4G/TV Co-existence Oversight Board Meeting	
Chair's report to Ministers and Ofcom	Meeting date: 23 September 2015
Attendees	
David Hendon, Chair	Mark Caines (Ofcom)
Paul Rosbotham (Vodafone)	Alberto Fernandes (Ofcom)
Robin Vernon (O2)	lan Dewhurst (DCMS) (via tele-conf)
Chris Bowley (EE) (via tele-conf)	Sue Ramroop (DCMS)
Erol Hepsaydir (Three)	Michelle Brownrigg (DUK)
Philip Milton (Channel 4)	Andrew Dumbreck (Technical Advisor)
Alexandra McNair (ITV)	
Peter Couch (Arqiva)	Apologies
Dave Darlington (BBC)	Inge Hansen (EE)
Ben Roome (DMSL)	Phil Sheppard (Three)
Roger Darlington (Non-Executive)	Nick Munn (DCMS)
William Webb (Non-Executive)	Alan Boyle (BBC)

1. Executive Summary

- 1.1 There were 8,729 confirmed cases of 4G interference at 800MHz as of the end of August, excluding the 35 cases during the pilots. The position remains lower than expected and is in line with recent experience.
- 1.2 Mast activations have begun in areas of lower power DTT signal from main TV transmitters. Whilst the risk of interference may be greater because of lower signal strength, at800 has assured the Board that the mitigation scheme is able to meet any increase in the volume of reported cases.
- 1.3 The KPI targets were met in August, with the exception of one missed target which was to issue reactive filters within three working days (KPIA7). Due to an issue with the third party supplier, 304 filters (from 3,916 requests) were sent outside of the KPIA7 target. at800 have addressed the issue with the supplier and processes have been established to avoid any repetition.
- 1.4 With effect from September 2015 onwards, Erol Hepsaydir will represent Three on the Oversight Board in place of Phil Sheppard, who will attend as the appointed alternate should the need arise.

2. at800 update

2.1 at800 observed that the summer period covering June to August has been the busiest operationally since the programme began. Aside from the increase in the number of engineer visits and confirmed 4G cases, the rate of mast activation has

escalated with roll-out now beginning to occur in areas of lower power DTT signal from main TV transmitters. These are the transmitters that provide six (or more) multiplexes: the three public service broadcast (PSB) channels and the three national commercial multiplexes. In these areas, the risk of interference may be greater due to the greater likelihood that viewers will have amplifiers in their DTT receiver system.

- 2.2 The combination of recent improvements to the operation, which includes better contact centre and engineer capacity management, clarification of business rules and the scope of engineer functions, provision of information from the operators on network optimisation (which enables at800 to re-profile and capture households whose risk of interference may have increased as a result) and the initial insights provided by technical investigations into the interference issue have placed at800 into a position where any additional pressures on the mitigation scheme would not cause concern.
- 2.3 This was most recently demonstrated by the reactive mailing operation in July and August (as explained in both of the relevant Board Reports) and the operational ability to meet the subsequent effects (outlined in this and those previous reports).

Roll-out

2.4 As of the end of August, there were 8,729 confirmed cases of DTT interference caused by 4G at 800MHz, excluding the 35 cases found within the pilots.

Mast Analysis

- 2.5 Whilst the number of cumulative cases reported within 28 days for distance of 900m and 1.5km was relatively steady in July (0.25 and 0.38 respectively) in comparison to the previous month (0.22 and 0.35), there was a significant increase in the monthly cases of interference reported for distances within 900m (0.67) and 1.5km (0.81) since June (0.42 and 0.46).
- 2.6 As the figures provided are one month in arrears, this marked difference in the number of monthly reported cases within 28 days for both distances are a result of the additional mailing activities conducted in July and August which generated an increase in the volume of calls and engineer visits and, subsequently, a higher number of confirmed 4G cases. It is expected that as the 28-day reporting periods pass, the figures will level out.
- 2.7 The rolling average of confirmed cases per activated mast across a 3-month period to August was 1.37 and the number of monthly cases per mast was at 2.32 (from 1.32 in July). Again, the high number of monthly cases per mast is due to the recent mailing and operational activity and the expectation is that this figure will also reduce in the coming months.

Installer Scheme and Audit Summary

- 2.8 In August, 2,325 visits were originally scheduled to take place; an increase on the number of visits scheduled for July (2,120) as a result of a high volumes of mailing activity throughout the summer.
- 2.9 The majority of scheduled visits (2,128) were undertaken and closed as arranged (over 90% within the 3 working day target), with 35 appointments rearranged by at800 to meet capacity restraints and the remaining 162 visits cancelled by the viewer.
- 2.10 Of the 2,128 engineer appointments that took place in August 5% were repeat visits, compared to 10% in July. The reduction in the number of repeat visits can be attributed to the recent work undertaken by at800 to clarify the engineer's functions; at800 expect that this rate will decrease even further in September.
- 2.11 There were 88 audits completed in August for engineer visits originally undertaken in June (2) and July (86). There were three overturns from non-4G to confirmed 4G; one overturn was due to the alignment of the aerial and the other two by an amplifier. at800 have addressed these with the regional contractors and engineers, reiterating the process to check whether 4G mobile signals are a contributing factor in similar situations.

Block A masts

- 2.12 In June I reported that at800 had informed the Board of an expectation that a number of Block A masts in Channel 60 areas will be open to commercial traffic and fully operational by the end of 2016.
- 2.13 at800 confirmed that there have been a substantial number of Block A mast activations over the summer period which have been closely monitored; whilst it is not clear how much commercial traffic is being carried by these masts, there are no indications of any issues which may be attributed specifically to them.
- 2.14 The Board's independent technical representative observed that the more 'idle' a base station is with on/off signal burst patterns, the more likely it is for interference to occur, although it was recognised that a fully loaded base station results in a higher mean power being seen by nearby TVs. at800 will continue to monitor the situation as Blocks A & B masts are activated.

<u>Communications</u>

2.15 Within the last year, at800 has mailed most postcode areas and run campaigns to raise awareness of the mitigation scheme on how to contact the company should viewers wish to report interference issues and/or seek assistance.

2.16 at800 is developing communication concepts on how they might re-visit those areas during 2016 to refresh awareness, ensuring that viewers remain knowledgeable about the scheme and alert to 4G related interference issues.

3. Mailings

- 3.1 In July and August I reported that further to the discovery of an error in the risk categorisation of the mailing profiling since March 2015, a number of households had not received postcards as they should have done for planned mast activations. Therefore, at800 had immediately conducted a special mailing exercise to target those properties in areas where masts had already been activated and then followed this with postcards to households where planned activations had not yet taken place. These mailing operations are now complete.
- 3.2 The error was discovered whilst at800 were conducting analysis into timelines to inform the reminder mailing proposal; the objective of which is to reduce the time between postcard receipt and mast activation, decreasing the likelihood that viewers first experiencing interference will not be aware of the mitigation scheme and whom to contact. Work on the proposal, including data analysis, was postponed whilst resource was focussed on the special mailing operation and when resumed, at800 discovered a further mailing issue.
- 3.3 During the trial of the new operational approach between January and August 2014, at800 was assessing risk of interference based on two probabilities of aerial installations at households being a standard domestic installation (SDI) or domestic installation with an amplifier (DIA). In the initial programme (pre-trial) proactive filters were only sent to properties that suggested a risk of SDI interference so by running both sets of data, the information on those potentially at-risk households was captured should there be a requirement to reinstate the proactive filter mailing programme in the event the trial, which included testing the provision of reactive filters only, did not prove effective.
- 3.4 As the risk of experiencing interference is more likely where an amplifier is installed (as the signals are boosted), when the trial was complete and the revised operation was approved, including the indefinite suspension of providing proactive filters, at800 moved to solely assessing the DIA risks in its processes from August 2014.
- 3.5 As a result, during those eight months of the trial (January August 2014), a number of households were not mailed because the risk profiling assumed that in areas where both SDI and DIA were likely (due to DTT signal strengths and proximity to planned masts) and the probabilities were at certain levels (below 5% for SDI and

above 5% for DIA), a filter would be sent automatically as per the original programme when in fact, with the new approach, a postcard should have been sent instead.

- 3.6 In addition, households in these areas had not subsequently received mailings due to changes in risk categorisation because the DIA risk score was already at a level that indicated the properties should have been mailed.
- 3.7 There are a total of 125,081 households which, based on masts active as of the end of August 2015, should have received a mailing based on their current DIA risk. These households are being sent a special mailing postcard.
- 3.8 A further 142,614 households could be at risk from masts that are not currently active but could be activated or submitted for activation. These households will be sent regular mailing postcards.
- 3.9 It is important to note that should any of these households have previously contacted at800 (or DUK / BBC contact centres) the mast look-up (MAL) data would have been accurate and they would have been triaged correctly. This is because MAL does not use SDI or DIA risk calculations, but proximity to active masts, to help triage viewer issues. Any households that contact at800 having previously paid for independent resolution to DTT interference as a result of disruption caused by 4G at 800 MHz will be reimbursed.
- 3.10 at800 has run a complete audit to match the number of households mailed against the latest DIA interference predictions of households at risk to ensure there are no further discrepancies.
- 3.11 As a note of interest in a comparable situation: of the 63,335 properties that received a special mailing in mid-July (postcards after mast activation, see para 3.1), at800 received 331 calls, generating 131 reactive filters and 104 engineer visits (34 confirmed 4G cases and 70 non-4G). at800 will be tracking the same information for these mailings.

Reminder mailings

- 3.12 Following review by the Coexistence Technical Working Group of potential changes to protection ratios (the TV receivers ability to reject interference) in the prediction model, at800 is conducting additional data work to take these into account when finalising the reminder mailing proposal.
- 3.13 Subject to further analysis and discussions with Ofcom on the recommendations, at800 expect to submit the proposal to the Board in October 2015

KPI Report

- 4.1 at800 reported passes against most of the KPIs including a 99% pass rate for KPIA for service restoration within 10 working days where a household is a primary DTT user; 786 confirmed 4G interference cases were resolved within target with one case still outstanding because of timing issues related to parking suspension arrangements with the local council (to enable a cherry-picker for access to the roof) and the holiday commitments of the viewer concerned. at800 will continue to work with the viewer and council to resolve the issue.
- 4.2 Due to issues with the third party supplier who fulfil the orders for reactive filters, 304 of the 3,916 filters requested in August were sent outside of the three working day target for KPIA7 achieving a 92.24% success rate (a red indicator in the RAG rating).
- 4.3 The missed target was due to incorrect stock and fulfilment information provided by the supplier who had notified at800 that orders had been completed when they had not. at800 addressed the issue as soon as they identified it, receiving a credit note as part of its own service level agreements (SLA) with the supplier, and established processes to avoid future repetition. The target will be met next month.
- 4.4 In addition to the mailing issues noted in this and previous reports regarding missed households, requests to activate masts ahead of schedule have also contributed to missed targets for SLA B1¹.
- 4.5 A special request was made to activate a September mast in August instead. at800 mailed the 402 households profiled to be affected by the activation and although the operator was informed that the mailing would be sent on a particular date, the mast was activated 4 days before the postcard would have been received. Of these households, there have been 15 engineer visits and 13 potential 4G cases.
- In addition, of 282,528 households identified for mailing because of other planned
 September mast activations, 17,035 were mailed in July and the remainder (265,493)
 in August when the schedule was brought forward.
- 4.7 at800 expect the SLAB1 results will continue to improve (86.7% in August, 60.5% in July and 40.7% in June) with a 100% success rate in October.
- 4.8 The Board recognise that it will take time for the rates to improve in light of the additional mailings due to the profiling errors and because of the re-scheduling of

¹ SLA B1: Identifiable addresses ... to be mailed at least once no more than 12 weeks ahead of scheduled mast activation

planned mast activations. As SLAs are an internal performance indicator, there are no recommendations required, or provided, by the Board.

5. Coexistence Technical Working Group (CTWG)

- 5.1 Following initial tests and analysis on the predication model modifications, the group has been focussed on the refinement of the modelling parameters, including expected antenna gain, and the impacts of improved accuracy upon the mailing operation.
- 5.2 The group are also considering how adjustments in the model thresholds may assist in reducing the time taken for each predication run which would be of substantial benefit to the at800 operation. These considerations include how to identify the optimum DTT signal (or digital preferred service area (DPSA)) that household aerials are likely to be aligned to in any given pixel as this would help to reduce the computation time; at the moment, each run takes approximately 42 hours as the model calculates the potential risks of interference of the nearest 4G mast against three possible DPSA layers. The ability to identify the most likely DPSA would reduce the computation time (as well as the prediction accuracy) but this is a nontrivial problem to solve.
- 5.3 The predication model modification recommendations will be provided by the CTWG for Board consideration in October 2015.

6. AOB & Next Meeting

- 6.1 With effect from September 2015 onwards, Erol Hepsaydir will represent Three on the Oversight Board in place of Phil Sheppard, who will now attend as alternate should the need arise.
- 6.2 A meeting is scheduled for Thursday 22 October 2015. However, the Board agreed that unless significant issues arose or a member proposed the October meeting did take place, the next formal discussions would be on Wednesday 18 November 2015. The invitation to attend via tele-conference remains open.

David Hendon Chair 4G/TV Co-existence Oversight Board