

900 MHz HSPA systems - **UMTS900** - efficiently extend voice, data and mobile broadband coverage. UMTS900 is a mainstream technology. This report confirms the gains and opportunities from deploying UMTS900, the global status of operator commitments, network deployments, launches, trials, regulation, and the user devices ecosystem.

72 commercial UMTS900 networks in 49 countries

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Country	Operator	Service launch
Finland	Elisa	November 2007
Estonia	Elisa	January 2008
Thailand	AIS	May 2008
Australia	Optus	May 2008
Belgium	Mobistar	May 2008
Belgium	Proximus	July 2008
New Zealand	Vodafone	July 2008
Finland	DNA	October 2008
Iceland	Siminn	October 2008
Venezuela	Digitel	March 2009
Finland	TeliaSonera	June 2009
France	Orange	Q2 2009
Croatia	Tele2	July 2009
Australia	VHA	August 2009
France	SFR	September 2009
Faroe Islands	Faroese Telecom	November 2009
Armenia	Orange	November 2009
Latvia	LMT	November 2009
Poland	Aero2	November 2009
Ghana	MTN	December 2009
Hong Kong	CSL Limited	January 2010
Dominican Rep	Orange	February 2010
South Africa	MTN	March 2010
Tanzania	Rural Telco	March 2010
Romania	Vodafone	April 2010
Estonia	EMT	June 2010
Bulgaria	Vivacom	June 2010
Malaysia	Maxis	June 2010
Saudi Arabia	Mobily	2010
Saudi Arabia	Zain	2010
Slovenia	Tusmobil	July 2010
Greenland	TELE	August 2010
South Africa	Cell C	September 2010
Poland	P4 (Play mobile)	January 2011
Estonia	Tele2	March 2011
UK	O2	March 2011
Qatar	Vodafone	March 2011
Kazakhstan	Tele2	April 2011
Papua New Guinea	Digicel	May 2011
Sweden	3	May 2011
Hong Kong	3	June 2011
Norway	Netcom	August 2011
New Caledonia	OPT	August 2011

Lithuania	Tele2	2011
Saudi Arabia	STC	2011
New Zealand	2degrees	September 2011
Spain	Vodafone	September 2011
Slovenia	Si.mobil	October 2011
Spain	Movistar	October 2011
Germany	E-Plus	December 2011
Poland	Polkomtel Plus	December 2011
Mozambique	Mcel	2012
Philippines	Globe	2012
Spain	Orange	2012
Russia	MegaFon	January 2012
Russia	MTS	January 2012
Russia	Vimpelcom	January 2012
Hungary	Vodafone	March 2012
Paraguay	Vox/Copaco	May 2012
Switzerland	Sunrise	May 2012
Japan	Softbank Mobile	July 2012
Tunisia	Tunisian	July 2012
UK	Vodafone	July 2012
Macedonia	VIP	August 2012
Greece	Vodafone	October 2012
Indonesia	Indosat	October 2012
Singapore	Starhub	November 2012
Benin	MTN	November 2012
France	Bouygues Tel	2013
France	Free Mobile	2013
Oman	Nawras	May 2013
Singapore	M1	September 2013

Almost 70 countries permit or are considering allowing UMTS900 system deployments

UMTS900 user devices are MAINSTREAM

UMTS900 Benefits

Deploying 3G voice and mobile broadband coverage using 2100 MHz in all areas is too costly, impractical and takes too long for many operators. Radio propagation path-loss at 900 MHz is much less and for the same service offer and coverage the number of sites is below half that needed in 2100 MHz, with faster rollout time. Indoor coverage is also improved using 900 MHz. UMTS900 can complement 2100 MHz deployments to improve coverage, reduce CAPEX and OPEX, improve quality of service and enhance the user experience. UMTS900 operators can provide HSPA over much larger areas in a very cost-efficient way. GSM operators can also re-use many existing network assets e.g. antennas, network management systems.

Regulatory aspects

In Europe, mobile phones operate to GSM specifications typically in 2 bands: 900 MHz (880–915/925–960 MHz) and 1800 MHz (1710–1785/1805–1880 MHz). On July

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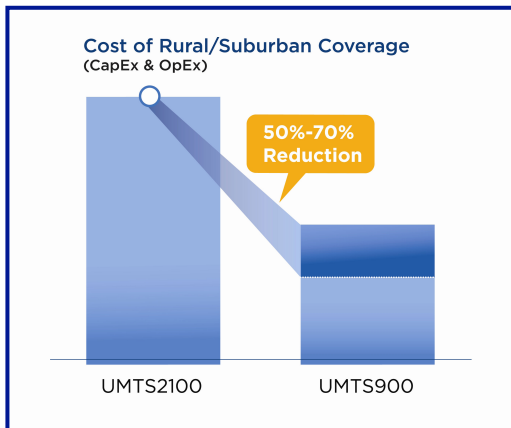
GSM/3G MARKET/TECHNOLOGY UPDATE

27, 2009 the Council of Ministers approved a proposal from the European Commission to update European legislation (the GSM Directive) on the use of radio spectrum needed for mobile services, giving the green light for deployment of 3G systems such as UMTS900 in 900 MHz spectrum. The amended Directive 2009/114/EC was ratified in October 2009. Commission Decision 2009/766/EC entered into force at the same time, and defined technical measures allowing for co-existence of 2G/GSM and UMTS systems on GSM spectrum in line with the Directive. All Member States have now transposed the Directive into national law.

UMTS900 operator case studies

Elisa, Finland

Elisa case study www.gsacom.com/gsm_3g/info_papers.php4
 Press release www.gsacom.com/news/gsa_252.php4



Elisa Finland launched the world's first UMTS900 system, confirming that 3G coverage with UMTS900 can save 50 - 70% of network costs vs. UMTS2100, for

Figure 1: CAPEX and OPEX savings using UMTS900 (source: GSA UMTS900 Operator Case Study – Elisa, Finland)

CAPEX and OPEX. UMTS900 brought 3G and mobile broadband more cost-effectively to outside the cities.

Elisa recognized indoor coverage as another key benefit. With UMTS900, Elisa was able to re-use existing GSM900 sites and frequencies to fill in areas not covered by the UMTS2100 service. As GSM site conversion is completed and nationwide 3G coverage is achieved, Elisa expands into urban areas to create a nationwide UMTS900 network.

Optus, Australia

Optus case study: www.gsacom.com/gsm_3g/info_papers.php4
 Press release: www.gsacom.com/news/gsa_272.php4

Optus saw the rollout of UMTS900 in suburban and rural areas as a natural extension of its initial 3G deployment in the more heavily populated areas where 2100 MHz was used. UMTS900 brought 3G and mobile broadband services more cost-effectively to outside the cities.

More than simply the need for fewer installations, UMTS900 facilitates the addition of a much larger data market as it provides better indoor coverage than is possible using 2100 MHz.

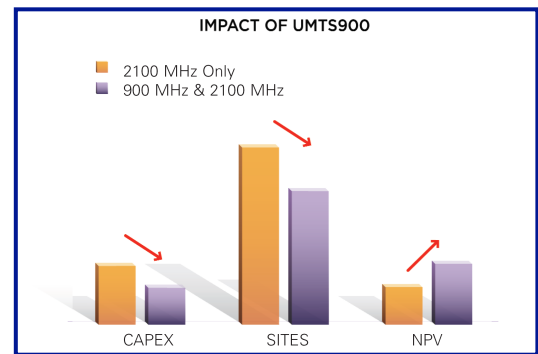


Figure 2: Impact of UMTS900 (source: GSA UMTS900 Operator Case Study – Optus, Australia)

Deployments/launches/regulatory update

Armenia: Orange Armenia launched 7.2 Mbps peak HSPA in 900 MHz and 2100 MHz on November 5, 2009

Australia: Telstra launched the world's largest 3G/HSPA network (Next G™) using 850 MHz on October 10, 2006, complementing its 3G/2100 MHz coverage. The network covers over 1.9 million sq km with 99% pops coverage. Telstra boosted peak downlink to 21 Mbps with the world's first HSPA+ commercial launch on February 23, 2009 and launched 42 Mbps DC-HSPA+ in June 2010. Vodafone has a national HSPA mobile broadband network, launched UMTS900 in August 2009, and deployed an 850 MHz HSPA network in 2011. The Optus 'yes'G network uses 2100 and 900 MHz spectrum. See the Optus UMTS900 case study.

Austria: Regulator RTR launched a consultation in early 2011 concerning liberalization of 900 and 1800 MHz spectrum. A further consultation followed in July 2011. An auction of 800, 900 and 1800 MHz spectrum announced for September 2012 was postponed on April 23, 2012 due to domestic operator merger proposals.

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Belgium: Mobistar put its first UMTS900 site on air in May 2008. Proximus launched UMTS900 in July 2008. Regulator BIPT announced an auction for new 2100 MHz spectrum beginning June 6 2011. A new 3G operator, Telenet Tecteo Bidco, was also granted technology neutral 900 MHz and 1800 MHz spectrum.

Benin: MTN Benin commercially launched UMTS900 as well as using 2.1 GHz spectrum on November 29, 2012.

Bosnia and Herzegovina: BH Telecom is deploying UMTS900.

Bulgaria: Vivacom commercially launched UMTS900 in June 2010. Globul completed a UMTS900/1800 trial.

Croatia: Tele2 launched UMTS900 in July 2009.

Cyprus: Version 1.9 of the Radio Frequency Plan confirms 900 MHz allocations compliant with Directives 87/372/EEC and 2009/114/EC and Decision 2009/766/E

Denmark: NITA announced on December 23, 2009 its decision on refarming of 900, 1800 MHz effective January 1, 2011. TDC, Telenor and Telia released a cumulative 2 x 5 MHz of 900 MHz and 2 x 10 MHz of 1800 MHz which was auctioned in October 2010 with rights to use for 2G/GSM, 3G/UMTS900 and LTE. Incumbents were excluded from bidding. Hi3G won the auction and duly received 900 and 1800 MHz spectrum.

Dominican Republic: Orange Dominicana launched UMTS900 in February 2010.

Egypt: Vodafone is deploying UMTS900

Estonia: Elisa launched UMTS900 on January 23, 2008. In June 2010 EMT launched a UMTS900 network for the Saaremaa and Muhu islands in the Baltic Sea. In March 2011 Tele2 announced the launch of UMTS900 services in Narva, Kohtla-Jarve, Sirgala, Pussi, Langa.

Faroe Islands: FT launched HSPA in 900 MHz (UMTS900) and 2100 MHz on November 3, 2009.

Finland: Finland was the first country in Europe to enable concurrent use of 900 MHz frequencies and 2G and 3G mobile communications services. The world's first UMTS900 service was launched by Elisa Finland on November 8, 2007 supporting HSDPA 16QAM and HSUPA. Elisa subsequently launched 21 Mbps HSPA+

in 900 MHz. See GSA case study on Elisa Finland www.gsacom.com/gsm_3g/info_papers.php4

DNA launched UMTS900 service on October 1, 2008. TeliaSonera launched UMTS900 on June 1, 2009.

France: On February 27, 2008 regulator ARCEP approved all GSM operators to reuse their 900 MHz spectrum for 3G. Free Mobile was guaranteed access to 900 MHz as incumbent operators returned spectrum according to an agreed timetable. Orange commercially launched UMTS900 in Q2 2009. SFR commercially launched UMTS900 in September 2009. In rural areas the network is shared. Bouygues Telecom and Free Mobile began introducing UMTS900 from early 2013. ARCEP published its preliminary decision allowing operators in French Overseas Departments and Territories of Guadeloupe, Martinique, French Guiana and Réunion to reuse GSM mobile spectrum for 3G.

Germany: E Plus launched UMTS900 in Dec 2011.

Ghana: MTN launched UMTS900 in Dec 2009.

Greece: 900 MHz and 1800 MHz technology-neutral licenses were auctioned in November 2011, won by Wind, Vodafone and Cosmote. Vodafone announced UMTS900 service launch in October 2012.

Greenland: TELE Greenland launched UMTS900 in Nuuk, on August 2, 2010.

Hong Kong: CSL brought its UMTS900 HSPA network into commercial use in January 2010, providing full coverage of the region with better indoor coverage and better performance at the cell edge. 3 HK brought UMTS900 into commercial service in June 2011.

Hungary: Regulator National Media and Infocommunications Authority (NMHH) authorized 3G/HSPA to be deployed in 900 and 1800 MHz from July 5, 2011. On January 31, 2012 NMHH published the results of the 900 MHz spectrum auction:

- the frequency usage right of one EGSM-band duplex frequency block of 5 MHz went to the Magyar Posta-MFB Invest Zrt.-MVM Zrt. consortium along with the 1800 MHz and 2100 MHz duplex blocks (15 MHz each);
- MT won 2 MHz duplex block in the 900 MHz bands;
- Vodafone Magyarország won 2 MHz block in E-GSM.
- Telenor Magyarország won 1.8 MHz duplex spectrum block in the E-GSM band.

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Vodafone commercially launched UMTS900 in March 2012 and now has over 90% 3G coverage.

Iceland: Siminn commercially launched UMTS900 service on October 2, 2008: 7.2 Mbps DL/1.4 Mbps UL.

Indonesia: Indosat launched commercial UMTS900 service on October 6, 2012.

Ireland: A multi-band auction for technology-neutral 800, 900, and 1800 MHz licenses was held by ComReg in November 2012.

Italy: On October 2, 2008 AGCOM approved UMTS in the 900 MHz band. The Ministry for Economic Development developed a frequency plan for 900 MHz which will qualify all operators to use at least 5 MHz for 3G. At least one 5 MHz block will be assigned in a competition to a new 3G entrant. Telecom Italia, Vodafone and Wind were required to release 2 x 5 MHz of 900 MHz as part of the refarming process and this freed block is to be reallocated by end 2013 for 3G use to a '3G only' player, e.g. H3G or a new entrant. Vodafone has begun a UMTS900 trial in Cremona. H3G is deploying UMTS900.

Japan: 900 MHz is referred to as the "Platinum Band". Softbank launched UMTS900 in July 2012.

Kazakhstan: Tele2 launched commercial UMTS900 services on April 24, 2011. Release 6 sites support 14.4 Mbps peak DL, and 5.8 Mbps UL. Release 7 sites support 21 Mbps HSPA+, and 11.5 Mbps UL

Kuwait: Wataniya Telecom is deploying UMTS900.

Latvia: LMT launched UMTS900 on November 10, 2009

Lithuania: Tele2 launched UMTS900 in 2011.

Luxembourg: 900 and 1800 MHz spectrum are liberalized.

Macedonia: VIP launched commercial UMTS900 service on August 30, 2012.

Malaysia: Maxis added UMTS900 to its 3G mobile broadband network to improve indoor coverage and increase speed; the first UMTS900 base site entered commercial service on June 25, 2010 and over 1,200 UMTS900 sites were in service by January 31, 2012. Celcom is deploying UMTS900.

Malta: Regulator MCA published its final decision on July 16, 2010 permitting rights of use as per EU decision 2009/766/EC, enabling deployment of GSM and/or UMTS, LTE or WiMAX in 900 or 1800 MHz. New 15 year licenses were granted to Melita Mobile, Mobisle Communications and Vodafone on August 26, 2011.

Mozambique: Mcel has commercially launched UMTS900 (2012E) as well as using 2.1 GHz spectrum.

Myanmar: UMTS900 is allowed, in deployment by MPT.

Netherlands: UMTS900 allowed from August 15th 2010. T Mobile began deploying UMTS900 in 2013 for better indoor coverage.

New Caledonia: OPT commercially launched UMTS900 as well as using 2.1 GHz spectrum on August 16, 2011

New Zealand: Vodafone announced expanded 3G/UMTS900 coverage in July 2008, and 97% population coverage by 31 May 2009. Vodafone deployed urban UMTS900 DC-HSPA+ in Auckland in 2013. On May 29, 2009 Telecom New Zealand launched a nationwide HSPA network (XT™ Mobile Network) in 850 MHz. Telecom launched HSPA+ in August 2010. 2degrees launched UMTS900 in September 2011.

Norway: Netcom launched UMTS900 in August 2011. Telenor is deploying UMTS900.

Oman: Nawras launched UMTS900 in refarmed 900 MHz spectrum in May 2013.

Papua New Guinea: Digicel launched UMTS900 on May 6, 2011.

Paraguay: Vox (Copaco) launched commercial 21 Mbps UMTS900 service in May 2012.

Philippines: Globe launched UMTS900 in 2012 as a complement to its 3G/2100 MHz service.

Poland: On November 16, 2009 the world's first HSPA+ system using 900 MHz was launched by Aero2. The 21 Mbps network was built for Aero2 by Sferia S.A. P4 (Play Mobile) launched UMTS900-HSPA+ services on January 24, 2011. Polkomtel Plus launched UMTS900 to customers in December 2011, also using 2100 MHz for their network. T Mobile (PTC) and Orange deployed a joint network including UMTS900 under their JV company and started testing in September 2011.

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GSM/3G MARKET/TECHNOLOGY UPDATE

Portugal: ANACOM adopted a Decision on July 8, 2010 to combine each operator's existing rights of use issued in the 900, 1800, and 2100 MHz bands into a single licence. Consultations followed regarding the auction process for liberalized spectrum including 900 MHz and a revised set of auction regulations for future allocation of spectrum in the 450, 800, 900, 1800, 2100 and 2600 MHz bands was confirmed. The auction began on November 28, 2011 and quickly concluded with winning bids from Portugal Telecom, Sonaecom and Vodafone. Vodafone indicated plans to deploy UMTS900.

Qatar: On March 29, 2011 Vodafone announced 3 sites in northern rural areas are upgraded with UMTS900.

Romania: In February 2010 ANCOM approved 3G deployments in 900 and 1800 MHz, spectrum used by Orange, Vodafone, and Cosmote. Vodafone commercially launched 21 Mbps UMTS900 nationwide on April 28, 2010. Orange began deploying UMTS900 in Q1 2011. Cosmote is considering deploying a commercial UMTS900 network. ANCOM auctioned spectrum in the 800, 900, 1800 MHz and 2.6 GHz in September 2012. In October 2012 ANCOM launched a consultation and draft decision on allowing 4G (e.g. LTE) technology to be deployed in 900 and 1800 MHz bands alongside existing technologies e.g. UMTS900.

Russia: In March 2011, the State Committee for Frequencies authorized use of 900 MHz for 3G. MTS commercially launched UMTS900 on January 17, 2012 with 500 UMTS900 sites in the Moscow region. Megafon had over 100 UMTS900 sites live in the Moscow region from March 2012. Vimpelcom said 80% of Moscow region sites support UMTS in 900 and 2100 MHz.

Saudi Arabia: Mobily, STC, and Zain have deployed and commercially launched UMTS900 systems with support under the USF Broadband roll-out program which commenced in 2010.

Singapore: Starhub commercially launched UMTS900 in their network in November 2012. M1 commercially launched UMTS900 on September 30, 2013.

Slovakia: UMTS is allowed in 900 and 1800 MHz.

Slovenia: Tusmobil launched UMTS900 in July 2010. Si.mobil also launched 21 Mbps UMTS900, increasing HSPA coverage from 69.2% to 85.9% by October 2011.

South Africa: MTN brought UMTS900 into commercial use in March 2010. Cell C commercially launched 21 Mbps HSPA+ UMTS900 network in September 2010. Vodacom is understood to be evaluating UMTS900.

Spain: Before the auction, 900 MHz was allocated to Telefonica and Vodafone (12.5 MHz each) and Orange (6 MHz). In March 2011 Vodafone detailed plans to deploy UMTS900 in 245 towns of < 1,000 people. The auction for 800, 900 MHz and 2.6 GHz ended July 29, 2011; Telefonica Movistar won one 2 x 5 MHz 900 MHz block and introduced UMTS900 from October 2011 in La Gomera and Santa Cruz de Tenerife. The second 900 MHz block did not sell. Vodafone (2011) and Orange (2012) all launched UMTS900.

Sweden: 3 launched UMTS900 on May 25, 2011.

Switzerland: ComCom renewed the GSM licences of Orange, Sunrise, and Swisscom until end 2013, allowing UMTS900. All GSM licences will expire together (Swisscom, Sunrise, Orange, In&Phone), giving ComCom an opportunity to reallocate mobile spectrum that is free now or will be in 2013 or 2016. In April 2011 Orange announced a 2-year modernization program including expansion of 3G in rural areas with UMTS 900 until 2013. A few areas currently have UMTS900 that customers can use. Sunrise commercially launched UMTS900 in May 2012.

Tanzania: Rural Telco launched UMTS900 in March 2010.

Thailand: AIS launched UMTS900 on May 6, 2008.

Tunisia: Tunisiana launched 21 Mbps HSPA+ in 900 MHz (UMTS900) and 2100 MHz on July 23, 2012

Turkey: BTK is studying the benefits of UMTS900

UAE: UMTS900 is allowed.

UK: O2 launched UMTS900 on March 17, 2011. Vodafone's coverage map highlighted availability of UMTS900 for its customers from July 2012.

Ukraine: Beeline/Kyivstar and MTS wish to deploy UMTS900 since 3G/2100 licences are not yet issued.

Venezuela: Digitel launched Latin America's first commercial UMTS900 on March 2, 2009.

Regulators in 69 countries & territories allow or are considering UMTS900 deployments: Armenia, Australia, Austria, Belgium, Benin, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Denmark, Dominican Rep, Egypt, Estonia, Faroe Isles, Finland, France, French Guiana, Germany, Ghana, Greece, Greenland, Guadeloupe, Hong Kong, Hungary, Iceland, Indonesia, Ireland, Italy, Japan, Kazakhstan, Kuwait, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Malta, Martinique, Mozambique, Netherlands, New Caledonia, New Zealand, Norway, Oman, Papua New Guinea, Paraguay, Philippines, Poland, Portugal, Qatar, Réunion, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Tanzania, Thailand, Tunisia, Turkey*, UAE, UK, Ukraine*, Venezuela (* = under consideration)

Country	UMTS900 operator	Network status	Network status
Armenia	Orange		Launched
Australia	Optus		Launched
Australia	VHA		Launched
Belgium	Mobistar		Launched
Belgium	Proximus		Launched
Benin	MTN		Launched
Bosnia and Herzegovina	BH Telecom	In deployment	
Bulgaria	Vivacom		Launched
Bulgaria	Globul	Testing	
Croatia	Tele2		Launched
Denmark	3 (Hi3G)	In deployment	
Dominican Republic	Orange Dominicana		Launched
Egypt	Vodafone	In deployment	
Estonia	Elisa		Launched
Estonia	EMT		Launched
Estonia	Tele2		Launched
Faroe Islands	Faroese Telecom		Launched
Finland	DNA		Launched
Finland	Elisa		Launched
Finland	TeliaSonera		Launched
France	Bouygues Telecom		Launched
France	Free Mobile		Launched
France	Orange		Launched
France	SFR		Launched
Germany	E-Plus		Launched
Ghana	MTN		Launched
Greece	Cosmote	Testing	
Greece	Vodafone		Launched
Greenland	TELE		Launched
Hong Kong	CSL Limited		Launched
Hong Kong	3 HK		Launched
Hungary	Vodafone		Launched
Iceland	Siminn		Launched
Indonesia	Indosat		Launched
Italy	3 Italia (H3G)	In deployment	
Italy	TIM	In deployment	
Italy	Vodafone	Testing	
Japan	Softbank		Launched
Kazakhstan	Tele2		Launched
Kuwait	Wataniya Telecom	In deployment	
Latvia	LMT		Launched
Lithuania	Tele2		Launched
Macedonia	VIP		Launched
Malaysia	Maxis		Launched
Malaysia	Celcom	In deployment	
Mozambique	Mcel		Launched
Myanmar	MPT	In deployment	
Netherlands	T Mobile NL	In deployment	

New Caledonia	OPT	Launched
New Zealand	2degrees	Launched
New Zealand	Vodafone	Launched
Norway	Netcom	Launched
Norway	TeleNor	In deployment
Oman	Nawras	Launched
Papua New Guinea	Digicel	Launched
Paraguay	Vox-Copaco	Launched
Poland	Aero2	Launched
Poland	Orange	In deployment
Poland	T Mobile	In deployment
Poland	P4 (Play)	Launched
Poland	Polkomtel Plus	Launched
Portugal	Vodafone	In deployment
Qatar	Vodafone	Launched
Romania	Cosmote	Planned
Romania	Orange	In deployment
Romania	Vodafone	Launched
Russia	Megafon	Launched
Russia	MTS	Launched
Russia	Vimpelcom	Launched
Saudi Arabia	Mobily	Launched
Saudi Arabia	STC	Launched
Saudi Arabia	Zain	Launched
Singapore	M1	Launched
Singapore	Starhub	Launched
Slovenia	Si.mobil	Launched
Slovenia	Tusmobil	Launched
South Africa	Cell C	Launched
South Africa	MTN	Launched
South Africa	Vodacom	Testing
Spain	Movistar	Launched
Spain	Orange	Launched
Spain	Vodafone	Launched
Sweden	3 (Hi3G)	Launched
Switzerland	Orange	In deployment
Switzerland	Sunrise	Launched
Tanzania	Rural Telco	Launched
Thailand	AIS	Launched
The Philippines	Globe	Launched
Tunisia	Tunisiana	Launched
Ukraine	Beeline	Planned
Ukraine	MTS	Planned
UK	o2	Launched
UK	Vodafone	Launched
Venezuela	Digitel	Launched

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