

Radio 1 Transmission History

247 metres

Before Radio 1 started, the Light Programme which preceded it broadcast on 88.1-90.1 MHz FM, 200 kHz (1500 m) long wave and 1214 kHz (247 m) medium wave. Long wave provided the main service for England and Wales, whilst the medium wave frequency was used where long wave reception was weak, such as in Scotland and to provide an additional option in the London, Yorkshire and Manchester areas as follows:

- London, Herts, Essex, S Beds (Brookmans Park, 50 kW)
- Manchester, E Lancs, S&W Yorks (Moorside Edge, 50 kW)
- Plymouth area (Plymouth, 0.5 kW)
- West Cornwall (Redruth, 2 kW)
- Tyneside, N Durham, S Northumberland (Wrekenton 2 kW)
- Central Scotland (Westerglen, 25 kW)
- Aberdeen and East Grampian (Redmoss, 2kW)
- Northern Scotland (Burghead, 20 kW)
- Belfast and East Northern Ireland (Lisnagarvey, 10 kW)
- Derry area (Londonderry, 0.25 kW)

When the Light Programme split on 30th September 1967, Radio 2 was allocated FM and long wave, while Radio 1 was given the medium wave frequency. Prior to launch additional Radio 1 transmitters were commissioned for the Midlands; South Wales, Avon & Somerset; Southampton & Portsmouth; the Brighton area; the Norwich area; and Hull, all on 1214 kHz, or 247 metres as radios were calibrated in wavelengths on AM then. A transmitter for Bournemouth on 1484 kHz (202 m) was added in 1968, with further transmitters for Torbay on 1484 kHz (202 m) and West Wales on 1214 added later. Meanwhile, Radio 2 reception in Scotland was strengthened with transmitters in Glasgow, Edinburgh, Dundee and Aberdeen all on 1484 kHz. The original Radio 1 transmitter network was as follows:

- London, Herts, Essex, S Beds (Brookmans Park, 50 kW)
- North West England and Yorkshire (Moorside Edge, 50 kW)
- South Wales, Avon and Somerset (Washford, 60 kW)
- Western Midlands Region (Droitwich, 30 kW)
- Brighton and South Sussex (Brighton, 1 kW)
- South Hampshire & Isle of Wight (Fareham, 1 kW)
- Plymouth area (Plymouth, 1 kW)
- West Cornwall (Redruth, 2 kW)
- East Norfolk and NE Suffolk (Postwick, 1 kW)
- Hull (Hull, 0.15 kW)
- Tyneside, N Durham, S Northumberland (Wrekenton 2 kW)
- Central Scotland (Westerglen, 40 kW)
- Aberdeen and East Grampian (Redmoss, 2kW)
- Northern Scotland (Burghead, 20 kW)
- Belfast and East Northern Ireland (Lisnagarvey, 10 kW)
- Derry area (Londonderry, 0.25 kW)

Added later:

- Bournemouth area (Bournemouth, 2 kW, 1484 kHz)
- Torbay area (Torquay, 0.5 kW, 1484 kHz)
- Ceredigion and SW Gwynedd (Tywyn, 0.5 kW)

This network was much less extensive than the current Virgin radio network, which supplements 1215 kHz with 21 fillers on nearby frequencies. (Note that Virgin powers are effective radiated power (ERP) and the BBC powers are transmitter output powers. For a high power transmitter the ERP is about twice the equivalent transmitter power.)

Radio 1 reception was poor in many places. Officially, daytime coverage was 86% of the population. Areas with a weak signal included Merseyside, the East Midlands, Dundee, Kent and Cumbria. To partially combat this, dynamic range compression and 110% modulation depth was introduced to keep the station as loud as possible. In Stoke,

Oxford, Reading, Ipswich, Northampton, Bedford, Gloucestershire, Swindon and parts of Lincolnshire, Radio 1 was unlistenable due to multiple transmitters on the same frequency interfering with each other. This problem was much more extensive in cars due to the lack of directional reception. At night, coverage dropped to 37%. This is because medium wave signals bounce off the ionosphere after dark, so the transmitters interfered with each other, reducing the effective coverage. In the winter, night-time reception conditions start around 4 pm.

Poor reception was less of a problem in the early days when Radios 1 and 2 only broadcast separate programmes for about 6 hours a day, so many Radio 1 programmes were also available on Radio 2. However, by the autumn of 1971, Radios 1 and 2 broadcast separately for 13 hours a day on weekdays (less at weekends). As Radio 2's AM reception after dark was much better, Radio 1 was given access to Radio 2's FM network late in the evenings, starting on 4th October. In the mid-evenings from 7 pm, Radio 1 merely relayed Radio 2. From 7th April 1973, Radio 1 started broadcasting on FM on Saturday afternoons when Radio 2 was carrying sport, which didn't really merit hi-fidelity transmission.

The BBC had planned to allocate a second medium wave frequency to Radio 1 when Radio 4's English regional programmes were ended on AM in 1972. This would have resolved most of the co-channel interference problems during the day. However, the government allocated the frequency to commercial radio instead. So, no improvements were made to Radio 1's transmission system for ten years, despite a number of Radio 4 fillers and local radio transmitters being opened on medium wave at this time. Whilst pop stations elsewhere in Europe broadcast on FM, Radio 1 was left to languish mostly on medium wave. Officially this was because most listening was done on portable and car radios, which were mostly AM only at the time. Another problem was that the FM band was limited to 88-97.6 MHz and adding Radio 1 would have left little room for local radio, which was initially on FM only. However, snobbery was also an issue. In the 1970s, the BBC was lobbying for the emergency services to be cleared from the FM band, not for Radio 1, but for a new education network to free up Radio 4's FM network.

1053 and 1089

From 23rd November 1978, a new European medium wave frequency plan was implemented. This regularised the channels to multiples of 9 kHz to eliminate cross-channel whistling and cleared countries to broadcast at higher powers. Albania was licensed to broadcast at high power on 1215 kHz, which would have reduced Radio 1 night-time coverage further. Also, the introduction of Radios Scotland, Wales and Cymru took over the Radio 4 frequencies in those areas. The BBC therefore decided to re-organise all of its AM transmitter networks. Radio 4 was given the long wave frequency, whilst Radio 3 was relegated to the old Radio 1 network as it had the smallest audience, most of whom used FM anyway. Radios 1 and 2 were given two high-power medium wave frequencies each.

The move to 1053 and 1089 kHz (285 and 275 m) enabled Radio 1 to eliminate virtually all of the daytime co-channel interference problems by spreading its transmitters across two frequencies. The transmitters serving the North, Midlands and South East were tripled in power and new high power transmitters introduced for the South West and the North East. New low power transmitters were introduced for East Kent, East Sussex, North Devon, Dundee, Barrow & Carlisle and West Cumbria. Transmitters for Merseyside and for Fermanagh and South Tyrone were added in 1982. Good daytime coverage of this network was 96%, with most other places at least receiving a useable signal. 55% of the population received a clear signal after dark, enough for Radio 1 to introduce its own evening programmes when it didn't have use of FM. The 1053 and 1089 medium wave network was as follows:

1053 kHz:

- Midlands (Droitwich, 150 kW)
- S Devon, S Cornwall and Dorset (Start Point, 100 kW)
- North East England and Carlisle (Stagshaw, 50 kW)
- North Scotland (Burghead, 20 kW)
- Norfolk and Suffolk (Postwick, 10 kW)
- South East Kent (Folkestone, 1 kW)
- East Sussex (Bexhill, 2 kW)
- Brighton and South Sussex (Brighton, 2 kW)
- North Devon (Barnstaple, 2 kW)
- Humberside (Hull, 1 kW)
- South Cumbria and NW Lancashire (Barrow, 1 kW)
- Dundee area (Dundee, 1 kW)
- Derry area (Londonderry, 1 kW)
- Fermanagh and South Tyrone (Enniskillen, 1 kW)

1089 kHz:

- London and South East (Brookmans Park, 150 kW)
- Yorkshire, North West & N Wales (Moorside Edge, 150 kW)
- South Wales and West England (Washford, 50 kW)
- Central Scotland (Westerglen, 50 kW)
- Central and East Northern Ireland (Lisnagarvey, 10 kW)
- South Hampshire and Isle of Wight (Fareham, 1 kW)
- West Cornwall (Redruth, 2 kW)
- Ceredigion and SW Gwynedd (Tywyn, 1 kW)
- West Cumbria (Whitehaven, 1 kW)
- Aberdeen and East Grampian (Redmoss, 2 kW)

1107 kHz:

- Merseyside (Wallasey, 0.5 kW)

1485 kHz:

- Bournemouth area (Bournemouth, 1 kW)

The move to FM

By the start of the 1980s, virtually all new portable radios and many car radios came with FM. Radio 1's lack of FM network was becoming increasingly anomalous as FM listening overtook AM for other stations. Even with the improved medium wave network, 45% of the population could not get a clear signal after dark. The decision was taken to extend the FM band in the UK from 97.6 to 107.9. The first chunk of new spectrum, 102.4-104.9, was released for broadcasting in 1983. However, this was allocated to BBC and independent local radio, which was expanding rapidly at the time. In the mid 1980s, the sub-band 97.7-99.8 MHz was allocated to the BBC for Radio 1. However, this was not to be fully cleared for broadcasting until the start of 1990.

To bring Radio 1 to some parts of the country prior to full clearance of its frequency band, a temporary FM network was developed. A service on 104.8 for the London area was launched on Saturday 31st October 1987 with minimal advanced publicity. The plan was then to add more transmitters through 1988, starting with Central Scotland. In the end, Radio 1 went for a big switch-on day on Thursday 1st September 1988, with the transmitters for Central Scotland, the North and the Midlands launched on temporary frequencies, taking FM stereo coverage to 50% of the population. Four weeks later on the 29th, The transmitter for South Wales and West England launched. The following day, the use of Radio 2's FM network in the late evening was withdrawn, which Radio 1 disguised with new evening schedules. The Saturday afternoon and Top 40 slots were retained. The last two temporary transmitters, serving Oxfordshire and Belfast, were launched on the 24th of November. The temporary FM network was as follows:

- London area 104.8 (Crystal Palace, 2 kW),
- Central Scotland 98.6 (Black Hill, 250 kW),
- North West and Yorkshire 98.8 (Holme Moss, 60 kW),
- Midlands 98.4 (Sutton Coldfield, 98.4, 25 kW),
- South Wales and West England 98.7 (Wenvoe, 60 kW),
- Oxfordshire and West Bucks 98.2 (Oxford, 5 kW),
- East & Central Northern Ireland 96.0 (Black Mountain, 1 kW).

Coverage for the temporary FM network was about 60% stereo, with another 10-20% of the population able to receive a mono FM signal.

The transition to the permanent FM network began on the 19th December 1989 with a second big switch-on. At the start of the day, The Holme Moss, Sutton Coldfield and Wenvoe transmitters were switched to their permanent frequencies and turned up to full power. Four transmitters were then ceremonially switched on through the day:

- Wrotham for the South East (replacing Crystal Palace),
- Tacolneston for Norfolk and Suffolk,
- Sandale for North East Cumbria and South West Scotland,
- Blaenplwyf for Ceredigion and SW Gwynedd.

This took stereo coverage to 76% of the population. Saturday afternoon broadcasting on Radio 2 FM ended at the start of 1990, with the final Top 40 on Radio 2 FM broadcast on March 24th. The remaining big coverage transmitters and frequency changes were as follows:

- 11/2/1990: North Hessary Tor opened for Devon and East Cornwall,
- 27/2/1990: Black Hill switched to its permanent frequency,
- 12/4/1990: Pontop Pike opened for North East England (initially at 15 kW, with full power a year later),
- 2/5/1990: Oxford switched to its permanent frequency at full power,
- 24/5/1990: Rowridge for Central Southern England.

These transmitters took stereo coverage to 85%. Pontop Pike broadcast a test tone for over a month, so it could be opened on the day the Queen visited Newcastle. Unfortunately, she was not available to perform the ceremony. The permanent service for Northern Ireland was delayed to 30/4/1991 due to re-engineering work at the Divis transmitter. However, Radio 1 moved to its permanent frequency on 2/3/1990 to make way for Radio 4. From 1990, FM relays at new sites all carried Radio 1 from the start, beginning with Buxton.

Although 85% of the population can be served by 13 high power transmitters, the BBC uses about 200 transmitters to provide FM radio to the remaining 15%. The next 10% of the population was served by mid 1991 from the following transmitters, with most of the rest receiving a mono service:

- 4/6/1990: Londonderry for Derry area
- 27/7/1990: Belmont for Lincolnshire and Humberside
- 1/10/1990: Meldrum for Grampian Region
- 4/10/1990: Forfar for East Tayside and North Fife
- 1/11/1990: Winter Hill for West, South & Central Lancs
- 14/11/1990: Guildford for West Surrey and NE Hampshire
- 6/12/1990: Brighton for Brighton and Worthing area
- 19/12/1990: Llanddona for North Gwynedd and NW Clwyd
- 16/1/1991: Peterborough for Cambs, Beds & E Northants
- 16/1/1991: Bow Brickhill for Milton Keynes and West Beds
- 2/3/1991: Darvel for Ayrshire
- 4/6/1991: Morecambe Bay for South Cumbria & NW Lancs
- 6/6/1991: Ashkirk for the Border Region
- 7/6/1991: Rosemarkie for Inverness and Moray Firth area
- 10/6/1991: Haverfordwest for Pembrokeshire
- 1/8/1991: Redruth for West Cornwall

Originally, commissioning the remaining Radio 1 transmitters, in decreasing order of population coverage, was scheduled to take until 1996 with medium wave due to be lost in 1993. However, the transmitters outside England also had to have Radio 4 added, so when it was proposed to take Radio 4 off long wave, the programme was accelerated. So, when the medium wave network was eventually shut in 1994, every FM transmitter except Chatton (1995) carried Radio 1. Medium wave was withdrawn over the course of June 1994 with late evenings, early evenings, afternoons and mid mornings withdrawn over successive weeks, leaving only the breakfast show for the final week. Closure on the 1st July was somewhat haphazard, with Brookmans Park putting out a commemorative programme, while Droitwich was accidentally left broadcasting Radio 1 for a few minutes.

Going Digital

In September 1995, Radio 1 (alongside Radios 2 to 5) launched the world's first digital radio service on DAB in the London area, with outdoor coverage extended to 60% of the population by mid 1998 as receivers started to become available. In December 2001, Radio 1's DAB bit rate was cut to make room for more BBC stations, causing a significant drop in sound quality, which has only been partially recovered to date through improved coding and processing algorithms. At the end of 2002, the first sub-£100 DAB radios were launched. Coverage has gradually increased from 2002 onwards, reaching 97% (indoor) by the end of 2015. In 2015, DAB radios were available from £30 and fitted to about 60% of new cars.

Internet streaming also began in the mid to late 1990s. On 19th November 1999, Radio 1 launched on digital satellite TV, adding digital cable the following year and digital terrestrial television in January 2003. In 2018, about 60% of Radio 1 listening was on FM, with 40% on various digital platforms.

Paul Groves 2004 (updated and reformatted 2015, 2016, 2020)