

Generations of Cellular Network

1G - 1st Generation Analog Cellular System			
Region	America	Europe	Japan
Standard	AMPS (Advanced Mobile Phone System)	ETACS (European Total Access Communications System)	NTT (Nippon Telephone and Telegraph System)
Multiple Access	FDMA	FDMA	FDMA
Duplexing	FDD	FDD	FDD
Forward Channel	869-894 MHz	935-960 MHz	870-885 MHz
Reverse Channel	824-849 MHz	890-915 MHz	925-940 MHz
Channel Spacing	30 kHz + 10 kHz(guard)	25 kHz	25 kHz
Data Rate	10 kbps	8 kbps	0.3 kbps
Spectral Efficiency	0.33 bps/Hz	0.33 bps/Hz	0.012 bps/Hz
Capacity	832 ch	1000 ch	600 ch

2G - 2nd Generation Digital Cellular System					
Region	US	Europe / Asia / US	US	US / Israel / Jap / S. Africa	Japan
Standard	IS-54 Digital AMPS(Interim Standard - for North-America TDMA Digital Cellular System). Commonly referred to as TDMA, D-AMPS network	GSM (Groupe Special Mobile. Aka Global System for Mobile)	IS-95 Commonly referred to as CDMA Network	iDEN (Integrated Digital Enhanced Network) "Push to Talk"	PDC (Personal Digital Cellular)
Multiple Access	TDMA	TDMA	CDMA	TDMA	TDMA
Duplexing	FDD	FDD	FDD	FDD	FDD
Modulation	$\pi/4$ DQPSK	GMSK	QPSK / OQPSK(Offset)	QPSK / 16QAM / 64QAM	$\pi/4$ DQPSK(Differential)
Forward Channel (down)	869-894 MHz	935-960 MHz	869-894 MHz		810-826 MHz
Reverse Channel (up)	824-849 MHz	890-915 MHz	824-849 MHz		940-956 MHz
Channel Spacing	30 kHz	200 kHz	1250 kHz	20 kHz + 5 kHz(guard)	25 kHz
Data/Chip Rate	48.6 kbps	270.833 kbps	1.2288 Mcps		42 kbps
Speech Codec Rate	7.95 kbps	13.4 kbps	1.2 / 2.4 / 4.8 / 9.6 kbps		6.7 kbps
Carrier	AT&T	AT&T	Verizon	Sprint NextTel	
Additional Comment	end of life (2008/03/01)			developer: Motorola. GSM Compatable	Exclusively in Japan. Being phased out.

2.5G ~ 3G+						
Generation	2.5G	2.5G	3G	3G	3.5G	3.5G
Standard	GPRS (General Paket Radio Service)	EDGE (Enhanced Data Rates for GSM Evolution)	UMTS(Universal Mobile Telecommunications System) Rel. 5(HSDPA)	cdma2000 1x Rel. 0	cdma2000 1x Rel. D (1xEV-DO, HDR)	IS-856 (1xEV-DO, HDR)
Multiple Access	TDMA	TDMA	CDMA	CDMA	CDMA	CDMA / TDMA
Modulation	GMSK	8PSK / GMSK	QPSK / 16QAM	BPSK / QPSK	QPSK / 8PSK / 16QAM	QPSK / 8PSK / 16QAM
Carrier Bandwidth	0.2 MHz	2.4 Mbps	3.84 MHz	1.25 Mbps	1.25 Mbps	1.25 Mbps
Peak Data Rate	115 kbps	384 kbps	1960 kbps	628 kbps	3091 kbps	2457 kbps
Data / Voice Support	data	data	data + voice	data + voice	data + voice	data
Carrier		AT&T				
Additional Comment	Designed as overlay on GSM / TDMA Networks	Paket Switching over GSM. Designed as overlay on GSM / TDMA networks	Designed as high throughput, high peak data rate extension to UMTS Release 99		Designed as high data rate extension to cdma2000 1x with voice support	Designed as high data rate extension to cdma2000

2.5G uses circuit switching TDMA layout and provides packet switching. This is accomplished by sending data packets on the idle TDMA channels

4G - Ultra Broadband		
Generation	4G	4G
Standard	WiMax	LTE (Long Term Evolution)
Multiple Access	OFDMA	OFDMA
Carrier Bandwidth	0.2 MHz	2.4 Mbps
Peak Data Rate	10Mbps	100Mbps (Down) / 50 Mbps(Up)
Carrier	Sprint / Clearwire	AT&T

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Evolution of AT&T Wireless Network

evolution of AT&T Cellular Network							
Generation	1G	2G	2G	2.5G	3G	3.5G	4G
Coined Network Name	Analog	TDMA	GSM (Global System for Mobile)	EDGE	3G	3G	4G
Network Standard	AMPS (Advanced Mobile Phone System)	DAMPS (Digital AMPS), IS-54	GSM (Global System for Mobile)	EDGE (Enhanced Data Rates for GSM Evolution)	UMTS (Universal Mobile Telecommunications System)	HSDPA (High-Speed Downlink Packet Access)	LTE (Long Term Evolution)
Multiple Access Technique	TDMA	TDMA	TDMA	TDMA	CDMA	CDMA	OFDMA
Modulation	-	$\pi/4$ DQPSK	GMSK	GMSK	QPSK / 16QAM		-
Peak Data Rate	10 kbps	48.6 kbps	270.833 kbps	384 kbps	1960 kbps		100Mbps (Down) / 50 Mbps(Up)