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# Executive summary

## 1. Aims

The research questions addressed in the project were:

1. What are the core functional requirements of blind and partially sighted people from consumer digital radio equipment?
2. What are the design considerations required to make the more advanced functions of current and emerging consumer digital radio equipment accessible to blind and partially sighted people?
3. What are the accessibility and usability priorities for accessible and easy to use consumer digital radio equipment for blind and partially sighted people?
4. To what extent (and how) are accessibility considerations built into manufacturers' product design and development processes of consumer digital radio equipment? Within this context, how feasible is it for manufacturers to develop consumer digital radio equipment that is accessible to blind and partially sighted people?

## 2. Methods

To address the above research questions, the project involved both consumer and industry research.

The consumer research comprised two activities:

1. Qualitative in-depth research in the homes of 38 Digital Audio Broadcasting (DAB) radio consumers around the UK (24 blind and partially sighted consumers, 3 consumers with dyslexia, 3 with reduced dexterity, and 8 'sighted control' participants). Participants were interviewed and observed using familiar and unfamiliar DAB equipment during these sessions. The goal of this activity was to gain an in-depth understanding of the needs of blind and partially sighted people in terms of maximising the accessibility and usability of consumer digital radio equipment. In addition, the research aimed to assess how the digital radio equipment needs of blind and partially sighted people compared with those of sighted people, people with dyslexia and people with dexterity impairments.

2. A telephone-based survey (Short Preference Survey) involving 325 DAB users (a sample of 100 blind and partially sighted DAB users, and a nationally representative control sample of 225 DAB users). The goal of this activity was to evaluate the extent to which current DAB radios support independent use by blind and partially sighted consumers, compared with sighted consumers, and to highlight any similarities and differences.

The industry research involved the project researchers conducting in-depth interviews with six senior representatives of manufacturers and other entities in the consumer DAB equipment supply chain. The majority of these interviews were conducted face-to-face, though two were conducted via the telephone. The goal of the industry interviews was to find out how participant companies currently research user needs, the extent to which the needs of blind and partially sighted consumers are researched and/or understood by participant companies, and what the industry sees as barriers for addressing the needs of blind and partially sighted consumers.

## 3. Main findings

### 3.1 **Blind and partially sighted users tend to be more reliant on radio than sighted users**

Consistent with much of the background literature reviewed in the project, access to radio was revealed in both the project's qualitative and quantitative research as more important to blind and partially sighted participants than to sighted participants. Blind and partially sighted participants were more likely to refer to listening to the radio as their favoured pastime.

### 3.2 **There are clear benefits for sighted consumers when the equipment needs of people with sight problems are addressed**

Many of the usability and accessibility issues which affected blind and partially sighted participants' use of DAB equipment were also observed to reduce usability for sighted participants. Addressing the design considerations should improve the user experience of digital radio equipment for all groups: blind, partially sighted and sighted consumers. The top level design considerations relate to button feedback, button design, physical properties of the text display and interface software design.

### **3.3 Limited interest in and concerns about advanced functions**

Many blind, partially sighted and sighted participants showed no interest in advanced features, either because they felt they had no need for them or they currently used and were comfortable with alternative methods for features such as recording. Many blind and partially sighted participants expressed concern that advanced features were not accessible to them because these features rely heavily on the text display.

### **3.4 Voice output greatly increases the ability of blind and partially sighted consumers to use digital radio equipment as independently as sighted consumers**

A major difference between how blind and partially sighted and sighted consumers use DAB radio is whether or not they can use their equipment independently. The research revealed that blind and partially sighted people can use radios with voice output more independently than they can use radios without voice output. Voice output provides audible (synthetic or recorded) speech feedback to the user in one or both of two ways. First a voice can confirm via speech, the buttons that a user presses or functions that a user alters. Second, a voice can read out the information that appears on the radio's text display (eg station name, time, genre).

Comparing matched samples, relative to sighted DAB users, blind and partially sighted users who do not have voice output on their radio were twice as likely to report needing help from another person to use their DAB radio. At first use, 90 per cent of blind and partially sighted participants who were using a DAB radio without voice output reported needing help from someone else. This contrasted significantly with the much lower figure of 39 per cent of the nationally representative sample reporting needing help. For subsequent use of DAB radio, blind and partially sighted participants using a DAB radio without voice output were again significantly more likely than the nationally representative sample to report needing help (69 per cent versus 17 per cent).

However, a much lower figure, namely 48 per cent of blind and partially sighted participants reporting on radios with voice output needed help from someone else at first use, and 26 per cent needed help for subsequent use. Voice output provided a level playing field, as these figures were not significantly different to those for the nationally representative sample. However, the numbers needing help were significantly higher for those blind and partially sighted participants reporting on use of a DAB radio without voice output.

Comparison of survey responses from blind and partially sighted consumers describing their use of DAB radios with and without voice output clearly demonstrates the high value of voice output for blind and partially sighted consumers. More blind and partially sighted users of digital radio with voice output report being able to use their radios independently than do blind and partially sighted users of digital radio without voice output.

### **3.5 Barriers to better addressing the needs of blind and partially sighted consumers cited by industry interviewees centred largely on pragmatic and commercial considerations**

Industry representatives from the consumer DAB equipment supply chain cited a range of commercial barriers to addressing accessibility issues, including: difficulty evidencing return on investment (and thus building a compelling business case); concerns that building in accessibility may be off-putting to the core (mainstream) market; and that previous attempts at marketing accessible products have rarely been successful.

Potential solutions suggested by interviewees included improved industry consultation with stakeholders, better access to research on user needs (where this report should fill the gap), actionable advice about how to improve accessibility (again a gap filled by this report), consumer education, and technical developments.

## **4. Key Project Output: prioritised design checklist**

Through analysis of the project's in-depth interviews and videos of participants using their own and unfamiliar digital radio equipment, an inventory of design considerations was developed within the project. This was developed into a prioritised checklist (see Chapter 9) as a design resource, and is also being used in a related activity commissioned by RNIB from Ricability, namely an evaluation of a range of DAB equipment on the market against the checklist.

The checklist items were prioritised by considering factors such as the range of tasks that could be affected by addressing the design consideration, the frequency of tasks, and whether they were involved in basic use such as switching on, changing station, and changing volume.

The full checklist is presented in Chapter 9. Highest priority items relate to best practice in:

- the provision of button feedback (including voice output)
- button design (including size, groupings and spacing)
- physical properties of the text display (including contrast and size) to make it more readable, and
- interface software design to minimise user intervention or to maximise simplicity of user interaction and to provide intuitive processes (eg for autotune, rescan, scroll, select, play recording)

The research findings and design considerations were presented to industry at an interim juncture in the project. The project team received feedback that many of the checklist items are easily addressable by manufacturers in the product development process.

## **5. Next steps to support the availability of more accessible digital radio equipment**

It is RNIB's intention that this research report, including the digital radio interface design checklist developed within the project, in conjunction with the comparative evaluation of currently available DAB equipment against the checklist, will support the availability of digital radio equipment that better meets the needs of blind, partially sighted and sighted consumers.

In further pursuit of this goal, RNIB is engaged with manufacturers, others in the supply chain, UK and European industry and statutory bodies.