GSM

Evolution towards 3rd Generation Systems

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Chapter 1

The Status and Development of the GSM Specifications

An Overview

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Key words: GSM, UMTS, mobile communication, TDMA, CDMA, mobile networks, mobile services, GSM Phase 2, GSM phase 2 +, GSM Release '96, '97, '98, ETSI SMG.

Abstract: GSM, the Global System for Mobile Communication is the world market leader for digital mobile communication systems with 62 % market share and more than 70 million users in 108 countries. The GSM success is caused by a number of GSM features: comprehensive services, system features, high quality, capacity and security. In addition the equipment cost for terminals and networks is low due to vendors' choice and market volume. A key factor for the success were the GSM specifications (and standards), since they provided a common, comprehensive, complete and stable system specification. The ongoing specification work for the evolution of GSM aims at supporting substantial growth and the exploitation of new market segments. In addition it is indispensable to maintain the integrity of the GSM platform in 900, 1800 and 1900 MHz. The content of GSM phase 2, the present working solution is described. The GSM Phase 2 + program brings GSM from second generation half the way to the third generation. The three GSM Releases '96,97 and 98 provide new services, new service creation tools, new terminal and network features like high speed data, new speech codecs, the use of Java like concepts in terminals and on smart cards (SIM). An outlook on the evolution towards Third Generation is given.

1. GSM'S ACCEPTANCE IN THE WORLD MARKET

1.1 GSM Specifications enable the global success of GSM

GSM the Global system for mobile Communication, is the world market leader for digital mobile communication systems with 62% market share, more than 70 million users and 251 networks in operation in 108 countries.

A wide range of manufacturers for SIM (subscriber identity modules), terminals, network systems and test systems supports this growth. Every SIM can work in every terminal. Every terminal can work in every network. Every network can work with every network to support roaming of terminals.

A key enabler for this success story were the GSM specifications (and standards), since they provided a common comprehensive complete and stable system specification. The ongoing evolution of the GSM specifications aims at supporting substantial growth and the exploitation of new market segments. In addition it is indispensable to maintain the integrity of the GSM platform.

1.2 GSM's Success Figures

1.2.1 GSM's World Market Share for digital Mobile Communication Systems (End 97)

There is a strong competition in the world market for digital mobile communication systems. GSM (Global System for Mobile Communication) is the market leader with a 62.2% share in the subscriber numbers. This means 70.2 million subscribers. GSM is based on an advanced TDMA (time division multiple access) radio technology. The Japanese PDC system (personal digital communication) - based on a basic TDMA radio technology - was able to achieve 24.1% or 26.8 million subscribers. The ANSI 54/136 (American National Standards Institute) TDMA system achieved 6.2%. The ANSI 95 CDMA (code division multiple access system) achieved 6.4%. This shows a clear leadership for GSM, and for TDMA technology.

Table 1. World market share: source for user numbers EMC (European Mobile Communication).

Standards	Radio Technologies	Users/million	Standards completed	%
GSM (900,1800,1900 MHz)	advanced TDMA	70.2	1991	62.2
PDC	basic TDMA	26.8	1992	24.1
ANSI 54/136 (800, 1900 MHz)	basic TDMA	6.9	1991	6.2
ANSI 95 (800,1900MHz)	narrow band CDMA	7.1	1991	6.4
Total		**110.0**		**100.0**

1.2.2 GSM User Numbers worldwide

GSM networks were introduced in 1991/2. Growth happened after an acceptable radio coverage was achieved and sufficient volumes of low cost, light weight terminals were available. There is still a very high relative and absolute growth.

Table 2. GSM users worldwide: source EMC and GSM MoU Association.

Date	GSM users worldwide/million
end 92	0.25
end 93	1.40
end 94	4.50
end 95	12.50
end 96	32.00
end 97	70.20
forecast for the end of 1999	160.00
forecast for the end of 2001	300.00

The GSM MoU Association has 293 network operators and regulators from 120 countries as members (end of April 98). This shows considerable short term growth potential for GSM networks and countries on air.

1.2.3 GSM Networks on Air

GSM networks went on air in the European Union first. The technology was accepted soon in the Arab World. It played a major role in the

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