



Measuring the quality of live subtitling

Statement

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Section 1

Summary

Introduction

- 1.1 Earlier this year, Ofcom consulted on proposals to improve the quality of live subtitling on UK TV to benefit deaf and hard-of-hearing viewers, among others.¹
- 1.2 Ofcom would like to thank the subtitle users, broadcasters, subtitle providers, representative bodies for hearing-impaired people, and others who responded. We have carefully considered their comments, which are summarised in section 2, together with Ofcom's responses to them, including our decisions. These decisions are summarised below.

Ofcom's decisions

Measurement of quality

- 1.3 In the light of responses to the consultation, and of the information available to Ofcom, we have decided that broadcasters should be required to measure the following dimensions of quality, on the basis of samples of live subtitling selected by Ofcom:
 - a) the average speed of the subtitling;
 - b) the average latency of the subtitling (the delay between speech and live subtitling), and the range of latencies; and
 - c) the number and type of errors (i.e. minor spelling errors, major omissions or factually misleading subtitles).
- 1.4 For this purpose, Ofcom will identify samples of live subtitling in three genres of programming – news, entertainment and chat shows – and ask broadcasters to carry out measurements. We shall ask broadcasters to collect data using a model which has been used for some years by academics, broadcasters and subtitle providers to categorise errors. Preparation for this will assist in the measurement of speed and latency. We will arrange a briefing for those involved in preparing for and carrying out the measurements. We intend that the measurement exercise should be carried out at six month intervals, starting later this year, for a period of two years.
- 1.5 We agree with respondents who said that ensuring consistency of measurements will be important. With this in mind, we approached the University of Roehampton, which has conducted research on various aspects of subtitling quality, and has applied the model in this context. Following discussion, Ofcom and the University of Roehampton have agreed that a small team from the university will validate the measurements provided by broadcasters from an expert, third party standpoint.
- 1.6 Once the validation exercise has been completed, Ofcom will clarify any outstanding points with broadcasters, and produce the final report. Ofcom intends that, if possible, the first round of measurement should be completed in time for the

¹ *The quality of live subtitling*, Ofcom, May 2013
(<http://stakeholders.ofcom.org.uk/consultations/subtitling/>)

outcome to be included in the access services report due for publication in spring 2014.²

Review of guidance, and possible targets

- 1.7 It is clear that there would be merit in looking again at the guidance in the light of the research conducted in recent years, but Ofcom considers that it would be better to await data from the measurement exercise. Ofcom will then consider what changes to the current guidance on latency and speed may be appropriate, and whether targets should be set. In doing so, we will also have regard to relevant research, and the views of interested parties.

Other issues

Short delays in transmission to improve quality

- 1.8 Ofcom invited consultees to tell us about the factors that might facilitate or hinder the insertion of a delay in live transmissions sufficient to improve the quality of subtitling. Responses suggest that a delay of 30 seconds or less could allow live subtitles to be synchronised (resolving the problems of latency), corrected for errors (dealing with the problems of inaccuracy), and presented in block rather than scrolling format (making the subtitles easier and less time-consuming to read). A shorter delay would allow subtitles to be displayed in block form.
- 1.9 Broadcasters were strongly opposed to inserting delays, citing the risk to viewer trust, the need for complex technical solutions, and competition from other media, amongst other reasons. We note that some broadcasters consider short delays editorially justified to safeguard viewers from the possibility that they might hear obscenities. We invite broadcasters to consider whether, in some programmes which are not time-sensitive, delays could be justified on editorial grounds to enable the quality of subtitles to be improved significantly and look forward to maintaining an ongoing dialogue with broadcasters over this issue.

Late delivered programmes

- 1.10 Ofcom's consultation drew attention to the problems that occurred when pre-recorded programmes were delivered to broadcasters too late to allow subtitling to be prepared in advance, necessitating lower quality live subtitling.
- 1.11 We have asked broadcasters to let us know in January next year which late-delivered programmes had to be subtitled live between July and December 2013. We plan to include a report on this in the first report from the quality measurement exercise, due in spring 2014.

Block vs scrolling subtitles

- 1.12 Ofcom sought views on whether block subtitles or scrolling subtitles were better for viewers. There was a clear consensus that block subtitles are easier for viewers to read and allow them to spend more time looking at images. However, it is equally clear that viewers do not want this to come at the expense of increased latency.

² Ofcom publishes access service reports twice a year, normally in March and September, summarising the provision of access services respectively in the previous calendar year, and the first six months of the year of publication (<http://stakeholders.ofcom.org.uk/market-data-research/market-data/tv-sector-data/tv-access-services-reports/>).

- 1.13 It has been suggested that, with training, the process of preparing and displaying block subtitles may take only marginally longer than transmitting scrolling subtitles. In the light of this, Ofcom suggests that there would be merit in broadcasters experimenting with the use of block subtitles for some programmes (e.g. late night programmes on rolling news channels) and testing these with focus groups to see their reaction. We look forward to maintaining an ongoing dialogue with broadcasters over this issue.
- 1.14 In the meantime, Ofcom suggests that broadcasters should consider:
- a) using block subtitles whenever possible; and
 - b) reversioning repeats of programmes with block subtitles synchronised with the original speech, in place of the original scrolling subtitles.

We look forward to maintaining an ongoing dialogue with broadcasters over this issue.

Section 2

Background

Introduction

- 2.1 In this section, we explain the background to Ofcom's decision to consult on proposals to require broadcasters to measure particular aspects of the quality of live subtitling, including:
- a) Ofcom's statutory duties and powers;
 - b) the importance of live subtitling to subtitle users;
 - c) why Ofcom decided to look at live subtitling; and
 - d) the main issues upon which Ofcom consulted.

Ofcom's statutory duties and powers

- 2.2 Section 3 of the Communications Act 2003 ("the Act") requires, amongst other things, that in carrying out its duty to further the interests of citizens and consumers, Ofcom should have regard to the needs of persons with disabilities.
- 2.3 Section 303 of the Act requires that Ofcom prepare (and review from time to time) a code giving guidance to broadcasters on how they should promote the understanding and enjoyment of their services by people with sensory impairments, including people with hearing impairments. The code must include:
- a) guidance on the means by which the understanding and enjoyment of television services should be promoted. This is largely comprised within the guidelines in Annex 4 of Ofcom's code;
 - b) provision for securing that every provider of a service ensures that adequate information about assistance for people with disabilities is made available. This is required by paragraphs 35 and 36 of the code;
 - c) obligations for the amount of subtitling, signing and audio description to be provided, which may include interim targets. These are set out in paragraphs 8 to 10 of the code; and
 - d) the descriptions of programmes to which those obligations shall not apply. This may include, in special cases, all the programmes included in a service. These provisions are set out in paragraph 11 of the code.³
- 2.4 As required by section 307 of the Act, all Broadcasting Act licences require providers to observe the code on television access services. The BBC Agreement also

³ *Code on Television Access Services*, Ofcom, December 2012
(<http://stakeholders.ofcom.org.uk/binaries/broadcast/other-codes/tv-access-services-2013.pdf>)

requires the BBC to observe the code in respect of its public television services subject to any exclusions agreed between Ofcom and the BBC.⁴

- 2.5 We explain below why, in the light of Ofcom's duties and powers, we concluded that it was important to gain and disseminate a better understanding of those aspects of live subtitling that affected the quality of the viewing experience for subtitle users, with a view to identifying possible areas for improvement, and encouraging broadcasters to pursue these.

The importance of live subtitling

The audience

- 2.6 For most people, television is an integral part of their lives. There is scarcely a household in the land without a television, and on average, we each watch some four hours of television a day⁵. Television is one of the most popular forms of entertainment, as well as being an important source of information. Viewers with hearing impairments like to watch television just as much as those without – in fact research conducted for Ofcom in 2006 found that viewers with hearing impairments watched significantly more than those without.⁶
- 2.7 As hearing loss is a natural part of ageing for most people, many subtitle users are older people.⁷ But they are drawn from all age groups, including the very youngest, who are just learning to read.⁸ Many people without hearing impairments also use subtitles from time to time⁹, but Ofcom's focus is on subtitling for those viewers who rely upon them to understand and enjoy television.
- 2.8 While Ofcom accepts that there are occasional problems with the quality of pre-prepared subtitling, we consider that the issues with live subtitling are an order of magnitude greater, and that the priority should be to tackle the issues affecting its quality.

The growth of live subtitling

- 2.9 Before 2005, subtitling (and other access services) were largely confined to public service channels, such as the BBC and ITV. Even for these channels, television access services were not generally available with the versions made available by cable and satellite.
- 2.10 The Communications Act 2003 required Ofcom to extend requirements to many more channels, including the growing number available by cable and satellite. The approach taken by Ofcom – to require channels with an audience share of 0.05% or

⁴ Clause 59, *Broadcasting: An Agreement Between Her Majesty's Secretary of State for Culture, Media and Sport and the British Broadcasting Corporation*, July 2006

(http://www.bbc.co.uk/bbctrust/assets/files/pdf/about/how_we_govern/agreement.pdf)

⁵ Ofcom (2013), *The Communication Market Report: UK*, Figure 2.46 'Average hours of television viewing per day, by age, all homes', UK. (http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr13/UK_2.pdf)

⁶ Ofcom (2006) *Provision of Access Services - Research Study Conducted for Ofcom*, pp 21-22.

(<http://stakeholders.ofcom.org.uk/binaries/consultations/accessservs/annexes/provision.pdf>)

⁷ A.C. Davis (1990) *Epidemiological profile of hearing impairments: the scale and nature of the problem with special reference to the elderly*, MRC Institute of Hearing Research, Nottingham University, UK.

(<http://www.ncbi.nlm.nih.gov/pubmed/2087969>)

⁸ Deafness Research UK (2012), *About childhood deafness*, (<http://www.deafnessresearch.org.uk/content/your-hearing/children-deafness/childhood-deafness/>)

⁹ Ofcom, March (2006), *Provision of Access Services - Research Study Conducted for Ofcom*, pp 4.4 (<http://stakeholders.ofcom.org.uk/binaries/consultations/accessservs/annexes/provision.pdf>)

more to provide television access services - means that over 90% of viewing in the UK is to channels that are required to provide some subtitling. Ofcom also sought to ensure that television access services were provided when channels were broadcast by cable and satellite.

- 2.11 Initially, most of the subtitling was for pre-recorded content, so viewers had little access to live programming. But as targets rose it became necessary for broadcasters to subtitle more live programming in order to meet their obligations. Although Ofcom accepted that subtitling live programmes was more difficult than subtitling pre-recorded programmes, it resisted pressure to exempt live programming altogether. As a result, the amount of live subtitled programming has increased markedly in recent years, and hearing-impaired viewers have come to expect a similar level of access to television as other viewers.

Why Ofcom decided to look at live subtitling

- 2.12 Alongside the enormous increase in the quantity of subtitling, complaints about its quality have persisted. When Ofcom last looked at this issue in the context of a wide-ranging review in 2006, we identified concerns with speed, delays and accuracy, particularly in relation to live subtitling, as well as technical problems with the transmission and reception of subtitles. Feedback suggested that more people thought that the quality of live subtitling was improving than considered it was getting worse. Ofcom expressed the hope that many of the technical problems that gave rise to quality problems would be resolved as the technology matured.¹⁰
- 2.13 However, complaints from viewers and Ofcom's own observations suggest that there are continuing problems with the quality of live subtitling in particular. It has been argued that human error and technical complexity render the problems affecting the quality of live subtitling intractable. With this in mind, Ofcom concluded that:
- a) there would be value in looking at what contributed to or detracted from the quality of subtitling from the viewer's perspective;
 - b) the main focus should be on live subtitling, which was more prone to errors and delays than pre-prepared subtitling;
 - c) there might be scope for small but significant improvements in respect of different aspects of quality;
 - d) taken together, these improvements could make an appreciable difference over time to the quality of the viewing experience for those relying upon subtitles to understand and enjoy television.
- 2.14 In the iterative process that followed, Ofcom:
- a) noted the feedback indicating that live subtitling in particular remained problematic, and identifying individual problems;
 - b) undertook a trawl for research relating to those problems, which was helpful in establishing the facts behind the understandably non-scientific observations of subtitle users; and

¹⁰ *Television Access Services – Review of the Code and Guidance*, Ofcom, March 2006 (<http://stakeholders.ofcom.org.uk/binaries/consultations/accessservs/summary/access.pdf>)

- c) tested emerging views about the range and significance of problems affecting the quality of the viewing experience with subtitle users, advocacy groups, broadcasters and access service providers.

The consultation

- 2.15 In May this year, Ofcom consulted on proposals that would require broadcasters to measure and report upon:
- a) key dimensions of quality that will make areas for improvement evident and would encourage them to focus on ways of improving performance to the benefit of viewers who rely upon subtitling; and
 - b) the number of pre-recorded programmes that are accepted later than the intended 'delivery date' to encourage broadcasters to strive to reduce the quantity of pre-recorded programming which has to be transmitted with live subtitling, which is necessarily of lower quality than pre-prepared subtitles.

We said that we would assess the impact of these actions and their effectiveness in the light of experience.

- 2.16 We also asked broadcasters for their views on the scope for delaying the transmission of some 'live' programmes slightly, which subtitling providers had told us would allow sufficient time to make an appreciable difference to the quality of subtitling provided.
- 2.17 Finally, we asked broadcasters to provide information on the causes of technical failures in the provision of subtitling, in order that we could understand whether there are particular aspects of the production or transmission processes that require attention. We explained our belief that it would be in the public interest to encourage broadcasters to be as frank as possible in providing information, despite the issues of commercial confidentiality that might arise, given that several parties are involved in the production and transmission processes. For this reason, we proposed to publish the information collected in a form that will preserve that confidentiality.
- 2.18 The following section summarises the responses to the consultation, and Ofcom's decisions.

Section 3

Consultation responses and Ofcom's conclusions

Introduction

- 3.1 This section summarises responses given to the questions posed in the consultation, as well as other matters raised, and Ofcom's conclusions. With the exception of one confidential submission, all the responses have been posted on our website. In formulating our conclusions, we have taken account of all the responses and the information available to Ofcom.
- 3.2 Respondents to the consultation included:
- a) groups and bodies representing the interests of people using television access services – the National Association of Deafened People (NADP), Action on Hearing Loss (AHL – formerly the RNID), the National Deaf Children's Society (NDCS), Media Access Australia (MAA), Hearing Link, Sense, Signature, the UK Council on Deafness (UKCoD), and the Communications Consumer Panel;
 - a) individual respondents - subtitle users and others;
 - b) subtitling providers – Red Bee Media (RBM) and Deluxe Media (DLM);
 - c) broadcasters - the BBC, ITV, Channel 4, Channel 5, S4C, UTV¹¹, British Telecommunications (BT), British Sky Broadcasting Limited (Sky), and one other broadcaster that wished to remain anonymous; and
 - d) academics from the University of Roehampton (Dr Pablo Romero-Fresco) and the University of Huddersfield (Professor Dan McIntyre and others).

General points

- 3.3 In addition to responding to the individual questions posed, a number of stakeholders offered general remarks on the approach set out in the consultation paper.

Subtitle user representatives and others

- 3.4 Organisations representing hearing-impaired viewers welcomed the consultation, saying variously that it addressed an issue that had long been a source of complaint by people with hearing loss (AHL), that prompted more complaints than any other (NADP), that affected millions of hearing-impaired viewers (Hearing Link), including deaf young people (NDCS), and that was absolutely crucial to people with dual sensory impairment (Sense).
- 3.5 Signature noted that television is a shared cultural experience that deaf people should be able to enjoy in the same way other people take for granted. Better quality subtitles would make a great difference to the TV viewing experience of deaf people.

¹¹ UTV, a Channel 3 licensee, said that it endorsed ITV's response, and did not offer any further comments. Accordingly, we have not referred separately to it in this section.

UKCoD said that Ofcom's proposals represented an important step in ensuring that problems with subtitles are treated in the same way as problems with sound or vision. The CCP, noting the significant increase in the amount of subtitling since 2004, was pleased that Ofcom's focus had moved to improving the quality of subtitling.

- 3.6 The NADP said that it received more complaints from its members on this issue than on any other topic, both on the lack of accuracy of the subtitles and also on the delay before they appear, both of which greatly reduced the enjoyment and comprehension of programmes.
- 3.7 NDCS said that TV subtitling was an important issue for deaf children and young people. It cited a recent online survey of almost 500 deaf young people (12-18), of whom 88% said that they used subtitling to enjoy television. However, many reported problems with subtitling. The main complaints were latency, errors and subtitles ceasing to work. In conclusion, it supported Ofcom's work to help improve the quality of live subtitling by working with broadcasters, subtitling providers and representatives of end-users.
- 3.8 Sense said that, for people with dual sensory impairments (of varying degrees), quality live and pre-recorded subtitles helped to overcome the challenge of combined sight and hearing impairment. When text is too fast, delays are too long and errors occur, the ability to maintain focus, concentration and understanding is impeded to the point of capitulation.
- 3.9 The University of Roehampton's Dr Romero-Fresco said that, compared to many other parts of the world, the standard of live subtitling was of very high quality. But viewers had a right to demand even more quality. Though future developments would depend largely on technological development, human intervention would be needed for many years to come, so the contribution to the enhancement of subtitling quality of professionals was just as important. The data to be gathered from measurements would be extremely useful for these professionals to understand issues such as how much editing should be done, and how this affects latency etc. The one-stop shop suggested by the BBC (see below) could allow viewers to make complaints and obtain information, and could prove useful in managing unrealistic expectations, as well as obtaining feedback on aspects of subtitling quality.

Broadcasters and subtitling providers

- 3.10 Broadcasters welcomed the opportunity to respond to the consultation, and stressed that they took their responsibility to deliver high quality subtitling seriously (BBC, Channel 4, Channel 5, Sky, another broadcaster). BT said that it understood the difficulties experienced by some people with hearing disabilities in relation to subtitling quality. Sky said that it supported Ofcom's endeavour to improve the quality of live subtitling and was not in principle against the provision of information to support this. It agreed with Ofcom that latency, accuracy and presentation were key quality dimensions. ITV welcomed the recognition of the lengths to which broadcasters go to ensure that subtitling is of reasonable quality and is successfully transmitted to viewers.

Calls for further research

- 3.11 However, the BBC said that the AHL survey of its members was not a sufficient basis for an empirical understanding of the viewing experiences of subtitle users, and Sky

said that the consumer research disclosed by Ofcom did not support the case for intervention.

- 3.12 The BBC suggested that, before considering changes to the present regulatory framework, Ofcom should commission research on the viewing experiences of subtitling users that could accurately gauge the priorities of hearing-impaired viewers, and test the degree to which access services distort their concerns compared to the wider UK public's concerns about their TV experience (such as repeats or a perceived 'lack of variety'). Sky advocated research that would consider the complex matrix of trade-offs between speed, accuracy, latency and presentation, and offered to help design the research.

Methodology for measuring quality

- 3.13 Several broadcasters commented on the proposed methodology for measuring the dimensions of quality. Channel 4 said that a framework for measuring quality could be a helpful way of publicly reporting the progress made in delivering high-quality subtitles and bringing objectivity to a field previously dependent on subjective assessments. Channel 5 said that it could lead to a research resource that might inform future improvements in subtitling quality.

- 3.14 Broadcasters also expressed concerns that:

- a) measurements should be consistent across broadcasters (Channel 4, Channel 5), to ensure confidence in the results (BBC). Some suggested that this would be best achieved by Ofcom carrying out all or some of the measurement (BBC, Channel 5). Others said that an agreed methodology should be adopted (BBC, Channel 4); this could take time to develop (BBC, Channel 4). Channel 4 said that detailed guidance would be needed on issues such as what constituted different categories of inaccuracy;
- b) the measurement costs should not be disproportionate, particularly as they received relatively few complaints about the quality of live subtitling (BBC, Channel 4, Sky, another broadcaster); and
- c) publication of the reports could lead to proposals to spend money on securing improvement; there should be an objective assessment of whether the costs are proportionate, informed by market research (BBC).

- 3.15 The BBC suggested that, to ensure confidence in the results, it would be necessary for Ofcom to undertake the analysis. In order to avoid unfair comparisons between broadcasts of varying complexity, it suggested that consideration would need to be given to an objective approach to sampling – one example could be sampling of regular opening news bulletins. It would then be appropriate to produce estimates of the costs of all the proposals that emerged, and to carry out an objective assessment and validation that these are proportionate. In addition, the approach should be properly informed by professional, independent and representative market research using qualitative and/or quantitative research methodologies.

Effectiveness of proposed measurements

- 3.16 Several broadcasters expressed scepticism that reporting on measures of quality would help to drive significant improvements. Sky said that technology improvements would be more effective than mandatory reporting. It also pointed to the fact that a significant number of broadcasters (including Sky) used the same subtitle providers,

limited the scope for individual improvements by broadcasters. BT said that as more subtitling became available, related problems could be expected to arise. Channel 5 did not think that substantial increases in both the accuracy and latency of live subtitling were possible. It would be far better for all parties to recognise this and accept that of necessity live subtitling will fall short of the quality of pre-recorded subtitling. Channel 4 cautioned that broadcasters might not be able to deliver significant quality 'uplifts' year after year.

Alternative proposals

3.17 Some broadcasters made alternative proposals:

- a) in the light of its comments on the methodology, the BBC thought that it would be better to establish a one-stop-shop for complaints, with guidance on how to make complaints to broadcasters. It would be happy to discuss with charities the possibility of strengthening their engagement with the BBC and formalising meetings with BBC managers on a periodic basis, alongside other initiatives to boost dialogue and shared understanding;
- b) one broadcaster suggested that self-regulation should be allowed to continue; Sky was also unpersuaded that regulatory intervention was necessary; and
- c) BT said that if Ofcom wished to monitor the quality of subtitling, it could do so itself, rather than requiring broadcasters to measure and report on their own performance.

Ofcom's response

3.18 Ofcom notes the broad support from representatives of hearing-impaired people for efforts to improve the quality of live subtitling, subject to their more specific comments, outlined below.

3.19 Ofcom's response to points raised by broadcasters under the headings above is summarised below.

Calls for further research

3.20 Ofcom agrees with the BBC and Sky that the AHL survey, by itself, would not be a sufficient basis for an empirical understanding of the viewing experience of subtitle users. Indeed, we pointed out in the consultation paper (paragraph 3.12(d)) that it had been carried out by an advocacy body, and was not based on a nationally representative sample of people with hearing impairments. That said, Ofcom remains of the view, as we said in the consultation paper, that it does help to illustrate the problems that respondents say they encounter when using live subtitling.

3.21 In any case, the survey did not form the sole basis for identifying the key dimensions of subtitling quality, or establishing that each of these could cause problems for some subtitle users. As explained in the consultation document (paragraph 3.36), our assessment of the key dimensions of quality was based on a range of sources, including the academic research cited in the consultation document, complaints received by viewers, and prior consultation with broadcasters, representative bodies and subtitle users. We found broad agreement with the key dimensions of quality that we identified as a result of this process. In this connection, we note that none of the bodies representing the interests of hearing-impaired viewers have disagreed with the analysis set out in the consultation paper.

- 3.22 Moreover, there seems little disagreement on the part of broadcasters, and none has suggested different factors. Sky agreed that latency, accuracy and presentation are key to the quality of live subtitling; it also appreciated that the speed of subtitling contributes to overall quality. Channel 4 said that it was right to focus on a basket of measures looking at several aspects of quality, such as speed, latency, accuracy or presentation. Channel 5 said that it understood that viewers want subtitles to be both accurate and to appear as soon as possible after the audio has been transmitted. The BBC explained its efforts to keep latency to a minimum, and why it regards accuracy as a key performance indicator. Accordingly, we do not consider that it would be either necessary or cost-effective for Ofcom to commission further research on the components of quality.
- 3.23 By the same token, Ofcom does not consider that much would be gained by undertaking further research to rank the dimensions of quality and / or ascertain the optimum balance between the different dimensions, as advocated by the BBC and Sky. Even if conclusions could be reached, they would not be valid for all subtitle users, nor fixed for all time.¹² Ofcom believes that there is sufficient evidence that each has a significant bearing on the understanding and enjoyment of television by hearing-impaired viewers, and that each should therefore be addressed. Ofcom recognises that, in principle, improvements in, say, latency could impact accuracy. However, we consider that there is scope to establish dependencies through experimentation, as broadcasters have done to date. Accordingly, we do not think the research proposed by the BBC and Sky would yield extra information of sufficient value to warrant the consequential delay and expense. This does not, of course, preclude broadcasters from conducting research in this area, as the BBC already does.¹³
- 3.24 As regards the BBC's reservations about relying on small sample sizes, Ofcom is satisfied that, although the 'dipstick' measures proposed would not be representative of all output, they would provide indicative data on the quality of live subtitling in the popular news, entertainment and chat show programming to be sampled. We consider that these data would be a helpful and proportionate means of identifying opportunities for improvement, and encouraging broadcasters to tackle them. Indeed, we note that the BBC, ITV, and Channel 4 already receive reports on speed and accuracy from their subtitling providers. The main effect of Ofcom's proposals would be to require broadcasters to carry out similar checks using a standardised approach.

Methodology for measuring quality

- 3.25 Ofcom agrees that it is important to ensure that measures across broadcasters are applied consistently, using a single methodology. Ofcom's plans for securing this are set out below. We also agree that the costs should not be disproportionate. Ofcom considers that the proposals to require broadcasters to analyse a limited number of programme samples at six month intervals ensure this. We have been advised that this process should only take a few working days on each occasion, and that it has the potential to replace or supplement similar staff assessments that are carried out by subtitling providers as part of their normal business.

¹² Indeed, it was RBM's willingness to challenge the accepted balance between latency and accuracy which has led to the improvements that the BBC and Channel 4 referred to in their submissions.

¹³ The BBC R&D North Usability Lab is presently conducting research into how the formatting and position of subtitling can improve the viewer experience, how speech recognition could be improved for respeaking, how the subjective perceptions of viewers about the quality of subtitling is influenced by changes in latency, and at the scope for offering an i-Player stream with synchronised live subtitles by slightly delaying transmission (see <http://www.bbc.co.uk/rd/projects/live-subtitle-quality>).

- 3.26 As regards the BBC's suggestion that it would be appropriate to produce estimates of the costs of all the proposals that emerged, and carry out an objective assessment and validation that these are proportionate, we note that there are at present no proposals for further regulation beyond measurements of subtitling quality for a period of two years.

Effectiveness of proposed measurements

- 3.27 Ofcom agrees that technological developments offer significant potential to improve the quality of live subtitling, though we note that operational changes have also played an important part. Measurement data can complement and support efforts to improve subtitling quality, by highlighting those areas where problems exist.
- 3.28 While it is true that several broadcasters use the same subtitling provider, they are not bound to do so, nor indeed to use any third party providers – they use them by choice, and remain responsible for the quality of their output. Even the use of the same provider by several broadcasters does not preclude different contractual arrangements, nor does it prevent broadcasters from differentiating by taking measures within their direct control, such as ensuring the timely provision of programmes to subtitling providers. Accordingly, we do not accept the premise that the fact that several broadcasters use one supplier means that they cannot influence improvements individually.
- 3.29 Ofcom accepts that improvements in subtitling quality will not be straightforward. Indeed, we made clear in the consultation paper our view that 'to achieve an appreciable improvement in the quality of live subtitling, small improvements would be needed in several areas' (paragraph 1.9). But Ofcom does not agree that higher quality levels are unachievable; indeed, the work done by RBM in devising improvements to subtitling quality and continuing research by the BBC¹⁴ suggests that incremental improvements are likely to be possible, and that these would help to promote the 'understanding and enjoyment' of live-subtitled television programmes by people with hearing impairments, which is the duty laid upon Ofcom by Parliament.¹⁵

Alternative proposals

- 3.30 As regards the alternative proposals made by some broadcasters, Ofcom:
- a) notes, in connection with the BBC's proposals for enhanced communications with disability organisations and a Parent Port-type complaint portal, that Ofcom's own website already provides links to each broadcaster for those wishing to make complaints about access services¹⁶ and there is already scope for viewers to complain either to Ofcom or directly to broadcasters, though one individual said that complaints to some broadcasters go unanswered. In addition, all the major broadcasters already meet disability organisations periodically to discuss access service issues. That said, Ofcom would welcome moves by broadcasters to make their own complaints procedures more accessible and easier to use. However, we do not see this as a substitute for

¹⁴ See footnotes 12 and 13

¹⁵ Ofcom is tasked by section 303 of the Communications Act 2003 with providing guidance to broadcasters on how they should promote the understanding and enjoyment of television by people with sensory impairments.

¹⁶ <http://consumers.ofcom.org.uk/tell-us/tv-and-radio/subtitling-signing-or-audio-description/>

gathering objective data on speed, accuracy and latency of live subtitling, in order to inform efforts to improve quality;

- b) notes that we are not currently proposing to regulate the quality of live subtitling directly. We are asking broadcasters to report in terms of standardised measures, but we are not proposing to set targets for the time being; and
- a) considers that asking broadcasters to take responsibility for the quality of their live subtitling output would increase the likelihood that senior broadcasting staff see and consider the reports. We also consider it reasonable that those broadcasters that are responsible for the vast majority of live subtitling should bear the costs of checking the quality of their output, rather than this being funded (through licence fees paid to Ofcom) by all broadcasters.

Average speeds of subtitling

Ofcom's proposals

- 3.31 Ofcom proposed that broadcasters should be required to measure and report on the average speed of subtitling. This would be based on a number of short samples of programmes that Ofcom would select every six months from news and other programmes. Broadcasters would be required to make available recordings of these segments to Ofcom in order that spot checks could be carried out.
- 3.32 In particular, we asked whether consultees agreed that broadcasters should be asked to:
 - a) measure and report every six months on the average speed of live subtitling in a variety of programmes, based on a sample of segments selected by Ofcom; and
 - b) report separately on different types of live programming. We suggested the categories of live news programmes, chat shows and entertainment programmes.

Consultation responses

Subtitle user representatives and others

- 3.33 NADP, NDCS, Hearing Link, AHL, UKCoD, Signature, Sense, the University of Huddersfield and 13 members of the public agreed with Ofcom's proposals to measure the speed of subtitling. Sense said the comprehension of people affected by both visual and hearing impairments was likely to be particularly impacted by rapid subtitling.
- 3.34 In comments on how subtitling speeds should be measured and reported, several respondents said that the methodology should be transparent so that results could be easily and meaningfully compared (NDCS, Hearing Link and UKCoD). Three (AHL, NDCS, Dr Romero-Fresco) said average speeds should be measured over 'fully spoken' excerpts and not those containing significant amounts of music or no dialogue. The results should be widely available to the public and published on the broadcasters' and Ofcom's websites (NDCS, AHL, UKCoD, an individual). In other suggestions, Signature asked that the number of subtitles broadcast at a rate of no

more than 145 wpm¹⁷ be measured, and Sense said Ofcom's sampling should include both scrolling and block text styles so that variations in speed dependent on the style of presentation could be identified and reported upon.

- 3.35 One individual disagreed that averaged speeds would be a helpful measure of the quality of live subtitling. She said that subtitling speeds that forced the viewer to focus on the text might be more acceptable in news programming, for example, and that this would be preferable to the deaf community than editing. She suggested that complex material led to natural moderation of speed due to the technical challenges it presented to re-speaking and stenography.¹⁸
- 3.36 Most respondents agreed that subtitling speeds should be reported for different categories of programme (Signature, UKCoD, NADP, Hearing Link, etc). Several suggested that the news and current affairs programmes were a particularly important category for deaf/hard of hearing viewers (Signature, UKCoD, NADP and Hearing Link). There was general support for Ofcom's proposed categories, but some suggested additional categories, such as quiz programmes (NADP), weather reports (AHL, Sense and UKCoD), voiceovers (Hearing Link, UKCoD) and sports programmes (Sense, UKCoD). NADP noted that entertainment programming was a wide category that might require further breaking down in terms of viewer experience of live subtitling.
- 3.37 Researchers from the University of Huddersfield agreed with our proposal that broadcasters should report on live news programming and believed that chat shows and entertainment programmes were sufficiently similar to require reporting on only one category. They believed broadcasters should be required to report on unscripted discussion programmes (e.g. Question Time) and programmes with specialist vocabulary.

Broadcasters and subtitling providers

- 3.38 ITV agreed with the proposal in principle, subject to more detail on the practicalities. Channel 5 thought it could lead to the development of a useful research resource, though it was not clear how this resource would lead to improvements. S4C agreed with the proposal, and said that it would allow broadcasters to share and gain information.
- 3.39 There was broad agreement that, if speed was to be measured, it should be done separately for different genres (BBC, Channel 4, Channel 5, ITV, S4C). Some suggested that it would make sense to look at additional or different categories to those suggested by Ofcom (S4C); suggestions included sport (BBC, ITV), regional news (ITV). Some pointed out that sports events would need to be similar in nature to allow comparison (BBC, S4C). However, Channel 4 felt that it was prudent to limit the number of categories initially.
- 3.40 However, several broadcasters were dubious about the merits of reporting on average speeds. Some noted that they or their providers already measured the speed of subtitling to some extent (BBC, Channel 4, DLM, ITV, RBM). Subtitling providers (DLM, RBM) said that measuring average speeds of live subtitling was

¹⁷ Suggested as the most appropriate speed for maximum comprehension c.f. Jensema (1998), cited in Pierre Dumouchel, Gilles Boulianne and Julie Brousseau 'Measures for quality of closed captioning', CRIM, Canada.

¹⁸ For a discussion of how subtitles are produced, see section 4 of our consultation document. <http://stakeholders.ofcom.org.uk/consultations/subtitling/>

possible, but RBM was unconvinced that measuring the average speed of a sample of programmes would help to improve live subtitling quality.

- 3.41 The BBC said that its spot checks had not identified any live subtitling exceeding 170 wpm; if this was happening, there might be other causes, such as temporary technical faults in the production chain or set top boxes, resulting in subtitles being buffered, then released too rapidly. In any case, it considered that considerable resources would be required to devise and apply an appropriate measurement methodology, and that this would be disproportionate given the small number of complaints about subtitling speeds.
- 3.42 Sky said that it would be a problematic measure as subtitling speeds were subject to too many variables outside the control of the broadcaster. In any case, it was unclear how it would drive improvements, which were largely dependent on technological progress. Accordingly, it did not agree with measurement and reporting. Ofcom's proposed requirements would increase the costs of providing access services and detract from increasing the volume of such programming.

Ofcom's conclusions

3.43 Ofcom:

- a) agrees that there would be some merit in broadening the range of genres to be sampled, but considers that the immediate priority should be to gain experience in the initial range of genres we proposed. We may add to the list in the light of experience;
- b) agrees that speeds should be measured separately for programmes in different genres. However, we do not agree that establishing the range of different speeds is unlikely to contribute to possible improvements in the quality of live subtitling. For example, the data gathered may shed light on anomalies or differences in approach that may present opportunities for improvements in quality;
- c) notes that, although some respondents have cast doubt on whether live subtitling ever exceeds the current recommended maximum of 160-180 wpm, some research suggests that it does. Other research cited in section 3 of our consultation paper also suggests that subtitling at this speed may be problematic for subtitle users.¹⁹ Ofcom considers that it would be helpful to get more data on actual speeds, in order that this can be used, together with relevant research, in reviewing Ofcom's guidance; and
- d) notes that the speed of subtitling may not be due solely to production methods in all cases, and that transmission problems or problems in a viewer's receiver may sometimes result in subtitling being held back and then released in a burst. Ofcom notes that broadcasters undertake the transmission arrangements, either directly or through third parties with whom they contract, and that they remain responsible for ensuring that the services they provide to viewers include subtitling which complies with the requirements of Ofcom's code.

¹⁹ See paragraphs 3.32 to 3.33 of the consultation paper, and J Martínez and G Linder (2010) '*The reception of a new display mode in live subtitling*' (2010) in M Carroll, J Diaz Cintas, Y Gambier and M O'Hagan (Eds.) Eighth languages & the media conference.

Guidance on subtitling speeds

Ofcom's proposals

- 3.44 We invited consultees' views on whether it would be appropriate to review the guidance in Annex 4 to the Code on Television Access. This suggests that subtitling speeds 'should not normally exceed 160 to 180 words per minute for pre-recorded programmes' and that, for live programmes, commissioning editors and producers should be aware that 'dialogue which would require subtitles faster than 200 wpm would be difficult for many viewers to follow'.
- 3.45 Finally, we asked whether consultees agreed that it was not appropriate to set a maximum target for the speed of subtitling as there may be exceptional circumstances when higher speeds would be appropriate.

Consultation responses

Subtitle user representatives and others

- 3.46 Most organisations representing deaf and hard-of-hearing people agreed with Ofcom's proposals.
- 3.47 NADP, NDCS and Signature believed that how the content was edited to achieve an appropriate speed was more important than the speed itself; but suggested that if programme types were consistently exceeding recommended speeds for live subtitling this should be reported. Hearing Link was concerned about the problems some deaf people would face when presented with subtitles at speeds in excess of 200wpm, but agreed with Ofcom's view that a target for maximum speed was not appropriate at this stage, as did AHL, NADP and UKCoD. UKCoD suggested that the phrase in the guidance 'not normally exceeding' could be strengthened to encourage positive action in this area.
- 3.48 Sense said that people with a dual impairment frequently had an experience of being unable to keep up with the fast pace of the text. They therefore believed the guidance should be reviewed to ensure the speed of subtitles was within an acceptable tolerance. Some subtitle users believed a target for maximum speed should be set. One member of the public said too many words made subtitling processing difficult. Some service users who believed that a maximum target for speed of subtitling should be set commented not on subtitles being too fast, but rather that they were too slow and did not keep up with the on-screen action.
- 3.49 Dr Romero-Fresco considered that a maximum target speed might constrain re-speakers from taking other factors into account, but suggested that the guidance did need to be reviewed, so that it reflected the latest understanding about subtitling speeds and their impact on viewers.
- 3.50 Most members of the public did not comment on whether the guidance should be reviewed; of those who did, views were mixed. One supported a review, another thought it unnecessary, and a third said that it would not be helpful without a greater understanding of how speed regulation might affect latency and accuracy. There were also a variety of views on whether a maximum target for speed of subtitling should be set. Two pointed out that reading speeds for individuals varied, particularly between those who were pre-lingually deaf, and those who had lost hearing later in life. This would make a single target hard to achieve. Another said they would rather

have fast subtitles showing every word than slower subtitles giving a simplified summary.

Broadcasters and subtitling providers

- 3.51 The BBC, BT, Channel 5, ITV, Sky and RBM believed Ofcom's existing guidance was sufficient and did not need to be reviewed at present. BT suggested it might be updated if new research evidence became available.
- 3.52 RBM agreed with the statement in the guidance that "dialogue which would require subtitles faster than 200wpm would be difficult for many viewers to follow", and explained the physical techniques of subtitling meant it was difficult to create live subtitles at speeds too fast for the average viewer to read. The BBC said that, even in programmes with very fast speech, the likelihood of going above 200wpm was very low. In the past year, their own spot checks had not registered any live subtitles at speeds above 170wpm.
- 3.53 The subtitling service providers who responded to the consultation agreed that a maximum target for speed of subtitling was not appropriate at this time. Deluxe Media explained that viewers could process more words per minute when block subtitles were used than with scrolling titles, meaning a maximum target for all live subtitling might not deliver the best service to viewers.
- 3.54 BT believed there was no need for a maximum target at present but suggested that Ofcom keep this under review. Sky agreed that a target was not appropriate and commented that speed was only one dimension of quality. S4C also cited the tension between speed and accuracy as well as a number of other variables in support of their agreement with Ofcom's proposal that a maximum target was not appropriate. They believed pressure to achieve a specific speed might impact adversely on the accuracy of subtitles.

Ofcom's conclusions

- 3.55 It is clear that there would be merit in looking again at the guidance in the light of the research now available, but Ofcom considers that it would be better to do so in the light of data from the measurement exercise. Ofcom will then consider whether there is a case for revising the current guidance on both speed and latency, and whether targets should be set. In doing so, we will have regard to the data, relevant research, and the views of interested parties. Pending that, we do not consider that it would be appropriate to gather data on subtitles exceeding a particular speed.

Latency

Ofcom's proposals

- 3.56 Ofcom proposed that broadcasters should be required to measure both the average latency of subtitling and the range of latencies, based on a number of short samples of programmes that we would select.
- 3.57 Ofcom also asked consultees whether they agreed with our view that it was not appropriate to consider targets for latency until we knew more about what was actually possible.

Consultation responses

Subtitle user representatives and others

- 3.58 There was strong support for measuring the latency of subtitles on their programmes. AHL said their research showed latency to be the biggest cause of problems for deaf or hard-of-hearing people watching programmes with subtitles. Sense also commented that latency and delays were the most significant and frequently reported problems with live subtitling by people with dual sensory impairment. They explained that if latency extended too much, comprehension of a programme was limited or lost completely. NDCS, AHL and NADP welcomed Ofcom's proposal to measure average latency and the range of latencies. NDCS also agreed the measurements should cover a range of programme types.
- 3.59 Several respondents agreed a maximum target for latency should not be set at this stage, although they believed a target might be appropriate when more research had been carried out (AHL, NADP, NDCS, Signature and Sense). However, individual respondents largely favoured a maximum target, pointing out that significant delays made comprehension difficult or impossible (particularly for news), and affected the enjoyment of programmes.
- 3.60 A number said that further research was required to determine optimum latency levels to avoid adverse impact on comprehension (AHL, Sense, an individual); Hearing Link said that targets should not be considered until more information was available about what was possible. An individual respondent said that there were many points in the transmission chain that could affect latency. She also suggested the balance between accuracy and latency differed according to the programme genre (for example, in news programming, accuracy was more important than latency).
- 3.61 While a number of respondents agreed that latency often exceeded 3 seconds, they nonetheless felt that the guidance should be retained (AHL, NADP, NDCS), to encourage broadcasters to make greater efforts (NADP).²⁰ MAA said that a target of 3 seconds delay was appropriate, but would be difficult to achieve in practice; in Australia, the average delay was around 5 seconds. Dr Romero-Fresco said that data from recent studies suggested that the current average latency is closer to 6-8 seconds, and that the guidance that latency should be less than 3 seconds could not realistically be met at present. Signature believed broadcasters should report on the number of subtitles delayed by more than 5 seconds.

Broadcasters and subtitling providers

- 3.62 There was general agreement on the part of broadcasters and subtitling providers that it would be premature to set targets for latency (BBC, Channel 4, Channel 5, ITV, RBM, Sky). Setting targets might prejudice the speed and accuracy of subtitling (BBC, Sky). Channel 5 did not see how targets could be set or enforced. Several suggested that latency could be affected by a variety of factors that were not solely within the control of broadcasters (DLM), including the complexity of the transmission chain (BBC, ITV, RBM, Sky).

²⁰ Ofcom's current guidance (paragraph A4.18 of the Code) says, amongst other things, that: '*In live programmes, the aim should be to keep the inevitable delay in subtitle presentation to the minimum (no more than 3 seconds) consistent with accurate presentation of what is being said.*'

- 3.63 Broadcasters offered a number of observations related to the measurement of latency. Channel 4 asked at what point in a programme this should be measured, noting that, as delays varied throughout the course of a programme, it had not been possible to agree on a 'single' latency number. ITV said that inevitable fluctuations in latency during a programme would need to be considered when specifying programme samples. S4C and ITV said the type of programme would determine latency to a certain extent (for example, latency was inevitable in fast-moving programmes such as a rugby game). ITV believed Ofcom needed to specify platform and receiving equipment if it required broadcasters to measure latency.
- 3.64 The BBC said that more work was needed to investigate the causes of latency, as well as to ensure that standards for receivers set by the Digital Television Group (DTG) were appropriate and applied both to existing receivers, and to emerging connected TV equipment.

Ofcom's conclusions

- 3.65 Ofcom notes that virtually no-one believes that the recommended maximum 3 second delay specified in the guidance is achievable. However, there is little enthusiasm for the guidance to be reviewed. Broadcasters are content for this recommendation to remain in the guidance provided it is not hardened into a target. Bodies representing hearing-impaired viewers want to retain the guidance, because they hope that it will encourage broadcasters to strive to achieve it.
- 3.66 Ofcom sees little value in reviewing the current guidance until data is available from the measurement exercise. Accordingly, we will defer any review until more data is available, and will take account of the research available at that point.
- 3.67 Ofcom recognises the point made by broadcasters, that latency may vary across the course of a programme, and that it may also vary from one type of programme to another. It was for this reason that we proposed the measurement of both the average latency of subtitling and the range of latencies across the samples tested. We believe that this should help to shape a better understanding of how latency varies, and the extent to which it departs from the aim that delays should be kept to the minimum (no more than 3 seconds). If experience suggests that it may be appropriate to change the way that latency is measured, we would consider that.
- 3.68 Finally, Ofcom notes that broadcasters undertake the transmission arrangements, either directly or through third parties with whom they contract, and that they remain responsible for ensuring that the services they provide to viewers include subtitling which complies with the requirements of Ofcom's code.

Accuracy

Ofcom's proposals

- 3.69 Ofcom noted that access service providers' routine assessments of the performance of individual subtitlers often included measures of inaccuracies such as misspellings, omissions, and false but credible facts and figures.
- 3.70 Ofcom proposed that broadcasters should be asked to report on both gross error rates and the number of more serious errors to be found in excerpts selected by Ofcom from a range of programmes.

- 3.71 We invited consultees to comment on whether they agreed with our proposal to require broadcasters to measure and report every six months on error rates on the basis of Ofcom's selection from a range of programmes.

Consultation responses

Subtitle user representatives and others

- 3.72 NADP, AHL, NDCS, Signature, Sense, UKCoD and Hearing Link agreed with Ofcom's proposal that broadcasters should be asked to report on error rates, including the number of more serious errors, as did most individuals who commented. However, some respondents thought that greater granularity was needed. NADP and NDCS noted that some errors were more serious than others and believed a breakdown of type and severity of error was important; a simple count of errors would not be sufficient. NDCS and Signature believed assessment of severity should include categorisation of minor, standard and serious errors.²¹ Dr Romero-Fresco agreed, and said that measuring only serious errors could lead to unreliable data.
- 3.73 One individual suggested that it would be preferable to focus either on speed or accuracy rather than attempting to improve both at the same time.
- 3.74 Additional comments were as follows:
- a) AHL believed Ofcom should investigate instances of high error rates to improve future quality, while UKCoD and Hearing Link believed more clarity was needed about action that would be taken if broadcaster error rates remained high. Sense commented that it would be useful to report presentation errors such as poor positioning of subtitles;
 - b) NADP said they received many complaints about high error rates in subtitles for regional as compared to national news;
 - c) NADP suggested that repeated attempts at correction sometimes increased the latency of what followed when comprehension was not severely compromised by the error. They proposed that reporting on error rates should include the number of corrections made; and
 - d) the University of Huddersfield said that greater clarity was required on what constituted accuracy in subtitling.

Broadcasters and subtitle providers

- 3.75 Channel 5, ITV and S4C agreed in principle with Ofcom's proposal, provided a single methodology was applied to all broadcasters. S4C agreed that it would be beneficial for broadcasters to report on error rates twice a year in order to share and gain information from other broadcasters. However, some felt that Ofcom should carry out the analysis to ensure the necessary objectivity (BBC, Channel 5). BT said that if Ofcom considered checks necessary, it could carry them out, or use a third party.
- 3.76 DLM said that it already monitored error rates and error types, which were combined with speed measurements to form an overall metric. It would support its client on any

²¹ These are the names given to categories of error in the NER model, summarised in paragraph 3.34 of the consultation paper.

reporting requirements that it felt were necessary. RBM said that it had robust mechanisms in place regarding live subtitling accuracy. In addition, RBM measured the live accuracy rate of every subtitler every month, and had stringent procedures around error correction and error reporting.

- 3.77 The BBC suggested that the process could be very time consuming, and might be of limited public value, given that broadcasters already have individual quality checks agreed with access services providers. Sky disagreed with the need for measurements of accuracy, saying that improvements in the quality of live subtitling would be better achieved through technology improvements than mandated reporting.
- 3.78 Some broadcasters suggested that the methodology should distinguish between different types and degrees of accuracy – minor, standard (significant) and serious (BBC, Channel 5). A clear definition of each would be essential but difficult to agree and establish (BBC). Samples should be chosen from the previous 90 days for which recordings were retained (BBC, Channel 5); Sky pointed out that broadcasters were only required to keep recordings with access services for 60 days.

Ofcom's conclusions

- 3.79 Ofcom does not agree with Sky that it suffices to trust to technology (and the rate at which broadcasters choose to adopt it) rather than mandated reporting, and that there is no need to measure the number, types and seriousness of inaccuracies in live subtitling. There is no reason to suppose that reporting requirements will interfere with the adoption of new technology; indeed, to the extent that the published reports shed light on differences between broadcasters, they should help in identifying opportunities for improvement.
- 3.80 Ofcom does not agree with the BBC's suggestion that, as subtitling providers already report on key performance measures to individual broadcasters, there would be limited public value in consistent and publicly reported measures we have proposed. As we pointed out in the consultation paper (paragraphs 6.6 to 6.8), there are drawbacks with the way quality is measured at present. In particular, the detail underlying these measures is not available to other broadcasters or to users of subtitles, and in any case, the basis of the measurements may not be consistent between broadcasters.
- 3.81 Ofcom has therefore concluded that it would be appropriate to measure the accuracy of programme samples selected by Ofcom every six months from programming aired in the previous 60 days. To maximise consistency between broadcasters and to minimise the regulatory burden, samples will be the same as those used for measuring the speed and latency of subtitling, so will be drawn from genres common to all or most broadcasters.
- 3.82 Ofcom agrees with broadcasters that the same methodology should be applied to all, and that it should be transparent. We also agree with those respondents, both broadcasters and groups representing subtitle users, who called for a breakdown of errors by type and severity. This would provide helpful data on the nature of inaccuracies, and should not be unduly burdensome, given that the measurement of gross errors (the total number of errors) requires that each error be separately identified.
- 3.83 We also agree with those broadcasters who said that clarity around definitions would be important, though we note that as no broadcasters broadcast identical content, no

methodology could eliminate any conceivable variations that might conceivably affect comparisons between subtitling on different programmes.

- 3.84 In the light of the considerations outlined above, we have concluded that it would make sense to adopt an established methodology that has already been used by broadcasters, subtitling providers and academics, and which categorises errors by type and severity – the NER model – which we referred to in the consultation.²²
- 3.85 We agree that ensuring consistency between broadcasters will be important. To this end we have approached the University of Roehampton, which has conducted research on various aspects of subtitling quality, and which has used the NER model in this context. The University of Roehampton has agreed to put together a small team to validate the measurements undertaken provided by broadcasters from an expert, third party standpoint.
- 3.86 Once the validation exercise has been completed, Ofcom will clarify any outstanding points with broadcasters, and produce the final report. Ofcom intends that, if possible, the first round of measurement should be completed in time for the outcome to be included in the access services report due for publication in spring 2014.²³
- 3.87 Ofcom will meet with broadcasters in the next few weeks in order to explain how the NER model works, and how programme samples to be used for measurement purposes will be selected at random.

Presentation: block vs scrolling subtitles

- 3.88 In the light of research suggesting that block subtitles were easier and quicker to read, Ofcom invited the views of consultees on whether they preferred programmes subtitled live to carry scrolling subtitles or block subtitles.

Consultation responses

Subtitle user representatives and others

- 3.89 There was a consensus that block subtitles were easier to read and should be used where this was possible (AHL, Hearing Link, NADP, NDCS, Sense, Signature, several individuals). The NDCS noted that only 4% of families with deaf children had said that scrolling subtitles were a particular problem for them. However, given recent research, they felt that scrolling subtitles could be a particular problem for younger deaf children whose reading abilities may affect their ability to follow and fully understand subtitles. UoH believed scrolling subtitles could distract viewers by causing them to vary their reading speed.
- 3.90 Dr Romero-Fresco said that UK viewers reliant upon scrolling subtitles were being asked to perform a very complex and tiring task on a daily basis. The practice of displaying subtitles in varying bursts of one or more words made it extremely difficult

²² Pablo Romero- Fresco and Juan Martínez (2011), 'Accuracy Rate in Live subtitling – the NER Model', Roehampton University, UK

(<http://roehampton.openrepository.com/roehampton/bitstream/10142/141892/1/NER-English.pdf>)

²³ Ofcom publishes access service reports twice a year, normally in March and September, summarising the provision of access services respectively in the previous calendar year, and the first six months of the year of publication (<http://stakeholders.ofcom.org.uk/market-data-research/market-data/tv-sector-data/tv-access-services-reports/>).

for viewers to predict how long it would take for words to appear, and as a result, they spent much more time than necessary on the subtitles, missing out a great deal of the visual content. In the light of evidence on this issue, countries such as France, Spain and Switzerland had adopted block subtitling for live subtitling.

- 3.91 However, most respondents did not want block subtitling at the expense of latency (AHL, NADP, NCDS). A number considered that scrolling subtitles were better for live subtitling, particularly when advance preparation was not possible (AHL, NDCS). Sense said, for consumers with dual sensory impairment, preference for style depended on their visual ability. Dr Romero-Fresco pointed out that, in countries which used live block subtitling, respeakers were obtaining impressive results that were close (if not equal) to those obtained by scrolling subtitles in the UK.
- 3.92 Several organisations called for further research in this area (AHL, Hearing Link, NDCS, Sense, UKCoD, UoH). Dr Romero-Fresco said that research on viewers' comprehension and opinions of block vs scrolling subtitles would be useful.

Broadcasters and subtitling providers

- 3.93 ITV said that research showing that block captions were significantly easier to read accorded with feedback it had received from the deaf community. Its subtitling providers used block subtitling wherever possible. S4C was very much in favour of block subtitles. Even though scrolling subtitles might appear very slightly earlier than block subtitles, they required more concentration than block subtitles, so taking viewers' attention away from the picture on screen. Using block subtitles allowed viewers time to get more out of the programme – facial expressions etc – than could be delivered through subtitles.
- 3.94 The BBC accepted that block subtitles were easier to read, but said that using them for live subtitling would necessarily increase delays. It said that it was seeking to increase the amount of block subtitling in news bulletins, by preparing block subtitles for pre-recorded / repeated segments. Sky said the scrolling format for live subtitling they currently used helped to avoid unnecessary latency, delivering a service to subtitle users that was closer to that provided to other viewers. BT said that it was a matter of personal preference, and Channel 5 said that this was an issue for subtitle users to comment on.
- 3.95 DLM said that viewer feedback reflected the results of research, which showed that block captions were significantly easier to read, and allowed more time to focus on the image on screen. RBM said that block subtitles were preferable to scrolling subtitles and should be used wherever possible. Where there was time to cue subtitles as blocks on late delivered programmes, this gave viewers far more effective access than scrolling subtitles. But for real time subtitling, the delay that would ensue from block subtitles mean that scrolling subtitles gave better access.

Ofcom's conclusions

- 3.96 Ofcom welcomes the feedback from subtitle users, broadcasters and subtitle providers. It notes the clear consensus that block subtitles are easier for viewers to read and allow them to spend more time looking at images – in other words, they make for a much better viewing experience. However, it is equally clear that viewers do not want this to come at the expense of increased latency.

- 3.97 In this connection, we welcome the plans of the BBC to make greater use of block subtitles in news programming, both for pre-prepared packages, and for repeats of previous reports. We encourage other broadcasters to consider a similar approach.
- 3.98 Ofcom agrees with those respondents who said that block subtitles should be used whenever possible, and expects to reflect this in its guidance when this is next reviewed. In the meantime, Ofcom strongly recommends that when scrolling subtitles are used, repeats are reversioned with block subtitles.
- 3.99 Ofcom also agrees that it would be sensible if further work could be done in this area to understand the trade-offs between subtitles that are easier to read and increased latency. In the light of the tests carried out by S4C and the apparently successful adoption of block subtitles for live subtitling in France, Spain and Switzerland, Ofcom suggests that there would be merit in broadcasters experimenting with the use of block subtitles for some programmes (e.g. late night programmes on rolling news channels) and testing these with focus groups to see their reaction. Ofcom also encourages subtitling providers to examine what lessons can be learned from overseas experience and we look forward to maintaining an ongoing dialogue with broadcasters over this issue.

Delaying live transmissions

Ofcom's proposals

- 3.100 Ofcom, along with broadcasters and access service providers, recognises the frustration caused by the delay between speech and subtitling. In discussions before the consultation, access service providers told us that a delay of 15-20 seconds (like those used to allow offensive language to be 'bleeped' out) could help to improve the quality of subtitling – for example, by allowing for better edited subtitles to be prepared and presented in blocks, making them easier to read and comprehend.
- 3.101 For this reason, Ofcom invited consultees to tell us about the factors that might facilitate or hinder the insertion of a delay in live transmissions sufficient to improve the quality of subtitling.

Consultation responses

Subtitle user representatives and others

- 3.102 Several respondents were keen that the idea of inserting delays to improve the quality of live subtitling should be explored further (AHL, MAA, NADP, NDCS). MAA said that as these would mean a significant, instant improvement in quality of live captions which would not increase costs in the long run, the idea should be explored vigorously. NADP suggested that broadcasters experiment with the idea; Hearing Link believed that if a delay would improve the quality of live subtitling, Ofcom should consider imposing that as a requirement.
- 3.103 However, some individuals believed a delay in broadcasting might be incorrectly construed as censorship, or that 'non-live' broadcast television was undesirable. One user noted that delays in live sports, for example, would be less desirable than in an entertainment programme.

Broadcasters and subtitle providers

- 3.104 There were differing views about how long a delay would be necessary to make a significant difference to the quality of live subtitling. S4C said it had experimented with delays of 30 seconds and 12 seconds and believed around 25-30 seconds was an optimal delay for improving the quality of live subtitles. The BBC believed that the delay would have to be much greater than 20 seconds; a further subtitler would be needed to correct errors, making the costs disproportionate. Sky thought that minutes, not seconds, would be required. However, Sky also quoted RBM as advising that a delay of 15-20 seconds would be required to deliver block subtitling.
- 3.105 However, broadcasters were strongly opposed to the idea of inserting delays in live transmissions for the purposes of improving the quality of live subtitling. Several were concerned that they would affect the integrity of live programmes and their value to audiences (BBC, BT, Channel 4, Sky, another broadcaster). Sky said that it only delayed transmission for one programme (Soccer AM), and this delay was for content compliance reasons rather to facilitate better subtitling – it followed a number of breaches of the Broadcasting Code due to offensive language used by studio guests.²⁴ To ensure that the schedule for the channel is not affected by the delay, filming starts 7 seconds before transmission so a compliance filter can be applied.
- 3.106 Broadcasters also worried about the inconsistencies that could arise when other platforms were carrying coverage of live events, or providing complementary content. Several pointed to an increased risk that viewers would learn first of significant events (e.g. goals) from the radio or social media, rather than television (BBC, BT, Channel 4, Channel 5, ITV). Some (Channel 4, another broadcaster) said that delays would make it more difficult to synchronise complementary content offered via second screens; Channel 4 said that it could discourage innovation.

Ofcom's conclusions

- 3.107 S4C's tests and RBM's advice underline the significant gains in quality to be had for deaf consumers from a short delay in live transmissions. In the light of work by S4C, it seems possible that a delay of 30 seconds or less could allow live subtitles to be synchronised (resolving the problems of latency), corrected for errors (dealing with the problems of inaccuracy), and presented in block rather than scrolling format (making the subtitles easier and less time-consuming to read). A shorter delay would allow subtitles to be cued out in block form.
- 3.108 Ofcom recognises the sensitivity around news and results-based programmes, and the practical difficulties around the coordination of different streams of regional programming. Ofcom notes the concerns that delays would make it difficult to better synchronise second screen content with that displayed on television. Notwithstanding this, it is not obvious that a short delay in a few popular programmes that do not involve real-time voting would be problematic.
- 3.109 We note that some broadcasters consider short delays editorially justified to safeguard viewers from the possibility that they might hear obscenities. We will discuss further with broadcasters whether, in some programmes, delays could be justified on editorial grounds to protect viewers from the certainty of poorer-quality subtitles.

²⁴ *Broadcast Bulletin no. 146*, Ofcom, 23 November 2009
(<http://stakeholders.ofcom.org.uk/enforcement/broadcast-bulletins/obb146/>)

Other issues

Late delivered programmes

- 3.110 In the consultation document, Ofcom explained its understanding that, on occasion, programmes for which pre-recorded subtitling would have been practicable were delivered too late, necessitating live subtitling of lower quality.
- 3.111 To help us understand whether guidance would be warranted in this area, Ofcom has asked the major broadcasters (BBC, ITV, Channel 4, Channel 5 and Sky) to report on the number of programmes delivered to the broadcaster after the time and date stipulated in the contract, where live subtitling was necessary; and the circumstances which led to late delivery. The reports are due by 15 January 2014, and will cover the period from 1 July 2013 to 31 December 2013.
- 3.112 Sky said that, where content is delivered at a late stage, for example, programming that is being broadcast one day after airing in the USA, it was able to pre-record subtitles for the first transmission of the content.
- 3.113 NDCS expressed concern about the number of pre-recorded programmes broadcast with live subtitles. It wanted all pre-recorded programmes to have pre-prepared subtitling, save in exceptional circumstances. It suggested that broadcasters be required to measure and report on live subtitling of pre-recorded programmes every six months, to better gauge the severity of this issue and inform further guidelines.
- 3.114 MAA argued strongly that the most practical and efficient way to improve the overall quality of captioning is to keep the amount of live captioning to an absolute minimum. It strongly supported Ofcom's view that 'day topical programs' (produced up to 24 hours before broadcast) should not be live captioned; ideally, broadcasters should have to justify the live captioning of any programme which is not genuinely live.
- 3.115 RBM explained that, for late-delivery pre-recorded programmes where there is not sufficient time to prepare a subtitle file, it prepared block captions to key out live, with the aim of delivering as far as possible subtitles akin to those that would accompany most pre-recorded programmes.

Correction of live subtitles for repeat and on-demand transmissions

- 3.116 Some subtitle users argued that errors in live subtitling should be corrected for subsequent transmissions. NDCS sought assurances from broadcasters that errors or omissions would be corrected before future transmission of that programme, including online platforms.

Many programmes are repeated within a week or so of the original transmission, providing an opportunity to give hearing-impaired viewers better access to popular programmes than is available when they are first shown. Ofcom's guidance already asks broadcasters to correct errors in live subtitling when programmes are repeated, and we understand that this is the usual practice. However, there are occasions when re-editing makes this difficult. Ofcom suggests that, in these cases, there may be merit in breaking down the programme into segments, so that several subtitlers can work on it at once, as subtitling providers have told us they sometimes do. We look forward to maintaining an ongoing dialogue with broadcasters on this issue.

Technical and other issues

- 3.117 Ofcom referred in the consultation paper to technical and other issues that lead to the loss of or interruption of subtitling, for a variety of different reasons. We said that, in order to understand whether there are particular aspects of the production or transmission processes that require attention, we would be asking broadcasters to provide information on the incidence, severity and causes of failures in the provision of subtitling.
- 3.118 UKCoD and Hearing Link agreed with our proposal to ask broadcasters to provide information on the incidence, severity and causes of failures in the provision of subtitles. NADP wanted to see an independent audit of broadcaster logs carried out, on the grounds that this could help to indicate recurring problems where improvement is required.
- 3.119 Ofcom considers that, as an independent regulator, it is as well placed to scrutinise the reasons provided by broadcasters for subtitling failures, and to identify frequent problems that warrant particular attention. We remain of the view, as we explained in the consultation, that it would be in the public interest to encourage broadcasters to be as frank as possible in providing information, and we recognise that, as the processes often involve multiple parties, there may be issues of commercial confidentiality. For this reason, we shall publish the information collected in a form that will preserve that confidentiality. We shall be asking broadcasters to report on subtitling failures resulting from technical, operational or other reasons for the three months beginning on 1 November.

Section 4

Current work to improve the quality of subtitling

Introduction

Live subtitling

- 4.1 The subtitle provider for the BBC, Channel 4 and Sky is introducing enhancements to the software that respeakers and stenographers use. As a result, it is said to produce significantly more accurate results than previous versions. Amongst other things, it is significantly quicker to train – enabling the subtitler to quickly scan in large amounts of vocabulary. It enables the creation of temporary macros which can ensure unusual words or names can be added to the subtitler’s vocabulary automatically. It is also said to be particularly useful for live subtitles on sports programming, for example, where a wide range of unusual terminology is used.
- 4.2 Later phases should allow the subtitling provider to prepare text much more easily and accurately – for example it will enable subtitles to be prepared for news broadcasts, where there is access to running orders in advance, which can then be transmitted in sync with the soundtrack, reducing latency to a minimum.
- 4.3 An interesting idea being explored by the BBC R&D team is the provision of a slightly-delayed iPlayer stream of a channel, in which the subtitling provided on the live version is automatically reformatted in blocks, which are synchronised to appear when the first word in the block is spoken.²⁵
- 4.4 In other research work aimed at tackling the problems of live subtitling, the BBC R&D team has identified some ‘candidate’ technologies to address the issues of timing, accuracy, and presentation in live subtitles. The team started by looking at the challenge of improving the accuracy of subtitles and noticed that many errors were out of context from the programme topic. Using weather forecasts as an example, the team sought to capture the style of language used in weather forecasts by building a language model from a large body of known accurate subtitles. Once the model had been developed, it was used to identify words within the weather subtitles which don’t match the style of language.²⁶

Repeats and on-demand programming

- 4.5 The improved software currently being deployed on improving live subtitling also has the potential to be used to improve the quality of subtitling in repeats and on-demand programming. The software captures all live text with timecodes enabling the subtitle provider to re-edit more quickly programmes where there is a first live showing and then either a VOD or a narrative repeat. Ofcom hopes that this will facilitate the faster turnaround that would be needed to subtitle repeats where these have been re-edited (e.g. *Have I got a bit more news for you*).

²⁵ You can view a video explaining this on the BBC’s R&D website. Please note that the video is not subtitled (<http://www.bbc.co.uk/rd/projects/live-subtitle-quality>).

²⁶ *Candidate Techniques for Improving Live Subtitle Quality*, Matthew Shotton, BBC R&D (<http://www.bbc.co.uk/rd/publications/whitepaper256>)

Other work

- 4.6 The BBC also noted that it was supporting RBM in its work with the EU Bridge project.²⁷ One of the aims of this project is to explore to what extent automatic speech recognition might be used to assist the subtitling process in future. The BBC hopes that this project will lead to greater efficiency and enhanced quality through, for example, automated wordlist generation.
- 4.7 The European Union is also funding the SAVAS project²⁸, which aims to help build large libraries of vocabulary, initially for six languages, which can be used in automated subtitling. Dr Romero-Fresco has noted that this is aimed at developing software that can create automatic subtitles without a respeaker, but that the technology struggles when there is background noise, overlapping voices or spontaneous conversation. While these challenges may be overcome, the capability to edit high speech rates without losing meaning is far from realistic.

²⁷ (<http://www.eu-bridge.eu/>)

²⁸ SAVAS ('Sharing Audio Visual language resources for Automatic Subtitling'), (http://www.fp7-savas.eu/savas_project)