sight. Our model has taken this into account to compute and compare the levels of LTE interference to DDT signals.

We have concentrated on LTE base station transmitter interference as this is likely to be the cause of most problems encountered.

However it is worth considering the impact of mobile unit transmissions which are in the frequency range 832 MHz to 862 MHz (i.e. DTT 8 MHz channels 66 to 69 as was). Although the transmitting level from these devices is relatively low they will also be most likely to be very close to television receivers within the home. It is known that these frequencies permeate through walls without serious loss and can interfere from a few (10s) of metres away. This may be in an adjacent home or flat, so moving the offending item away from the immediate vicinity of the receiver may not be a simple manoeuvre. However because of the large frequency difference between 832MHz and 790MHz (highest frequency of DTT Channel 60) we believe a relatively simple filter costing £10 to £15.00 plugged between the incoming aerial feed and the TV receiver will suffice for this problem. Many millions of these filters will be needed bearing in mind the 3 TV receivers apparently residing within each household.

Without mitigation we estimate that some 5.4 million homes will require some measure or other to reduce the problems caused by LTE base station transmissions. The causes of this interference are in the main overload of broadband amplifiers connected prior to the TV receivers. This can comprise:

1. Aerial installations with
  - o Masthead amplifiers (to aid individual aerial installations in recovering weak DTT signal levels)
  - o Distribution amplifiers to split signal between various outlets
  - o Set top boxes with modulators having a broadband amplifier- PVR or Sky, Sky+, Sky HD boxes which have a separate input for DTT so as to combine the Sky box output with the DTT channels . PVRs and Sky boxes tend to have a broadband amplifier in the DTT circuit so as to compensate for the losses through the box. These broadband amplifiers are very susceptible to overload by the LTE transmissions.

This represents 17.5 million homes of which we estimate some 4.125 million will need some form of remedial action.

2. Individual house installations with antenna either for a single TV reception or with a passive splitter to split between TV receivers in various rooms.

These installations are likely to be the most robust and only where LTE levels are extremely high at the receiver or where DTT Channels 59 and 60 are endeavouring to be used will there be interference problem.

This represents 4.5 million homes of which we estimate some 305 000 homes will need some form of remedial action.

3. Broadband amplifiers within communal aerial installations. Here some protection is in place as probably 25% of communal aerial installations will have a cluster filter leveller (or some sort of filter) which will in many cases reduce the levels of LTE. These filters are especially effective where the DTT transmissions are below channel 55. Some 50 dB of rejection will reduce the level of LTE in 791 to 821 MHz. They are less effective where the DTT channels are in the range from 56 to 60 with 59 and 60 not providing much selectivity at all.

This represents 5.2 million homes of which we estimate some 988 000 homes will need some attention.

***Consultation Question 2. Do you agree with our high level conclusions on mitigation options?***

**Answer: No** – for the following reasons:

We do not believe that the mitigation measure proposed take full account of the problems likely to be encountered. Currently installers are encouraged to install wideband aerials which has been the case since the start of analogue switch off.

These aerials will allow all the LTE signals to enter the home distribution amplifier and the television tuner.

The LTE signal will be of such a level as to cause problems all through the broadcast spectrum and particularly for areas where the television channels are at the top of the spectrum, close to the LTE signals. The ability to filter out will not be possible close to base stations and further away will be very costly.

Coaxial cables for both single aerials and systems currently being installed should comply with the CAI benchmarks (many do not) which provide a level of screening immunity to class B. The recently completed revision to the EMC equipment standard requires class A screening for protection from LTE signals and it is likely that existing cables will pick up interfering signals from LTE devices.

Overall we believe the costs will be significantly greater than OFCOM currently predicts.

***Consultation Question 3. Do you have any comments or evidence that you would wish to be considered in our further work looking at the appropriate level of consumer support?***

**Answer: Yes** – for the following reasons:

- In view of the likely interference issues there should be a help service set up to help and guide people to a resolution and provide access to remedies. It is essential that clarification is given on who is responsible for remedial costs. It is our belief that this should probably be the LTE licence holder.
- The support system should carry on after roll out has finished to cater for those who add reception equipment to an existing system after that time.

***Consultation Question 4. Do you have any comments or views on how we have assessed the approaches and our preference for the hybrid approach?***

**Answer: Yes** – for the following reason:

Mentioned above. Clarification needs to be issued regarding what costs and what rights a household has when there are interference issues.

***Consultation Question 5. Do you agree with the options, the assessment approach and our initial conclusions? What are your views on the cost risks and how to deal with them?***

**Answer: No** – for the following reasons:

- There is a clear cost risk when considering the number of households we consider at risk of interference in comparison to OFCOM's prediction.
- OFCOM should recalculate the costs of the remedial works necessary.