Department for Transport

Department for Culture Media & Sport

Improving mobile communications to UK rail passengers

Call for evidence

June 2015

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Ministerial Foreword

Dropped calls and intermittent access to the internet are frustrations felt by many rail passengers. Mobile communications are so important to passengers that free Wi-Fi now appears in the top ten priorities for improvement according to a major survey last year.

The Government is responding to this by investing millions of pounds to equip trains with new Wi-Fi equipment. This will go a long way to improving mobile connectivity on trains. Agreements the Government has secured to improve mobile coverage across the UK will take this even further. We are not complacent, however.

This call for evidence is instrumental to ensure we get the best possible deal for passengers and give them the mobile connectivity they want and need, both now and in the years to come. Through this call for evidence, we want to build on the work that has already happened across industry and reach a collective understanding of the remaining technical and commercial challenges and the potential solutions, making sure that any solution allows for the rapidly-changing technological landscape.

Claire Perry

Parliamentary Under Secretary of State

Ed Vaizey

Minister of State for Culture and the Digital Economy

How to respond

We do not expect all respondents to answer all the questions presented. Please feel free to answer only those that you feel are most pertinent.

Responses to the questions below can be submitted in a variety of ways.

Online

You can enter your responses online. Find this consultation at www.gov.uk/dft#consultations.

Email

RailDigitalServices@railexecutive.gsi.gov.uk

Post

Rail Digital Services

4th Floor, Zone 26-28

Great Minster House

33 Horseferry Road

London

SW1P 4DR

The call for evidence will run from 10 June to 10 July 2015. Please ensure that your response reaches us before the closing date so that we can consider your evidence.

With your response please specify if you are responding as an individual or on behalf on an organisation, in which case please make it clear who the organisation represents and, where applicable, how the views of the members were assembled.

Freedom of Information

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the Freedom of Information Act 2000 (FOIA) or the Environmental Information Regulations 2004.

If you want information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

The Department will process your personal data in accordance with the Data Protection Act (DPA).

Introduction

Rail passengers rely upon their mobile devices to remain connected whilst travelling by train but are unable to utilise them fully due to periods of intermittent or no mobile service. Passengers are frequently unable to make voice calls, utilise SMS messaging or send and receive mobile data (which is necessary for email services, internet access and many mobile applications) due to the poor quality of mobile coverage across the rail network.

The main factors which have been identified by Ofcom[1] as contributing to the reduced mobile service are:

- A commercial imperative for mobile operators to prioritise locating their masts where they will serve the most customers. Often this does not correlate with the location of rail lines, resulting in trains passing through areas which are not covered by their mobile network operator. These are referred to as mobile 'not-spots'.

- Physical barriers to radio signals reaching the railway track. These include railway cuttings, tunnels and trackside clutter (buildings, heavy vegetation etc.)

- Signal weakening, called attenuation, caused by train carriage walls and windows.

- The performance of passengers' mobile devices.

Scope

This call for evidence seeks to gather information on the need to improve mobile coverage, Government's role, technical solutions, their deliverability as well as the costs and benefits of implementation. Other areas of interest include, but are not limited to:

- The commercial arrangements which may be needed to deliver a solution.

- Insights into mobile usage behaviour and future trends, for train passengers and more generally.

- Recommendations on the strategic direction of any action.

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[1] Rail 'Not-Spots' – Technical Solutions & Practical issues", Report January 2012, Mott MacDonald

Options for providing a better mobile service

To overcome the barriers to providing good mobile services for passengers, the Government has been considering a number of technical options. We welcome further suggestions, innovative ideas and improvements on existing ideas. There are a number of different types of railway services, from long distance journeys between major cities to busy commuter services and services in rural areas. It may be the case that there is no single solution for the whole railway network, and a range of solutions are needed to cater to the demands of different types of passengers and services.

We have categorised technical solutions into two categories: on-train and off-train. Many off the off-train options would also require market intervention to incentivise infrastructure improvements. They would need to be compatible and work together to provide passengers with seamless connectivity.

On-train technical options

1   On train Wi-Fi - roof-top antennas used to aggregate mobile network data signals and rebroadcast as a Wi-Fi signal within the train, in line with the Government policy announced in February 2015.

2   Digital on-board repeaters (D-OBR) - amplify external mobile signals within the carriages, reducing the signal attenuation effects of walls and windows.

3   Femto cells - these act as mobile base stations providing connectivity within carriages and requiring connectivity with the mobile operators' networks.

4   'Passive repeaters' - high-gain external antennae on all train carriages with low loss coupling to internal antennae, potentially reducing the effect of cuttings due to the height of the antenna and eliminating the attenuation effects of the carriage.

Off-train technical options.

5 Every mobile network operator makes improvements to their off-rail infrastructure to improve coverage along the rail network. This would target not-spots to provide continuous coverage.

6 Every mobile network operator utilises Network Rail assets (including masts, facilities and telecommunications) to provide continuous coverage.

7 One or more mobile network operators provide mobile coverage across the rail route.

8 Instead of using mobile network operators, build a private network along the rail route with an alternative service provider.

9 Instead of using mobile network operators, use train-to-satellite mobile broadband connectivity to deliver both voice and data services.

10 Utilise future unmanned aerial vehicles (UAVs) or tethered balloons to deliver targeted connectivity to trains or some other innovative option.

Annex A. Full list of consultation questions

Government intervention

A.1   Why is there not already good mobile coverage on rail?

A.2   Is Government intervention necessary and, if so, how is it best targeted?

Technical Solutions

A.3   What would be the most effective strategy for meeting the mobile connectivity needs of rail passengers?

A.4   What would be the costs of delivering each of the technical solutions and what would the passenger experience be in each case?

A.5   Are there technical solutions which have not been considered? If so, what are the benefits over other options, and what would be the associated costs?

A.6   What technologies and solutions have been successfully used in other countries or industries to address similar problems?

A.7   Do you foresee any particular safety risks to the railway associated with a particular type of technical solution or strategy?

Benefits

A.8   Are you supportive of initiatives to improve mobile coverage on rail, and do you believe there is an appetite for this from the public?

A.9   Are there any other parties or services, both Government or otherwise, that could benefit from the improvements to mobile communications on the rail network?

A.10   Are there other quantifiable benefits of introducing improved mobile coverage on trains, for instance by facilitating work for business travellers?

A.11   To what extent will improved mobile communications make rail a more attractive travel option?

A.12 Are there any other benefits associated with this work?

Delivery Strategy

A.13 Are the requirements of passengers consistent throughout the UK? If not, where should investment be targeted? Are there areas which would benefit more from voice rather than data services, and vice versa?

A.14 How do the requirements of passengers vary by journey type e.g. commuter, business, leisure, etc.?

A.15 Who are the key stakeholders who should be directly involved in this work and how can these organisations work together to aid delivery?

A.16 What risks are there in pursuing this initiative?

Behavioural insights

A.17 What does a good passenger experience look like?

A.18 What devices can we expect the majority of rail passengers to use to communicate while on the train in the next 2, 5 or 10 years?

A.19 What capabilities of mobile devices will passengers seek to use while travelling? What will be the most important and frequently used functions by passengers?

A.20 Is the ability to make and receive phone calls or being able to access the Internet with high-speed data more important to passengers?

A.21 Will consumers prefer to access the Internet using Wi-Fi or 4G/LTE in future? If both are available, what is the preferred method of connection?

A.22 How do passengers' preference towards using Wi-Fi change with the requirement of needing to register and log-in?

A.23 In 5 years, what would the data throughput to a train need to be to ensure that all passengers of that train are satisfied with performance?

Commercial arrangements

A.24 How can we ensure that all relevant parties have the right commercial incentives to support successful delivery of a solution?

A.25 What sources of private funding could be used in this initiative?

A.26 What existing infrastructure could be shared or used to improve coverage, and what commercial arrangements could be established to encourage this?

A.27 What arrangements could be made for the integration of an alternative service provider or aggregation network with mobile network operators?

A.28 Do you have suggestions for any innovative commercial options to support this initiative?