

Opinion: The Future of AM Radio

England, Scotland, Wales and Northern Ireland

Summary

AM radio in the British Isles is now in terminal decline with audiences dropping and many transmitters closed already. The majority of the remaining transmitters will likely close by the mid-to-late 2020s. Over the next few years, the BBC and major commercial broadcasters will be looking to minimise their AM transmission costs by reducing transmission powers at the high-power sites and closing some of the low-power transmitters serving small audiences. A coordinated AM shutdown may then follow at some point during the second half of the 2020s, though some independent broadcasters may continue using AM beyond this. This article explores these issues in more detail.

Background

AM was the dominant listening medium for radio in the British Isles until the mid 1980s, when it was overtaken by FM. In the early 1990s, with improvements in FM coverage and wide access to FM radios, it was decided to mostly abandon simulcasting in the UK and launch new stations on AM. In general, the most popular stations have broadcast on FM since the 1990s, while AM has been used for more specialist services. Five Live, Talk Sport and many of the minority stations have remained successful. However, most of the music stations have lost more than half of their audience as more commercial stations have launched on higher quality FM and Radio 2 has broadened its appeal.

With the widespread adoption of digital radio in the UK, the decline in listening to ‘AM’ stations has halted and their audience has stabilised. However, the proportion of that audience that is still using AM is declining. AM listening hours halved between 2013 and 2020 and the UK government 2021 Digital Radio and Audio Review predicts that AM listening will halve again between 2020 and 2025, at which point it will become “commercially unsustainable”.

Within Europe, many countries, such as Austria, Belgium, Germany, Sweden and Switzerland, have closed AM radio completely. Most other countries have substantially reduced the number of transmitters in use. Only Romania and Spain have maintained the vast majority of their AM transmitters. In the UK, more than a third of the AM transmitters closed between 2018 and 2021. The UK government has asked the BBC, Bauer and Wireless to develop plans for the closure of the national AM services and migration of their audiences to digital platforms “at some point in the mid-2020s”, but has no current plans to mandate closures.

The Problem

Clearly, AM radio is in decline and audiences will continue to drop. AM transmitters are more expensive to run than FM and DAB transmitters (though hilly areas can be served by fewer transmitters on AM). The electricity costs are around ten times higher than FM and DAB because high-gain transmit antennas are not practical at the wavelengths AM radio operates on. Recent increases in energy costs have exacerbated this problem. AM radio generally uses separate transmission sites, whereas FM and DAB radio share transmission masts with each other, with television and with mobile communications services. AM transmitter sites also require more land (see Appendix B).

Without changes, the transmission cost per AM listener will get higher and higher until it is no longer sustainable. Particular problems can occur when investment in new transmission equipment is needed or a site lease has expired, requiring relocation of the transmitter in order to continue broadcasting. At some point, stations will have to close down AM and expect the remaining AM listeners to switch to digital radio. The government anticipates this will be in the mid 2020s, but it could be later if the decline in AM listening slows.

In practice, different stations will reach the limit of economic viability at different times. Typically, Five Live and Talksport have a lower cost per AM listener, while the music stations have a higher cost per listener. In terms of alternatives, DAB coverage is now sufficient for many commercial stations, though not necessarily for the BBC, which is obliged to provide close to universal coverage. For home listening, switching from AM to digital platforms is relatively straightforward, with television and internet listening providing an alternative to DAB. Outdoor listening using DAB is possible in most places, though battery life can be poor, particularly on older receivers. The problem is in-car listening, where it is difficult to replace radios that are typically integrated into the car dashboard. A stand-alone DAB radio can connect to the car using the jack connection provided for music players or a low-power FM transmitter, but providing an adequate aerial can be problematic. Many listeners will simply switch to another station instead. Norway kindly volunteered to act as a test-bed for in-car DAB installation by switching off its national FM transmitters in 2017. A few months after the switch off, only a third of cars without DAB before the switch off had DAB receivers installed with the result that nearly half of Norwegian cars were unable to receive national radio.

The fundamental problem that stations face is that if they switch off AM early, they will lose a significant proportion of their audience, whereas if they keep it going for several more years, they will be spending money broadcasting to a shrinking audience.

The Solution

The best approach for the next 5 years or so is therefore to follow the example of many other countries by reducing the cost of AM transmission, whilst trying to minimise the number of listeners lost as a result. If coverage is reduced gradually, sudden drops in the overall audience (i.e., across all platforms) will be avoided. A good strategy could be to try to keep the transmission cost proportional to the number of AM listening hours as the latter declines.

For high-power AM transmitters, electricity costs form a large proportion of the operating costs. Therefore, simply halving the power of these transmitters would significantly reduce transmission costs without completely cutting off any listeners. Some would simply experience more background noise. Arqiva revenue would not be affected by this as electricity costs are “passed through” from the electricity suppliers to the broadcasters. Absolute Radio halved the powers from its main sites in 2018 and the BBC and Talk Sport are likely to follow at some point.

For low-power transmitters, the cost of distributing the audio to the transmission site by landline is significant. For national FM networks, distribution costs are minimized by using the high-power transmitters to feed the low-power transmitters. This works because good reception of at least one high-power transmitter is usually available on top of a relay station tower with a good aerial. This doesn't work for AM because reception of other AM transmitters carrying the same programme is generally poor at transmission sites. The major broadcasters now use a combination of satellite distribution and feeding from the corresponding DAB service, substantially reducing the cost.

Transmission costs can, of course, be reduced by closing transmitters. This also provides a source of spare parts for the remaining transmitters. In general, those transmitters with the smallest audiences should be closed first, noting that audiences do not necessarily correspond to coverage areas. However, sites requiring extensive maintenance work are also likely to be closed earlier. Also, transmitters typically cost less to operate where the site is shared with other broadcasters, particularly other AM transmitters, but also FM, DAB and TV transmitters. Thus, it can be more cost effective to shut down solo transmission sites even if the affected audience is slightly larger. Conversely, closure of a transmitter at a shared site increases the costs for the remaining users of that site. The government (in the 2021 radio review) is therefore encouraging broadcasters to coordinate site closures where possible. Appendix A lists commercial radio and Radio 5 Live AM transmitters (or groups thereof) by estimated cost per listener.

Another driver of transmission closures is land value. Some AM transmission sites have substantial redevelopment value and it is no longer cost effective to relocate the transmitter(s). Several AM transmitters have already closed to enable redevelopment of the transmission site. This is explored in Appendix B.

A further option to close high-power AM transmitters overnight to save electricity costs. There is a precedent for this; Radio 1 closed its AM transmitters from midnight to 06:00 between 1991 and 1994 after introducing 24 hour broadcasting on FM. Radio 5 Live is currently available on FM between 01:00 and 05:00, via the BBC's local and regional radio stations, so does not need to be available on AM during these hours. Absolute and Talksport would need permission from Ofcom to do this.

The remainder of this article considers each service in turn.

Absolute Radio

Absolute Radio has already substantially reduced its AM network to minimise costs. The Gatwick transmitter closed in 2003 and the Reading transmitter closed in 2015 when the site was sold. In May-June 2018, a further 12 transmitters closed. These were at Redmoss (Aberdeen), Dundee, Wallasey (Merseyside and North Wales), Sheffield, Hull, Cambridge, Hoo (Kent and Essex), Guildford, Swindon, Torbay, Plymouth and Redruth (Cornwall). Aberdeen, Plymouth and Cornwall lost AM coverage altogether, while the remaining areas have degraded reception.

Power reductions of 50% also took place at the five high-power sites: Westerglen, serving Central Scotland; Moorside Edge, serving Northern England; Droitwich, serving the Midlands; Washford serving South Wales, Avon, Somerset and Wiltshire; and Brookmans Park, serving London and the surrounding counties. These changes were motivated by Arqiva quoting a much higher price for continuing operation of Absolute's AM network in the pre-2018 configuration beyond April 2018 because much of the transmission equipment needed replacing. Closing sites thus reduces the amount of new equipment needed and, together with the power reductions, offsets the cost of procuring the remaining new equipment. Daytime population coverage from was reduced from 90.5% to 85.4%, but the loss of night-time coverage was proportionately much larger, impacting commuting hours during winter.

In its 2017 request to Ofcom to reduce coverage, Bauer stated that it expected the new AM network configuration to become unprofitable by 2022. However, Absolute's AM listening actually increased between 2017 and 2021 due to Absolute losing its FM frequencies in London and the West Midlands to Greatest Hits Radio and several other FM rock music stations changing format. Absolute's current AM network should thus remain viable until around 2025 unless major capital investment is needed. Rising electricity costs may need to be offset by further power reductions.

For AM transmission to remain profitable after that, the cost per listener needs to be kept below a certain level as AM audiences decline. Closing a further 10 low-power transmitters would reduce the cost per listener by about 25%, keeping AM viable for another year or two. However, it is not possible to reduce the cost per listener by more than this without reducing daytime population coverage below 50%, which Ofcom is unlikely to permit.

Any coordination with other national broadcasters is likely to take the form of an agreement to continue operating certain transmitters until a certain date, which could then be extended by mutual agreement. The five high-power transmitters at Brookmans Park, Droitwich, Moorside Edge, Washford and Westerglen are likely to form the core of such an agreement. The low-power transmitters at Bournemouth, Brighton, Fareham (S Hampshire), Lisnagarvey (near Belfast) and Postwick (Norfolk) are shared with both Talksport and Radio 5 Live, so may also be included. There may also be an agreement with Talksport to coordinate the closures of Boston, Lydd, Stockton and Newcastle Wrekenton, with the latter likely to be retained until the high-power transmitters are closed due to its high coverage.

Absolute is the sole user of the Gloucester transmission site and the sole AM user at Manningtree and Oxford, while the Northampton, Stoke-on-Trent and Trowell (for Nottingham and Derby) sites are shared with local commercial licencees. Therefore, these are the most likely candidates for the next round of closures. The impact of closing the Gloucester, Northampton, Oxford, Stoke-on-Trent and Trowell transmitters could be reduced by changing the frequency of the Droitwich transmitter to 1341 kHz (previously used by BBC Radio Ulster), eliminating daytime co-channel interference with the other high-power transmitters.

Talksport

Talksport has the highest AM listening share of the three national AM networks and the second highest overall audience. Listening is likely lower in Scotland and Northern Ireland, which have their own sporting culture.

At the beginning of 2020, with Ofcom's permission, Talksport closed the Exeter, Londonderry, Occombe (Torbay), Plymouth, Redmoss (Aberdeen), Redruth (Cornwall) and Rosemarkie (for Inverness) transmitters, all of which served relatively small populations. Exeter also receives daytime coverage from the Washford transmitter. These closures were likely motivated by transmitters becoming life expired and the broadcaster being reluctant to replace them, noting that transmitters (but not antennas) can easily be moved from one site to another.

The largest potential saving in transmission costs is likely to be from power reductions at the five high-power sites: Brookmans Park, Droitwich, Moorside Edge, Washford and Westerglen. These are still broadcasting at the original powers. Given the recent increase in energy costs, power reductions at these sites are likely to happen quite soon. Any agreement with the other national broadcasters to continue operating until a certain date is likely to focus on these five high-power transmitters and the low-power transmitters at Bournemouth, Brighton, Fareham, Lisnagarvey and Postwick that shared with both Absolute and Radio 5 Live. There may also be an agreement with Absolute to coordinate the closures of Boston, Lydd, Stockton and Newcastle Wrekenton, with the latter likely to be retained until the high-power transmitters are closed.

The six low-power sites that are now used only by Talksport, which are Clipstone (Nottinghamshire), Dumfries, Duxhurst (Sussex & Surrey), Hull, Rusthall (SW Kent) and Wallasey may therefore close earlier, together with the Dundee site which is shared with a local licensee. Apart from Dumfries, these provide night-time coverage to areas that can receive good daytime-only reception from a high-power transmitter. However, with a lot of live sports coverage occurring in the evening, night-time reception is more important for Talksport.

With a much larger AM audience, Talksport may wish to continue broadcasting on AM for longer than Absolute. However, this would result in increased costs at shared sites. Thus, if Talksport does continue on AM after Absolute leaves, a round of closures and power reductions would likely take place at that time to offset the costs. However, it is unlikely to be economically viable for Talksport to continue on AM after both Absolute and Five Live have left.

BBC Radio Five Live

At the time of writing, there have been no changes to Radio Five Live's AM transmitter network. However, the BBC's 2022-23 Annual Plan states that "we will begin developing plans for the closure of Medium Wave over the coming years." Most likely, the closure of the Five Live AM network will be done in two (or more) stages with an

initial coverage reduction to minimise costs followed by a full closure some years later, coordinated with Talksport and potentially also Absolute Radio.

The transmitters likely to be retained initially will include those at sites shared with Talksport and Absolute Radio: Bournemouth, Brighton, Brookmans Park, Droitwich, Fareham, Lisnagarvey, Moorside Edge, Postwick and Westerglen. Coverage is also likely to be maintained in other areas where Talksport and Absolute are still on AM:

- North East England and North Cumbria using either the current Stagshaw transmitter or the Newcastle Wrekenton and Carlisle transmitters currently used by Radio 4 (see below).
- South Wales and the West of England using either the current Clevedon transmitter or the Washford transmitter currently used by Radio Wales, either on 882 kHz as at present or moved to 909.
- The East Sussex and South Kent coasts using the Bexhill and Folkestone transmitters.

In addition, the Start Point transmitter serving most of Devon, Cornwall and Dorset is likely to be retained due to its high population coverage. Power is likely to be reduced at all of the high-power sites.

The remaining Five Live AM transmitters serve areas where Talksport and Absolute Radio are not available on AM and are not shared with other broadcasters. Some of the sites are shared with other BBC services, but these are likely to close soon. Therefore, the Barrow (S Cumbria), Burghead (North Scotland), Enniskillen, Exeter, Londonderry, Redmoss (Aberdeen), Redruth (Cornwall), Tywyn (Cardigan Bay) and Whitehaven (W Cumbria) transmitters are likely to close in the initial phase. Some of these areas receive adequate daytime coverage from other transmitters.

BBC Radio 4 Long Wave

For the past few years, the BBC's long wave transmitters (but not the Radio 4 MW transmitters) have been partially funded by the electricity industry, that uses phase information in the long wave transmissions to provide the Radio Teleswitch Service which switches 'Economy 7' electricity meters between day and night modes. This arrangement was originally due to end in 2020. However, due to delays in smart meter installation, the contract has been extended several times and currently expires on 31 March 2023. Further extensions are possible, but are now unlikely as we are now within a year of the closure date and it is rumoured that the main Droitwich transmitter is short of spare parts. Once the Radio Teleswitch Service ends, it is likely that the Radio 4 Long Wave network (including the MW transmitters) will close. An announcement from the BBC concerning this is likely to be made soon.

The Radio 4 medium wave transmitters could potentially be closed early to save money. However, cost savings from closing transmitters only a few months early will be minimal and could result in adverse publicity. Therefore, it is more likely that the whole network will close together unless there is a technical fault at one of the sites.

BBC Local and Regional Radio

In 2012, the BBC announced plans to close down most of its local radio AM transmitters in England, noting that 10 were closed down in the 1990s to make way for commercial radio expansion. Initially, several transmitters were temporarily closed to determine how many listeners relied on them. Radio Nan Gaidheal's AM transmitter in Aberdeen was then closed in November 2015 and Radio Bristol's AM transmitter in February 2016, the latter to enable redevelopment of the transmission site. However, the main closure programme, extended to regional radio, did not begin until 2018, following improvements in local DAB coverage and the addition of BBC local radio to digital terrestrial television. 13 transmitters were closed in 2018, 17 closed in 2020 and 17 closed in 2021.

Following these closures, several areas were left with inadequate FM reception of BBC local or regional radio. DAB coverage was provided for some of these areas, but not others. Most areas left with no FM or DAB reception would have required transmitters serving fewer than 2000 people to fill the gaps. Full details are given in Appendix C.

The BBC's 2022-23 Annual Plan states that "we will begin developing plans for the closure of Medium Wave over the coming years," so the remaining 11 radio transmitters will be closed over the next few years. Appendix D lists the gaps in FM/DAB coverage served by these transmitters. There are no plans within the next few years to improve DAB coverage in any places where BBC local and regional radio are only available via AM. Improvements to FM coverage are possible, but not likely due to BBC funding constraints. The individual transmitters are discussed below.

- The Radio Guernsey and Radio Jersey AM transmitters were originally retained to provide opt-outs from the main service covering the island assemblies. These opt-out services are now available on DAB, so these transmitters are likely to be switched off in the BBC's next closure round.
- The Radio Cumbria (North and South), Radio Derby, Radio Norfolk (West) and Radio Somerset transmitters serve similar FM and DAB coverage gaps to the AM transmitters that have already been switched off. Consequently, they are also likely to be closed in the next round.

- The Radio Gloucestershire (West) transmitter serves areas with very poor FM and DAB coverage. This area is the most likely candidate for additional FM transmitters, in which case AM would be retained until they are installed. If no improvements to FM coverage are planned, the AM transmitter could be closed in the next round or it could be retained until the final Five Live AM transmitters are switched off.
- The original Radio Wales (South) transmitter was replaced by a new lower power transmitter in 2021. This makes it unlikely that the transmitter will be switched off in the near future. However, it could be transferred to Five Live, enabling closure of the Clevedon transmitter. The BBC might consider an additional FM transmitter to serve Monmouth. Alternatively, Radio Wales could be added to the BBC National DAB multiplex (probably using DAB+), plugging both the Monmouth and Garth coverage gaps.
- The Radio Scotland transmitter at Westerglen serves significant FM coverage gaps in the road network, so may be retained until the final Five Live AM transmitters are switched off, potentially with a power reduction. The FM coverage gaps served by the Burghead transmitter have much lower traffic/population levels, so Burghead is more likely to close in the near future. However, Burghead does provide coverage of sports opt-outs in places unserved by DAB. Thus, closure may be delayed until improvements in coverage to the Inverness DAB multiplex that are due to be made before the licence renews in August 2023.

Local Commercial Radio

Since 2015, AM transmitters in Aberdeen, Bedford, Bristol, Cardiff and Reading have closed due to site redevelopment. The broadcasters also chose to close transmitters in Luton, Newport and West Berkshire that were covered by the same licences instead of asking Ofcom to amend the relevant licences. Further closures may also occur where site leases expire. However, this is difficult to predict without access to proprietary information.

More recently, broadcasters have begun to close AM transmitters because they are no longer profitable. In 2020 and 2021, Bauer closed AM transmitters in areas where Greatest Hits Radio had moved to FM on the basis that replacement AM services were not cost-effective. These were in Birmingham, Coventry, Humberside, Lancashire, Leeds, Manchester, Merseyside, Shropshire, Wolverhampton. In Lancashire and Greater Manchester, the replacement FM coverage was less than that of the AM service that closed.

If there is a coordinated shutdown of the main national radio AM transmitters, it is likely that the remaining Bauer and Global Radio local radio AM transmitters will close at the same time, taking advantage of coordinated publicity. Some Bauer and Global Radio transmitters are likely to shutdown before this if the costs of maintaining them exceed the revenue brought in. However, it is difficult to predict which transmitters will close when. In general, those stations with a lower transmission cost per listener (see Appendix A) are likely to continue on AM for longer.

The other local commercial AM broadcasters are Sunshine Radio from Ludlow, where AM fills some gaps in FM coverage, Premier Radio in London (also on national DAB) and several Asian stations. The Asian stations have a much higher proportion of their audience listening on AM than other radio services, so many of them are likely to continue broadcasting on AM after the national radio AM transmitters close.

Other Services

The BBC Asian Network, a national digital service, broadcasts on AM in parts of the Midlands only because it began as an opt-out service from BBC local radio there. Despite the limited coverage, more than half of listening to the service was on AM as recently as 2017. These transmitters are likely to close before the main Five Live transmitters as part of BBC cost savings.

Thirteen community stations broadcast on AM. Ten of these, including seven Asian services, are on AM due to lack of FM frequencies at the time of licensing. Some of them could potentially move to FM (*see Opinion: The Future of AM Radio*). Dales Radio uses AM to supplement FM coverage in a very hilly area and Radio Caroline and Carillon Wellbeing Radio uses AM to serve larger areas than Ofcom are willing to licence on FM with Caroline reaching most of Eastern England. Most of these services will be able to join small-scale DAB multiplexes over the next few years. However, many of the Asian stations may retain AM beyond the closure of the national AM networks if they are not able to switch to FM as their audiences seem to prefer AM to digital radio. Radio Caroline is also likely to continue to broadcast on AM for as long as it can as it is part of the UK's heritage sector, like steam railways.

The final group of AM transmitters are those on low-power AM (LPAM) restricted service licences (RSLs). About half of these broadcast BFBS Gurkha radio to military bases, while most of the rest are hospital radio stations. Ofcom is now making FM frequencies available for these stations, so most will likely move to FM over the next few years.

Paul Groves. August 2015; Last updated: April 2022.

Appendix A: AM Transmitters ordered by Estimated Cost per Listener

Very High Cost per Listener

†Radio 5 Live Exeter	22.9
†Radio 5 Live Tywyn	22.6
Absolute Radio Gloucester	22.5
Absolute Radio Oxford #	19.5
†Radio 5 Live Whitehaven	13.2
Talksport Dumfries	11.5
Absolute Radio Manningtree	11.1
*Radio 5 Live Burghead	9.6
Smooth Hampshire (2 transmitters) #	9.6
Greatest Hits S Yorks (3 transmitters) #	8.8
†Radio 5 Live Folkestone	8.3

High Cost per Listener

Absolute Radio Stoke	8.0
†Radio 5 Live Redruth	8.0
Radio 5 Live Enniskillen	7.8
Radio 5 Live Londonderry	7.8
Absolute Radio Lisnagarvey	7.3
Absolute Radio Bournemouth	6.4
Absolute Radio Northampton	6.4
†Radio 5 Live Bexhill	6.3
Greatest Hits Radio Tyne & Wear #	6.3
*Absolute Radio Brookmans Park #	5.9
Smooth Suffolk (2 transmitters) #	5.8
Absolute Radio Boston	5.5
Smooth Plymouth	5.5
†Talksport Dundee	5.3
*Absolute Radio Washford	5.2
West Sound AM	5.0
*Absolute Radio Droitwich	4.8
Greatest Hits R W Yorks (2 transmitters)	4.8
Smooth Kent (2 transmitters)	4.8
Absolute Radio Postwick	4.5
Absolute Radio Stockton	4.3
Smooth Essex (2 transmitters) #	4.3
Tay 2 (2 transmitters)	4.3
Absolute Radio Brighton	4.2
Smooth Gloucestershire #	4.2

Medium Cost per Listener

†Talksport Rushhall	3.9
Smooth Sussex (2 transmitters) #	3.9
Absolute Radio Lydd	3.9
Smooth Wiltshire (2 transmitters)	3.9
*Radio 5 Live Start Point	3.8
Absolute Radio Trowell	3.7
*Lyca Radio 1458	3.7
†Talksport Clipstone	3.6
†Talksport Duxhurst	3.6
†Talksport Hull	3.6
Smooth Norfolk #	3.5
*Absolute Radio Westerglen	3.5
MFR 2	3.5
Greatest Hits Radio Teeside #	3.4
†Radio 5 Live Bournemouth	3.4
Absolute Radio Fareham	3.3
Gold Northamptonshire #	2.9
Swansea Sound #	2.9
Radio City Talk	2.9
Smooth Dorset	2.7
Absolute Radio Newcastle	2.6
Radio 5 Live Aberdeen	2.5
Radio 5 Live Barrow	2.5
Gold Manchester	2.4
Talksport Lisnagarvey	2.3
*Talksport Droitwich	2.2
Talksport Lydd	2.2
*Talksport Westerglen	2.2
Talksport Bournemouth	2.2
*Talksport Moorside Edge	2.1
Talksport Boston	2.1

Low Cost per Listener

Gold East Midlands (2 transmitters)	2.0
Smooth Wrexham #	1.9
Downtown Radio Belfast	1.9
Forth 2	1.9
*Talksport Washford	1.8
Talksport Postwick	1.8
*Radio 5 Live Clevedon	1.8
Gold Cambridgeshire #	1.8
Clyde 2 #	1.7
Talksport Brighton	1.7
*Absolute Radio Moorside Edge #	1.7
Greatest Hits Radio Stoke	1.5
*Radio 5 Live Westerglen	1.4
Talksport Stockton	1.3
*Radio 5 Live Stagshaw	1.3
*Radio 5 Live Droitwich	1.2
*Talksport Brookmans Park	1.2
Radio 5 Live Postwick	1.2
*Gold London	1.1
Radio 5 Live Brighton	1.1
Radio 5 Live Lisnagarvey	1.1

Very Low Cost per Listener

*Radio 5 Live Moorside Edge	1.0
Sunrise Radio (2 transmitters)	1.0
Talksport Fareham	0.9
Talksport Newcastle	0.9
†Talksport Merseyside	0.9
Lyca Dilse 1035	0.9
Radio 5 Live Fareham	0.8
BBC Asian Network (4 transmitters)	0.7
*Radio 5 Live Brookmans Park	0.6
LBC News	0.5

Closed

†Absolute Radio Guildford #	27.0
†Absolute Radio Swindon #	27.0
Absolute Radio Torbay	18.8
Talksport Redruth	16.5
†Absolute Radio Reading #	16.0
Talksport Torbay	15.8
†Absolute Radio Hoo #	14.5
Absolute Radio Redruth	14.0
†Absolute Radio Cambridge	12.8
Absolute Radio Aberdeen	12.0
Absolute Radio Plymouth	12.0
Absolute R Classic Rock Shropshire ¹	10.9
Talksport Londonderry	9.1
Greatest Hits R Coventry #	8.2
Absolute Radio Dundee	7.4
†Absolute Radio Hull	7.2
Greatest Hits Radio Manchester #	7.0
Absolute R CR Wolverhampton ¹	6.9
Smooth Herts & Beds (2 transmitters) #	6.4
Talksport Rosemarkie	6.5
Absolute R Classic Rock Birmingham ¹	6.1
Greatest Hits Radio Lancashire #	5.8
Talksport Plymouth	5.7
Smooth Berks (2 transmitters) #	5.5
†Talksport Exeter	5.1
†Absolute Radio Sheffield	4.0
Northsound 2 #	3.9
Greatest Hits Radio Leeds #	3.7
Talksport Aberdeen	3.6
Greatest Hits Radio Humberside #	3.4
Smooth South Wales (2 transmitters) #	2.9
Smooth Bristol #	1.8
†Absolute Radio Merseyside	1.4

BBC Local and Regional Radio, Radio 4 LW, Asian Sound, Panjab Radio, Premier Radio Sabras, Love Sport and Radio XL are not costed as AM listening cannot easily be estimated. Asian Sound, Radio Sabras and Radio XL likely have low or very low cost per listener.

Transmitters covered by the same local radio licence are listed together.

Listening figures are based on 2019 RAJAR figures averaged across the whole year and are scaled by the proportion of listening estimated to be on AM (i.e., audience share). Absolute Radio estimates are adjusted according to the availability of Absolute and other rock stations on FM. AM shares of oldies/ easy listening stations are adjusted according to whether there is a commercial competitor on FM or overspill of the same station on FM from a neighbouring area. These are marked with a #.

Transmission costs comprise antenna, transmitter and distribution. Estimated antenna costs are shared across all users of a particular antenna and account for the number of masts and their height, varying between £30,000 and £150,000 per year. Taller masts are assumed to have larger ground mats. Costs will be higher than estimated here where antenna systems need rebuilding as these will be amortised over 4-10 years. Shared costs for continuing services have been adjusted to account for the BBC and Talk Sport transmitter closures scheduled for 2020.

Transmitter costs include electricity, maintenance and capital expenditure (assuming a 25 year replacement cycle). £9,000 per year is assumed for transmitters up to 1 kW and £10,000 per year up to 2 kW. Up to 20 kW, £8,000 plus £1,200 per kW is assumed. Above that, £1,600 per kW is assumed. Power estimates are based on transmitter output, not the broadcast power in the direction of maximum antenna gain.

The highest power stations typically use multiple 50 kW transmitters, thus it is reasonable to assume that maintenance and capital costs will be proportional to transmitter power. Costs will be higher than estimated here where capital costs are amortised over less than 25 years.

Transmitters marked with an asterisk (*) could reduce the cost per listener by reducing power.

Transmitters marked with a cross (†) provide night-time reception in areas where clear daytime-only reception is available from a high-power transmitter

For closed stations, RAJAR figures, AM share estimates and transmission cost estimates from just before they closed are used.

¹ Audience figures are extrapolated from when the transmitter broadcast Free Radio 80s

Appendix B: Land Value

An issue affecting the viability of some AM transmission stations is land value. Medium-wave antennas normally incorporate a conductive ground mat of at least 40m in diameter per mast, which must be kept clear, and some antenna systems use two or more masts. Consequently, they require substantially more land than FM and DAB transmitters. Most AM transmitters are located in rural areas or on flood plains so the sites have limited alternative use. However, some sites are within towns and cities and could be sold for housing, retail or light industrial development, which would be considerably more profitable for the land owner than maintaining them as transmission sites. Where a site is also used for FM and/or DAB, just the part of the site used for the AM antenna could be sold.

The following AM transmission sites have already been closed for redevelopment:

- Manor Farm, Reading – *closed*;
- Mangotsfield, Bristol – *closed*;
- Nigg, Aberdeen – *closed*;
- Kempston, Bedford – *closed*;
- Hadfield Road, Cardiff – *closed*;

The following AM transmission sites have high potential for redevelopment:

- Lewsey Farm, Luton – *closed*;
- Bebington, Merseyside – *closed*;
- North Looe near Epsom, carrying Premier;
- Colinswell, near Edinburgh, carrying Forth 2;
- Tywyn, Wales, carrying Radio Five Live;
- Ashton Moss, Manchester, carrying Asian Sound.
- Ashton Moss (NGW), Manchester, carrying Gold.

The following AM transmission sites have some potential for redevelopment:

- Farnley, West Yorkshire – *closed*;
- Fulford, York – *closed*;
- Sheffield MF – *closed*;
- Bow, London, carrying Premier – *now closed due to redevelopment of an adjacent site*;
- Little Shurdington, Gloucestershire, carrying Smooth;
- Hoo St Werburgh, Kent, carrying Smooth;
- Clipstone, Nottinghamshire, carrying Talksport;
- Folkestone, carrying Radio Five Live;
- Whitehaven, Cumbria, carrying Radio Five Live;
- West Lynn, Norfolk, carrying Radio Norfolk;
- Bexhill, carrying Radio Five Live and Smooth;
- Trowell, carrying Absolute Radio and Gold;
- Perth Friarton Road, carrying Radio Tay 2;
- Gunthorpe, Peterborough, carrying Gold and BBC Asian Network;
- Crimpsal, Doncaster, carrying Greatest Hits Radio;
- Rohais, Guernsey, carrying Radio Guernsey;
- Southwick, Brighton, carrying Radio Five Live, Talksport, Absolute Radio and Smooth;
- Fareham, carrying Radio Five Live, Talksport and Absolute Radio;
- Fern Barrow, Bournemouth, carrying Radio Five Live, Talksport, Absolute Radio and Smooth;
- Redmoss, Aberdeen, carrying R Five Live and R4 LW;
- Wallasey, Merseyside, carrying Talksport;
- Hull, carrying Talksport;
- Stockton, carrying Talksport, Absolute Radio and Greatest Hits Radio;
- Wrekenton, Tyneside, carrying Talksport, Absolute Radio and Radio 4 LW;
- Brookmans Park, Hertfordshire, carrying Radio Five Live, Talksport, Absolute Radio and Lyca Radio;
- Droitwich, Worcestershire, carrying Radio Five Live, Talksport, Absolute Radio and Radio 4 LW;
- Lisnagarvey, Northern Ireland, carrying Radio Five Live, Talksport, Absolute and Radio 4 LW.

Appendix C: FM/DAB Coverage in Areas where BBC Local and Regional Radio AM Transmitters have been Switched Off

The following areas have been left with poor coverage of BBC local or regional radio following switch-offs of the AM transmitters. The term “small population” refers to 2000 people or fewer. The closure dates given are for the end of programming. Transmitters were switched off several weeks later after transmitting retuning information.

Radio Bristol (1548, *Closed February 2016*): Generally good FM and DAB coverage.

Radio Cambridgeshire (1026, *Closed 10 May 2021*): Although DAB coverage is good, Ely, Godmanchester, Littleport and St Neots have poor FM reception.

Radio Cornwall (West Cornwall, 630, *Closed 2 March 2020*): Generally good FM and DAB coverage.

Radio Cornwall (Mid Cornwall, 657, *Closed 2 March 2020*): Parts of the Boscastle area (technically outside the AM coverage area) and Port Isaac (both small populations) have been left unserved. There are also areas where FM coverage is weak, but DAB coverage is very good.

Radio Cumbria (Whitehaven, 1548, *Closed 9 March 2020*): Generally good FM coverage. DAB was added after the AM closure.

Radio Devon (Barnstaple, 801, *Closed 20 August 2021*): The North Devon coast from Woolacombe to Lynton is unserved on FM and only the Ilfracombe area is served on DAB. More than 10,000 people will be left without a service. However, several transmitters would be needed to serve them on FM or DAB.

Radio Devon (Exeter, 990, *Closed 20 August 2021*): FM coverage of East Devon is poor, though DAB coverage is generally better. For example, Sidmouth and Seaton are served on DAB but not FM. However, Beer and parts of Cullompton have neither FM nor DAB coverage, leaving more than 15,000 people without a service.

Radio Devon (Torbay, 1458, *Closed 9 January 2018*): Generally good FM and DAB coverage.

BBC Essex (Main, 765, *Closed 20 May 2021*): FM reception in the far west of Essex is poor. Harlow has good DAB reception of BBC Essex. South West Essex has good FM and DAB reception of BBC Radio London and the Saffron Walden area has good DAB reception of BBC Radio Cambridgeshire

BBC Essex (North East, 729, *Closed 20 May 2021*): Both FM and DAB reception are poor in Harwich and Walton-on-the-Naze. Harwich is served by BBC Radio Suffolk on both FM and DAB.

BBC Essex (South East, 1530, *Closed 15 January 2018*): Generally good FM and DAB coverage.

Radio Foyle (792, *Closed 6 May 2021*): Generally good FM and DAB coverage.

Radio Gloucestershire (East, 1413, *Closed 23 June 2021*): FM and DAB reception in Winchcombe is very poor, affecting 9,000 people. In addition, Bourton-on-Water, Moreton-in-Marsh and Stow-on-Wold have good DAB coverage, but poor FM coverage.

BBC Hereford and Worcester (North, 1584, *Closed 13 May 2021*): There is no FM or DAB coverage in the Tenbury Wells area, so closing this transmitter leaves more than 5,000 people without a BBC local radio service.

BBC Hereford and Worcester (Worcester, 738, *Closed 13 May 2021*): Bromsgrove has poor FM reception, but a good DAB signal. Both FM and DAB reception are poor around Evesham, however, BBC CWR is available on FM there.

Radio Humberside (1485, *Closed 11 January 2018*): Generally good FM and DAB coverage.

Radio Kent (East, 744, *Closed 8 January 2018*): FM coverage is poor in parts of Canterbury and along parts of the A28. However, these areas have good DAB coverage. FM and DAB coverage are both weak in Hamstreet, which has a small population and was on the edge of the AM coverage area.

Radio Kent (Tunbridge Wells area, 1602, *Closed 8 January 2018*): Generally good FM and DAB coverage.

Radio Lancashire (855, *Closed 17 May 2021*): Barnoldswick, has very weak FM coverage, but is outside the AM service area.

Radio Lancashire (North, 1557, *Closed 15 January 2018*): Generally good FM coverage, but poor DAB.

Radio Leeds (774, *Closed 1 June 2021*): Parts of Bradford have weak FM reception, but good DAB coverage. Hebden Bridge and Todmorden have poor FM and DAB coverage, but are just outside the AM service area.

Radio Lincolnshire (1368, *Closed 4 January 2018*): Generally good FM and DAB coverage.

Radio Merseyside (1485, *Closed 11 March 2020*): There are a few areas where FM coverage is weak, but DAB coverage is very good.

Radio nan Gaidheal (Aberdeen, 990, *Closed November 2015*): Generally good FM and DAB coverage.

Radio Newcastle (1458, *Closed 26 February 2020*): Generally good FM and DAB coverage.

Radio Norfolk (East, 855, *Closed 16 March 2020*): FM coverage of Thetford is very poor, but this area receives a good DAB service. Wells has weak FM reception in places and no DAB reception, but was on the edge of the AM coverage area.

Radio Nottingham (1584, *Closed 10 January 2018*): FM coverage is relatively poor, but DAB coverage is much better. Egmanton and parts of the East Markham area have very weak reception on both FM and DAB. However, these were on the edge of the AM coverage area and has good reception of Radio Lincolnshire.

Radio Scotland (Dumfries, 585, *Closed 10 June 2020*): Generally good FM coverage, but no DAB, so sports opt-outs were lost.

Radio Scotland (Aberdeen, 810, *Closed 10 June 2020*): Generally good FM and DAB coverage.

Radio Sheffield (1035, *Closed 27 May 2021*): FM and DAB reception in Hathersage is very weak, but this has a small population and is on the edge of the AM service area.

Radio Solent (S Hampshire, 999, *Closed 4 March 2020*): The Petersfield area has been left unserved, though it does receive BBC Sussex on FM and DAB. Winchester has poor FM reception (very poor in places), but good DAB reception. Ventnor is left with no FM reception, but a good DAB service. Several other parts of mid Hampshire have weak reception on both FM and DAB, but the affected populations are small.

Radio Solent (E Dorset and SW Hampshire, 1359, *Closed 4 March 2020*): FM coverage of Poole is very poor, but this area receives a good DAB service.

Radio Stoke-on-Trent (1503, *Closed 24 May 2021*): FM coverage is weak in parts of Cheadle, Congleton and Leek, and very weak in Uttoxeter. Congleton has a good DAB service, while Uttoxeter can currently receive BBC Radio Derby on AM.

BBC Surrey (1368, *Closed 3 January 2018*): Generally good FM and DAB coverage.

BBC Sussex (Brighton, 1485, *Closed 3 January 2018*): The Upper Beeding area has very poor FM reception, but is mostly served on DAB.

BBC Sussex (East, 1161, *Closed 3 January 2018*): Generally good DAB coverage with weak FM coverage in parts of Hastings.

Three Counties Radio (Main, 630, *Closed 17 February 2020*): Parts of Amersham, Chesham and Great Missenden have weak FM and DAB reception. However, they were on the border of the AM service area.

Three Counties Radio (Bedford, 1161, *Closed 17 February 2020*): Some villages to the north of Bedford have poor FM reception, but DAB coverage should be sufficient there. Some of these were on the edge of the AM coverage area

Radio Ulster (Main, 1341, *Closed 6 May 2021*): Bellair (Antrim), Cushendall (Antrim), Glenariff (Antrim) and Glenelly Valley (Tyrone) (all small populations) are unserved on DAB and have very poor FM reception

Radio Ulster (Enniskillen, 873, *Closed 6 May 2021*): Belcoo (Fermanagh, small population) is unserved on DAB and has very poor FM reception.

Radio Wales (North Powys, 882, *Closed 1 April 2020*): FM coverage matches BBC national radio. No DAB coverage.

Radio Wales (Mid Powys, 1125, *Closed 18 March 2020*): Knighton, Presteigne and New Radnor (small population) have very poor reception of Radio Wales. There were on the edge of the AM coverage area. Reception from the main Washford AM transmitter was available until the 2021 power reduction. No DAB coverage.

Radio Wales (North, 882, *Closed 23 June 2021*): FM or DAB reception the far west of the Llyn peninsula is weak due to a much lower power to the north from the Radio Wales transmitter at Blaenplwyf compared with national FM.

The Radio Wales signal from Llanddona is also weaker here. In addition, Abergele, Meliden and Talysarn have poor FM reception, but are served by DAB.

Radio Wales (West, 882, *Closed 2 April 2020*): There are gaps in FM coverage along the A470 (noting that national FM is not available here either). Very limited DAB coverage.

Radio Wales (Wrexham, 657, *Closed 9 June 2021*): FM and DAB reception is weak in parts of the Holywell area.

Radio Wiltshire (West, 1323, *Closed 10 January 2018*): Box (small population) has weak FM reception and is unserved on DAB.

Radio Wiltshire (Swindon, 1368, *Closed 10 January 2018*): Generally good FM and DAB coverage.

Radio York (Main, 666, *Closed 24 February 2020*): The Pateley Bridge area (small population) is unserved on FM and DAB, though very weak FM reception of Radio Leeds may be possible. This was on the edge of the AM coverage area

Radio York (Scarborough, 1260, *Closed 24 February 2020*): The Ravenscar, Flyingthorpe and Robin Hood's Bay area (small population) is unserved on FM and DAB, though very weak FM reception of Radio Tees may be possible. This was on the edge of the AM coverage area

Appendix D: FM/DAB Coverage in Areas where BBC Local and Regional Radio AM Transmitters Continue

This appendix provides details of areas served by the BBC's remaining local and regional radio AM transmitters. Some areas where FM is poor, but DAB is good are also discussed. Some of these areas may receive improvements to either FM or DAB coverage before the AM transmitters are switched off. However, the BBC is likely to decide that FM or DAB coverage of smaller populations, particularly 2000 people or fewer, is not financially justifiable.

Radio Cumbria (North, 756): FM and DAB coverage is non-existent in Alston and poor in Kirkby Stephen and Lorton (all small populations). Kirkby Stephen is just outside the AM service area and Alston just inside the AM boundary. If BBC national DAB transmitters were installed at these sites, Radio Cumbria could acquire much better FM coverage by swapping FM transmitters with Radio 3.

Radio Cumbria (South, 837): Most areas of South Cumbria with poor FM and projected DAB coverage are also outside the AM coverage area. Coniston and Gosforth are on the border, but have small populations. Sedbergh is larger, but outside the AM service area.

Radio Derby (1116): Ashbourne has poor FM reception and is unserved on DAB. Parts of the Dove Valley (small population served by Grange Farm site) area are unserved on both FM and DAB, but this is on the border of the AM coverage area. Long Eaton, Swadlincote, Wirksworth and parts of Burton have poor FM coverage, but good DAB reception.

Radio Gloucestershire (West, 1413): Both FM and DAB coverage is very poor. New DAB or FM transmitters would be needed at Chalford, Cinderford, Coleford, Dursley and Nailsworth to fill the gap.

Radio Guernsey (1116): FM coverage should be adequate. AM was retained for opt-out programming, but this has been available on DAB since autumn 2021.

Radio Jersey (1026): FM coverage should be adequate. AM was retained for opt-out programming, but this has been available on DAB since autumn 2021.

Radio Norfolk (West, 873): This area is not currently served by local DAB. North West Norfolk, including Burnham, Hunstanton and Wells-next-the-sea has areas of weak FM reception. It may be possible to improve coverage of this area with a single new FM transmitter at Burnham or by increasing the power to the north of the existing FM transmitter at Great Massingham. South West Downham Market and Mundford (small population) also have poor FM reception. Most of these areas are on the edge of the AM service area.

Radio Scotland (Central, 810): The Arrochar area (Argyll) and Crianlarich (Stirlingshire) (both small populations) are unserved on FM or DAB by any radio service. However, the AM transmitter also provides significant road coverage, such as along the A82, A84 and A85 in West Stirlingshire, and along the A74(M) from Moffat to Elvanfoot.

Radio Scotland (North, 810): Durness and Tongue in NW Highland are unserved on FM or DAB by any radio service, though it is not known if these areas are served on AM either. The Lairg and Balblair Wood area (Highland)

and Tomintoul (Moray) have weak FM reception. All of these areas have small populations. However, the AM transmitter also provides significant road coverage and provides sports opt-outs to significant areas without DAB coverage.

BBC Somerset (1566): The Vale of Taunton has no FM or DAB reception, leaving about 10,000 people served only on AM. An FM or DAB transmitter at Washford would be needed to fill this gap.

Radio Wales (South, 882): The power of this AM transmitter was reduced from 100 kW to 12 kW in 2021. Radio Wales FM reception in South East Wales is poorer than that of Radios 1, 2, 4 and Cymru due to the power of the Wenvoe transmitter being 6 times lower for this service. New FM or DAB transmitters may be needed at Abergwynfi, Garth (district of Maesteg), Glyn Corrwg, Knighton, Monmouth, New Radnor (small population), Presteigne and Sennybridge. Of these, Monmouth and possibly Maesteg are more likely to receive coverage improvements as they have larger populations and already have BBC national DAB transmitters. There are also coverage of gaps along the A40 and A470, however, national FM is not available here. In addition, Hirwaun and Penywaun have poor FM reception, but they are served by DAB.