

Report from the UMTS Forum

Long Term Potential Remains High For 3G Mobile Data Services

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
ECONOMIC TRENDS AND FORECAST IMPLICATIONS	3
IMPACT OF SEPTEMBER 11 ATTACKS	3
SLOWED SUBSCRIBER GROWTH.....	5
ACCESS TO CAPITAL AND DELAYS IN NETWORK INVESTMENTS	6
REDUCED CONSUMER DEMAND.....	8
CONCLUSIONS.....	10

EXECUTIVE SUMMARY

2001 was a challenging year for the wireless industry. As we approach mid-second quarter 2002, industry participants around the globe are announcing their 2001 results and are striving to appropriately set investor expectations. The continued economic downturn has prompted renewed concerns about the near-term commercial viability of mobile data services, including 3G. This report re-examines the worldwide market demand for 3G services in light of these new market challenges and provides renewed confidence in the validity of the UMTS Forum 3G forecasts released in Report 17, August 2001.

Recent events have not materially changed the 3G forecast of August 2001, which was built upon an assumption of slow adoption for the first five years.

The UMTS Forum Reports No. 9 and No. 13, released in September 2000 and April 2001, studied 3G service-revenue opportunities and proposed a 3G-service framework that characterises the market opportunity from the user's perspective. Report 17 provided an update to the worldwide and regional forecasts of the previous reports, given changes in market conditions during the second and third quarter of 2001. This report summarises the results of a re-examination of the August 2001 forecast in light of changes that have taken place in the latter half of

2001 and early 2002 – most notable among these being the September 11, 2001 attacks on the World Trade Center and Pentagon in the US. While these attacks were dramatic and significant in nature, we conclude that they did not materially change the 3G forecast of August 2001, which was built upon an assumption of slow adoption for the first five years.

However, predictions of slower subscriber growth and reduced capital spending by the carriers have investors worried. Vague and seemingly contradictory statements from some carriers (e.g., “we are reducing our capital budget by 40% ... our 3G deployment plans remain on track¹”) are serving to further cloud the outlook for 2002. So we are again examining these concerns in light of the methodology used to develop the 3G forecasts.

In this report, we examine several factors and reiterate how the UMTS Report 17 forecast addresses each one. In each case, we held to a very specific definition of 3G based on services delivered using new spectrum specifically allocated to 3G. 2.5G and other

¹ J-Phone press releases in January and February 2002.

transitional networks are excluded from the forecasts. Therefore, users attracted to these new 3G networks will – almost by definition – be mobile data users.

The industry factors examined are:

- Adoption rate for 3G
- Worldwide 3G service demand
- Pricing and willingness to pay
- Access to capital
- Perceived lack of consumer demand

In addition, the forecast validation highlights the UMTS Forum position on several key aspects of 3G services:

- Complex services will take time to develop and services will be adopted slowly through 2005 in the developed countries.
- Many countries in the developing world will not adopt any 3G services until late in the decade.
- Issues involving handsets and 3G-service delivery are short-term and resolvable and will not affect the longer-term viability of 3G services.
- The demand for 3G mobile data services is real. Consumers and business users have consistently demonstrated strong interest in trying new services that combine mobility with content and personalisation.
- The challenge is to create compelling services that take advantage of the promise of 3G technology and provide a satisfactory end-user experience.

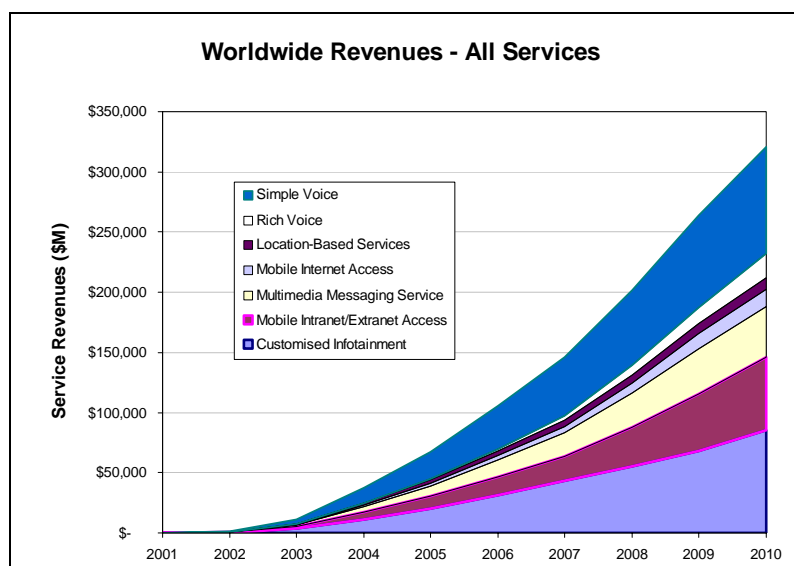
Market conditions are dynamic and the UMTS Forum will monitor 3G progress. As a Market Representation Partner advising the technical standardisation community, the UMTS Forum will continue to guide the industry on 3G-service requirements, user expectations and market opportunities.

ECONOMIC TRENDS AND FORECAST IMPLICATIONS

As detailed in the UMTS Forum Report 17, negative market conditions in early 2001 had already reduced the short-term revenue forecast for 3G services by 17%— a total reduction of \$10 billion by 2004. Through 2010, however, this represents less than a one per cent reduction in the overall service revenues predicted for 3G. Service revenue from 3G networks, therefore, still represent a substantial market opportunity of \$320 billion in 2010, \$233 billion of which will be generated by new mobile data services (see Figure 1).²

Figure 1. Worldwide demand for 3G services by revenue – 2001-2010.

Source: UMTS Forum and Telecompetition Inc., August 2001.



Several common concerns voiced by many in the industry combined with the September 11 attacks that shook the US economy are addressed in this report.

IMPACT OF SEPTEMBER 11 ATTACKS

The attacks on the US have made the already “bad” economic and market conditions significantly worse. How will this impact the rollout of 3G services?

The events of September 11 certainly did not improve the existing economic downturn. The impact was greatest in the period immediately following the attacks. In the first week of trading after September 11, US stock prices fell significantly; but in some sectors, stock prices are beginning to rebound to near pre-attack levels. Surprisingly, the rebound is occurring in sectors most likely to be

² UMTS Report 13 shows total 3G revenues in 2010 of \$322 billion—\$234 billion from new 3G services.

In general, the impact of September 11 on the rollout of 3G services is short-term.

significantly affected by the attacks: commercial aircraft (Boeing Co.) cruise lines (Carnival Corp.), and hotels (Starwood Hotels and Resorts Worldwide Inc.). Though the share prices of these sector leaders are still below pre-September 11 levels, some analysts view them as having "good recovery potential."³ If these sectors that are widely considered to be the hardest hit by the attacks have the potential for recovery, the impact on the wireless industry will not be long lasting.

Several analysts suggest that the US wireless industry will benefit from the proposed federal spending increase in defence, national security, and technology.⁴ In addition, the proposed budget authorises \$715 million for spectrum-reallocation costs to free up 3G spectrum.

In January 2002, the European Commission reported that the September 11 events affected the European government bond market much less than expected.⁵ The resulting lower interest rates are prompting some telecommunication firms to raise capital in the form of debt instead of equity to invest in 3G.

Overall, the financial community, government agencies and other economists tend to believe that the current negative economic situation is short-term and that expansion will soon resume.⁶

³"Looking Past Sept. 11 to the Long Term," the Washington Post, February 3, 2002.

⁴ "Industry would benefit from Bush's proposed budget," Total Telecom, February 6, 2002.

⁵ "European government bonds hit less by Sept. 11 than feared - EU Commission," Ananova, January 28, 2002.

⁶ For example, Mr. Milton Friedman, Nobel Laureate in economics and senior research fellow at the Hoover Institute has stated that "...the current recession will be mild and expansion will soon resume." Wall Street Journal, January 22, 2002.

SLOWED SUBSCRIBER GROWTH

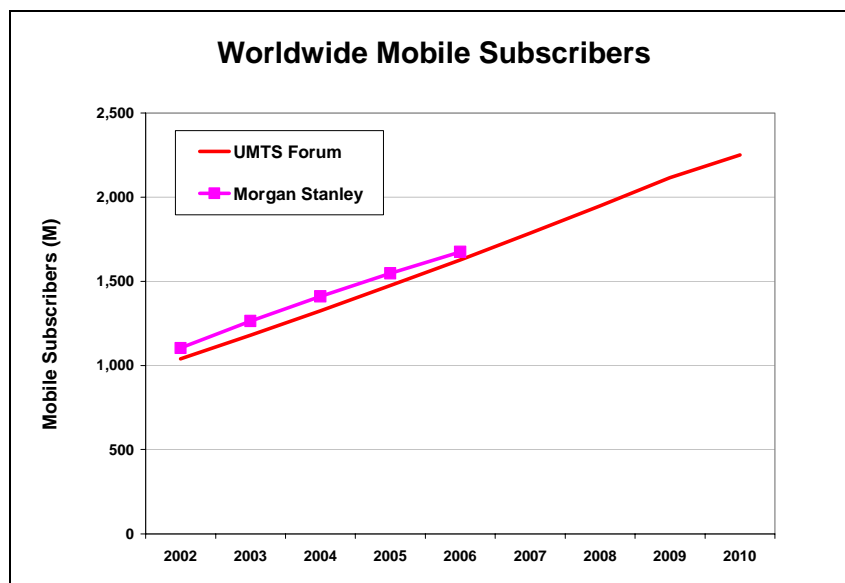
Analysts' forecasts for worldwide mobile subscribers are within a range consistent with the UMTS Forum forecasts.

General economic downturn has resulted in lower-than-expected mobile subscriber growth for EOY 2001. How realistic are the mobile subscriber assumptions made in the UMTS market forecasts?

While growth has slowed in many countries in the developed world, the UMTS forecasts are consistent with worldwide mobile subscriber forecasts from other analysts. Figure 2 compares the UMTS Forum forecast assumption for worldwide mobile subscribers with a recent 2002 report from Morgan Stanley.

Figure 2. Worldwide mobile subscriber forecast comparisons.⁷

Source: Telecompetition, Inc. February 2002, and Morgan Stanley "Worldwide Wireless – 1/02", January 22, 2002.



Slowed subscriber growth also reflects reduced discretionary consumer income due to the economic downturn. The UMTS Forum forecast assumes mass market as opposed to premium pricing. This does not say that premium pricing isn't possible; it says that the pricing model is very conservative. In addition to mass market pricing, the forecast assumes significant price declines throughout

⁷ Years 2007-2010 extrapolated from Morgan Stanley projections by applying 2001-06 compound annual growth rate (12.7%) to the remaining forecast years.

the forecast period. There is some evidence showing price increases may happen in conjunction with industry consolidation.⁸

Once again, this examination has supported the conservative assumptions used in the August 2001 forecast.

ACCESS TO CAPITAL AND DELAYS IN NETWORK INVESTMENTS

Initial 3G services will not be offered by most Western European countries until 2003.

Financial constraints of 3G licence holders, declining stock prices, and lack of 3G handsets have delayed 3G commercialisation in some countries. Does the UMTS Forum forecast consider this?

Stock prices are lower. As a result, companies are shifting from an equity-based strategy for raising capital to a debt-based strategy.

Some analysts believe the market slowdown is helping incumbent carriers to generate much needed cash from their 2G networks. A decline in market growth reduces customer-acquisition costs and increases the EBITDA⁹ margin.¹⁰ This factor is also bolstered by the industry's cost reduction and efficiency¹¹ improvement efforts. Cost reduction efforts include outsourcing, partnering and sharing networks. Combined, these factors do suggest that the capital needed to begin deploying 3G *on schedule* will be available, particularly for incumbent carriers.

The UMTS Forum forecasts assign a country-specific commercialisation date for 3G availability. It was originally assumed that 3G-service full commercialisation¹² begins 12-24 months after the licence has been awarded. Due to announcements by a number of global operators regarding handset shortages and other technical problems, the 3G-commercialisation dates for many countries have changed.

⁸ Based on recent US price increases for broadband access from \$39 to \$45 per month as smaller industry players have faltered.

⁹ Earnings before interest, taxes, depreciation, and amortisation.

¹⁰ "Fears about debt levels of mobile operators are misplaced," Total Telecom, Stefan Zehle (Coleago Consulting), Jan. 11, 2002.

¹¹ Introduction of IP-based infrastructure is generally considered an improvement in network efficiency.

¹² "Full commercialisation" excludes the first six months or so of service, which typically consists of market trials and limited deployment.

In general, Western European countries were originally assumed to begin offering 3G services beginning in the 2001-2002 timeframe. This assumption, revised in Report 17 to the 2002-2003 timeframe, is being validated by recent announcements. For example, Deutsche Telekom announced the official launch of 3G services in January 2003. Belgium's three operators have communicated their desire to delay the rollout of 3G services until 2003. The US forecast, due to the lack of 3G spectrum, assumes a 2004 3G-commercialisation date. Commercialisation dates for developing countries generally occur in 2007 or later.

The technical problems with the initial 3G handsets appear to be resolved. Demand versus availability tensions¹³ combined with ongoing debates regarding design and form factor will continue. In addition, issues are likely to occur as new services are introduced, but these have been considered in the forecast assumptions. As demand levels increase and manufacturers and mobile operators gain more confidence in the viability of services, handset production will increase.

The revised assumptions in Report 17 reflect these announced delays and industry concerns.

¹³ Manufacturers desire for proof of demand prior to developing terminals while operators can not prove demand until they can deliver services with attractively priced terminals.

REDUCED CONSUMER DEMAND

Slow early adoption is to be expected for any new technology especially one that requires new end user behaviour and the forging of new business

Poor service quality for existing mobile data services suggest that consumers are ambivalent toward 3G services. Will service adoption proceed slowly?

The UMTS Forum market studies have consistently assumed that 3G adoption will be slow in the early years and will only be used by less than 30% of the worldwide mobile-subscriber base by 2010. Slow early adoption is to be expected for any new technology, especially one that requires new end

user behaviour and the forging of new business relationships. Due to the 2001 economic climate, the August 2001 forecast in Report 17 modified the 3G-adoption curve used in Reports 9 and 13 to be slower in the initial years. Figure 3 illustrates the assumed 3G-adoption rates.

Figure 3. 3G-adoption rate showing that 28% of worldwide mobile subscribers will be 3G subscribers in 2010 – a conservative assumption.

Source: Telecompetition, Inc., February 2002.

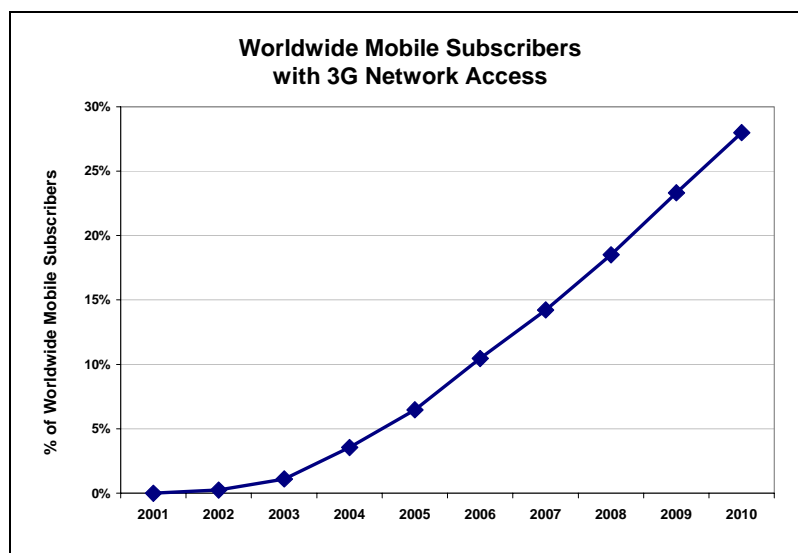
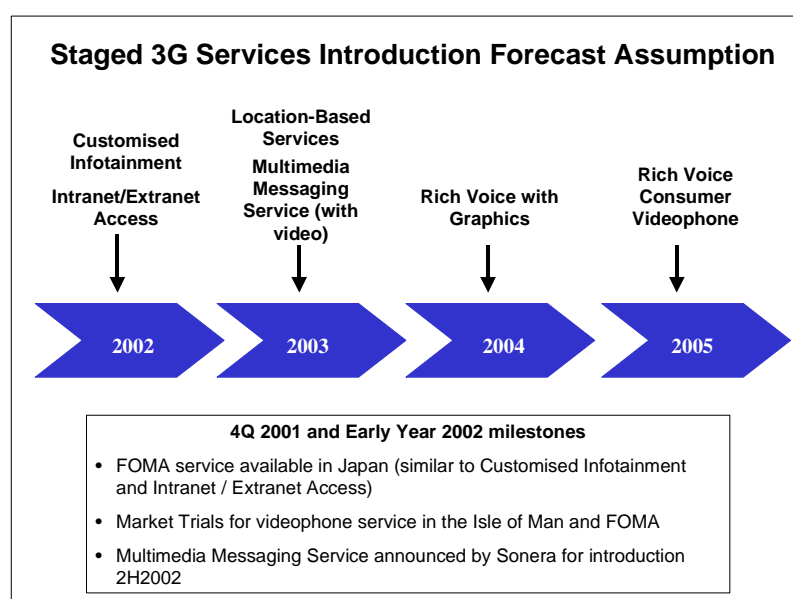


Figure 4 demonstrates the UMTS Forum's position that complex services take time to develop.¹⁴ The Report 17 forecast, therefore, has significant delays built in, based on the additional years it will take for the complex service demand to materialise in any commercially significant manner.

Figure 4. Assumed 3G service category start dates showing the later introduction of more complex services.

Source: Telecompetition, Inc., February 2002.



For example, the UMTS Forum forecast assumes that a robust version of 3G consumer mobile videophone service (which currently has an early implementation service in market trial with NTT DoCoMo's FOMA service and with Manx Telecom in the Isle of Man) will not be widely available until 2005.¹⁵ 3G Location-based Services, already available in less robust forms through Global Positioning Satellite and 2.5G networks, do not contribute revenue in the UMTS Forum forecast until 2003. These latter commercialisation dates are meant to account for initial end-user resistance to adopting a new service and for other early hindrances to market adoption, network and handset availability and technology issues, and more limited content choice.

¹⁴ Other examples of complex service that have taken a long time to develop are broadband access delivered through Digital Subscriber Loop (DSL), and cable modems, and voice over IP (VoIP).

¹⁵ Sources: Company news releases, web sites, and interviews.

CONCLUSIONS

Several key economic factors have been re-examined in light of the events of September 11, 2001 and other current economic trends.

In the final analysis, even as more details regarding EOY 2001 results are being announced, we believe the revised worldwide forecast in Report 17 is still valid. This is largely due to the fact that the forecast is based on an assumption of slow adoption in the first five years. As yet, the industry and financial community have not suggested that the current economic environment will continue for the long term. Therefore, for the near term, the conservative and fact-based methodology used for the forecast is being validated by recent events.

This analysis was prepared for the UMTS Forum by Telecompetition, Inc., which can be contacted at info@telecompetition.com.

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