

## **Mobile Network Operators**

Four mobile operators launched GSM networks in the UK during early 1990s. Over the years which followed there has been acquisitions, mergers and rebranding which has resulted in three GSM network operators at the time of writing (July 2022). Only one network, Vodafone, retains the original network name although its branding has changed several times over the years.

The following network operators launched their GSM service during the early 1990s:

- Vodafone - 2 December 1991 (it appears to be July 1992 before volume sales started)
- Mercury one2one - 7 September 1993
- Cellnet - December 1993
- Orange - 28 April 1994

At the time of GSM launch, Vodafone and Cellnet also operated analogue TACS (Total Access Communication System) based mobile communication networks, this included an Extended spectrum range in the 900 MHz band which was often described as ETACS). Both operators launched their TACS service in 1985, Vodafone on 1 January 1985 and Cellnet on 7 January 1985. Their GSM networks operated in the same 900 MHz frequency band as their TACS service, therefore radio spectrum had to be carefully managed as it was migrated from TACS to GSM. There was no backwards compatibility between GSM and TACS, they were completely different systems.

Mercury one2one and Orange deployed networks which operated in the 1800 MHz frequency band, this was a new band which was made available specifically to enable additional GSM network operators to launch and therefore drive a more competitive market for businesses and consumers alike.

The choice of the 1800 MHz band was first proposed in a paper by the UK Department of Trade and Industry which was published in January 1989 and titled: Phones on the Move. A copy of this paper can be found on Stephen Temple's excellent website: <http://www.gsmhistory.com/> at: <http://www.gsmhistory.com/wp-content/uploads/2013/01/6.-DTI-Phones-on-the-Move.pdf>

The proposal to build a national network at 1800 MHz, considered an extremely high frequency for such an application at the time, was debated amongst industry and the consensus was that networks in this frequency band would be focused on urban areas which required high capacity yet limited coverage. Networks in the 1800 MHz band became known as PCN (Personal Communications Network) while the GSM standards work referred to the technology as DCS1800 (Digital Cellular System [in the] 1800 MHz band). The operating frequency was effectively the only difference from what became known as GSM900 and as such it was not long until the term DCS1800 was dropped in favour of GSM1800, albeit both terms coexisted for many years.

The 900 MHz band provides greater geographical reach (for a given radio system configuration) than 1800 MHz however the 1800 MHz band has more spectrum and therefore more capacity, the lower coverage level of 1800 MHz is also useful when inter-site distance

must be reduced to increase area capacity density, so there are pros and cons to both frequency bands...

### **Vodafone**

Vodafone launched its GSM network on 2 December 1991, becoming the first GSM network in the UK.

Vodafone's headquarters is in Newbury, Berkshire. Vodafone was originally a subsidiary of Racal Telecommunication Group Limited and was floated as an independent company, known as Vodafone Limited, in 1991. In 1999 Vodafone merged with AirTouch, a large mobile network operators from the USA, and in 2000 it completed the acquisition of Mannesmann AG, creating a major global network operator.

From Racal to Voda to Vodafone, the logo has evolved over the years as illustrated below:



The evolution of Vodafone's logo - source: <https://1000logos.net/vodafone-logo/>

### **Mercury one2one**

Mercury one2one launched its GSM network on the 7 September 1993, becoming the second GSM network operator in the UK and the world's first 1800 MHz digital cellular network.

Mercury one2one had its headquarters at Elstree Tower, Borehamwood. In 1992 Cable & Wireless and US West merged their PCN business units to form Mercury Personal Communications which launched Mercury one2one.

In 1997 Mercury one2one chose to rebrand and in doing so dropped the Mercury name and became known as one2one. one2one was purchased by Deutsche Telekom (DT) in 1999, who rebranded it with their global T-Mobile brand name in 2002, this company was known within DT group as T-Mobile UK.



The evolution of Mercury one2one's logo and company name

### Cellnet

Cellnet launched its GSM network during December 1993, becoming the third GSM network in the UK.

Cellnet's headquarters is in Slough. Cellnet was a 60:40 joint venture between BT Group and Securicor. In 1999, BT acquired Securicor's share of Cellnet and the company was later rebranded as BT Cellnet. BT Wireless division, including its European assets, was spun off from the BT Group in 2002 (after shareholder agreement was reached during October 2001) to form a new holding company, mmO2 plc, which introduced the new O2 brand. In 2005 mmO2 plc was renamed O2 plc. O2 plc was purchased by the Spanish telecommunications company Telefonica in 2006, which retained the O2 brand.



1985



1988



1990



1999



2002-now

The evolution of Cellnet's logo and company name - source: <https://1000logos.net/o2-logo/>

In May 2020, Telefonica reached an agreement with Liberty Global to merge the company with Virgin Media. On 1 June 2021, O2 and Virgin Media formally merged to create Virgin Media O2 as a joint venture.



Virgin media O2 logo – source: <https://www.virginmedia.com/news/virgin-media-o2>

### Orange

Orange launched its GSM network on 28 April 1994, becoming the fourth GSM network in the UK.

Orange had its headquarters in Almondsbury, Bristol. One of the PCN license holders and originally known as Microtel. Microtel was acquired by Hutchison Telecom in July 1991 and went on to become Hutchison Microtel prior to rebranded to Orange in 1994, in advance of launching its commercial GSM network.

Hutchison sold Orange to Mannesmann AG in 2000, just prior to Vodafone's acquisition of Mannesmann. As a result of this Orange was owned by Vodafone for a short period of time however due to regulatory reasons, they quickly sold the company to France Telecom (FT) with the deal completing in August 2000. FT wanted a UK network operator but also wanted a brand and subsequently rebranded all of France Telecom's network businesses as Orange.



Orange logo

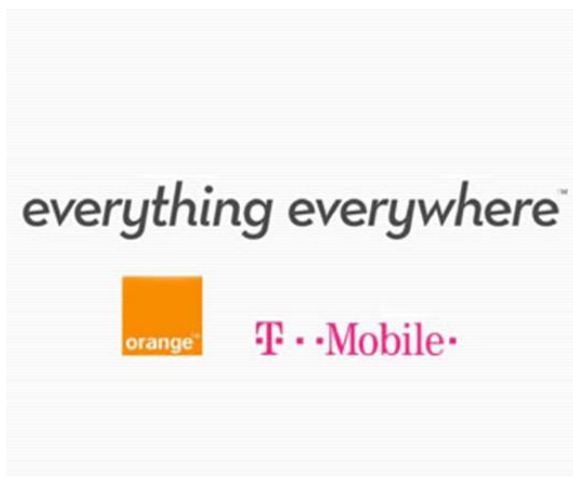
During the time of Hutchison Telecom's ownership of Orange, it was common for the logo to appear with a black banner with white text below which read: Hutchison Telecom.

## Two become one, the Orange and T-Mobile merger

On the 8 September 2009 FT and DT, the respective owners of Orange UK and T-Mobile UK, announced their plans to merge the two businesses in a 50:50 joint venture. The Orange office at Paddington Basin in London would become the headquarters of the combined business which would be known as Everything Everywhere.

The joint venture would continue to market the Orange and T-Mobile brands using a technique known as smart-compete to position the brands within the marketplace. Orange was positioned as a high-end product while T-Mobile focused on lower cost mass market, there was some overlap with customers given the option to migrate between brands and therefore propositions, hence the smart compete methodology. As both brands were operated by Everything Everywhere it was a flexible marketing approach.

Once the merger received formal approval the new business set about the process of network integration. Initially this took the form of national roaming between the two networks, this was known internally as Project Mint. In time the GSM network was refreshed with new equipment from a single vendor (Huawei) which replaced the legacy Nokia equipment in Orange and Ericsson and Nortel equipment in T-Mobile. More on this in a later paper on the technical implications of the merger on GSM network infrastructure.



Everything Everywhere evolved to a brand of its own, EE

As Everything Everywhere evolved it became clear that there would probably be a change of ownership, maybe DT or FT would buy out the other party or perhaps the company would be sold to a third party. To prepare for this a decision was taken to cut ties with the Orange and T-Mobile brands and build a standalone brand; this became EE, which was launched to align with the networks 4G LTE service launch on 30 October 2012.

The company changed its name to EE Ltd and continued to operate under the ownership of DT and FT until it was acquired by British Telecom (BT). BT announced an intention to purchase EE in February 2015 and the deal closed with the necessary regulatory and shareholder approvals in January 2016. The EE brand has been retained by BT and operates alongside BT and Plusnet branded mobile propositions, all operating on the EE network.

Note that while there is a general trend to refer to Vodafone and Cellnet as 900 MHz GSM network operators and Orange and Mercury one2one as 1800 MHz GSM (DCS1800) network operators, all four operators do have 1800 MHz spectrum. The original 3 PCN license holders; Mercury PCN, Unitel and Microtel were each awarded 2 x 25MHz of spectrum in the 1800 MHz band. The merger of Cable & Wireless and US West (which created Mercury one2one) did not result in a company with twice as much spectrum; one license had to be surrendered. No other company came forward to take this license therefore the spectrum was split between the four mobile network operators some years later. Mercury one2one and Orange received an extra 2 x 5 MHz each whilst Cellnet and Vodafone received 2 x 5.8 MHz each.

### **Summary**

The table below summarises the market facing brands of GSM mobile network operators, starting at network launch, and highlighting any changes over time. Refer to the specific operators' section above for further details.

GSM launch	Vodafone	Mercury one2one	Cellnet	Orange
		one2one	BT Cellnet	
		T-Mobile	O2	
2022	Vodafone	EE*	Virgin Media O2	EE*

EE\* a single network as a result of the merger of Orange and T-Mobile.

At the time of writing (July 2022) the UK has three operational GSM networks although an amount of spectrum previously deployed for GSM operation has been repurposed, or refarmed as described in the mobile networks industry, to other radio access technologies; typically, 3G UMTS or 4G LTE, although EE has recently further refarmed some 1800 MHz spectrum for 5G.

The inclusion of Hutchison's Three (3) network means the UK currently has four mobile network operators however Three is not and has never been a GSM network operator, Three entered the market as a 3G UMTS network operator in 2003.