

Source: Cingular Wireless
Title: Contribution on Aspects of a Study Item on Future Evolution
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Contribution on Aspects of a Study Item on Future Evolution

1.0 Background

Based on a review of the 3GPP TSG RAN Future Evolution Workshop¹ submissions, it is evident that certain common themes are being considered globally and that UMTS technology can be further improved/enhanced and evolved.

The submissions to the workshop represent a snapshot of the thoughts of service providers, operators, vendors, technology developers, and others around the world as to the near and longer term evolution of UMTS, and potential follow-on radio access technologies.

Attachment 1 is the Cingular Wireless input to the RAN Future Evolution Workshop-Version 1 which provides a market based viewpoint on drivers for the future evolution of UMTS and HSDPA. In the presentation, Cingular advanced the idea of establishment of an Ad Hoc to expediently arrive at the requirements and capabilities needed for the future. However, after considering the scope, depth, and content of the excellent presentations reviewed at the workshop, Cingular is encouraged that this initial material can form the nucleus of a Study Item without requiring the extraordinary step of a specific Ad Hoc. Dialog with other participants at the workshop supports our conclusion in this regard.

Attachment 2 is a Cingular Wireless developed summary of the RAN Future Evolution Workshop submissions (V2) and is enclosed for information and review. This summary considers the following areas:

1. Common Themes
2. Market and Market Driver Views
3. Service Views
4. Time Frames
5. Spectrum Aspects
6. RAN Performance
7. Architecture and Technology

¹ TSG RAN Future Evolution Workshop, 2-3 November, 2004, Toronto, Canada

8. Cost Impacts
9. Process Issues
10. Other Issues

and additionally provides tables of key aspects organized by submitting entity.

Consequently, 3GPP should look further at the technology ideas emerging from these very interesting discussions to understand how these views can shape the 3GPP work with an eye on the marketplace needs around a 2008 timeframe. Other similar workshops or seminars outside of 3GPP are also addressing the future, perhaps in more general terms, - but this merely serves to emphasize that the timing is correct for 3GPP to invest effort in understanding what is required in the 3GPP portfolio of future products.

Release 7 is still in the formative stages both for scope and content. The dates associated with closure of Release 7 are also still open. It is therefore proposed to leverage the workshop and use it as a starting point for a “Study Item on Future Evolution”. The conclusions may be useful in the Release 7 work program as well as in defining longer range developments.

2.0 Study Item on Future Evolution

The possible terms of reference for this Study Item:

A “Study Item on Future Evolution” should be approved in the RAN Plenary to study the competitiveness, improvements, and enhancements of UMTS against existing and evolving wireless technologies anticipating the evolving needs of the marketplace.

- Study the strengths and weaknesses of UMTS compared with 1X-DO, OFDM, 802.XX, and other emerging wireless technologies.
- Performance, latency, and spectrum efficiencies are some of the vital areas for the Study Item to address.
- A futuristic road map should be one of the outputs of this Study Item including timeframes and development milestones.
- The participants in this Study Item should as a minimum include Operators, Service Providers, Vendors, and Technology Developers as well as Market Development Organizations.
- Views expressed in the RAN Future Revolution workshop should be utilized as the starting point for the Study Item. (confer Attachment 2)

- Direct participation of the expertise represented in RAN Working Groups 1, 2, 3, and 4, is important for success of this Study Item.

3.0 Timeframes

This Study Item should be approved in December 2004 in the RAN #26 Plenary. Since time is of the essence in initiating the Study Item detailed work, it is expected that the Study Item could commence the work by early January 2005. Cingular believes this aggressive start should be undertaken because the depth of the information already developed for the workshop clearly shows a strong desire to move forward with the work on future development of UMTS and the momentum of this workshop should not be lost..

The Study Item period is initially believed to extend through 2005 and perhaps into early 2006.

During the course of the Study Item, it is anticipated that appropriate Work Items will be forthcoming to advance the requisite developments identified and agreed in the Study Item. It is the idea that Work Items originating from the Study Item would be well defined and understood, coordinated with other Work Items generated within the Study Item, and consequently require minimal additional work to finalize them as they are individually progressed to completion in the Work Item phase.

Suggested working methods might include joint meetings, conference calls, and email discussions on a reflector established by 3GPP MCC for this specific Study Item.

The results of this Study Item (and the subsequent Work Items) should drive adjustments to 3GPP overall work plan beginning with 2005 activities and may be considered as a cornerstone for portions of the Release 7 work as well.

4.0 Recommendation

It should be noted that Cingular Wireless is a supporting company on the establishment of a Study Item on Evolved UTRA and UTRAN.

Because of the desire to have the Study Item approved at RAN #26, this current contribution is intended to provide additional rationale for a Study Item and act as an early look at some of the important ideas already identified by the industry that might be considered in the course of the work.

Cingular recommends that Attachment 2 of this contribution “*Cingular Wireless Summary of 3GPP RAN Future Evolution Workshop-V2*” be utilized in the Study Item as a foundation for the work.

ATTACHMENT 1

See PowerPoint of Cingular Wireless submission to TSG RAN Future Evolution Workshop, filename:

R1-Cingular Wireless REV WS009 3GPP Action to Support Evolving Market Needs

Please note this R1 version differs slightly from WS009 original submission in that it corrects some text errors and adds the slides on a possible format for the summary of the workshop (Page 23)

ATTACHMENT 2

Cingular Wireless Summary of 3GPP RAN Future Evolution Workshop-V2²

1. Common Themes Executive Summary

From presentations at the 3GPP RAN Future Evolution Workshop³, the following common themes could be derived from both operators and equipment vendors

- 3GPP specifications should be driven by market requirements and customers' demands (needs)
- It is important that UMTS networks provide the same or better customer experience as WiFi or other wire-line network services with consistent performance and service quality in service coverage areas
- It is a common understanding that the spectrum efficiency and network capacity have to be further enhanced to meet the market competition and growing future customer requirements
- UTRAN evolution should focus on data and the UMTS network needs to be evolved and optimized to fully support IP and IP based services
- 3GPP specification development should address issues related to immediate network deployment needs by streamlining and implementing more efficient working procedures in 3GPP. Near term enhancements should be targeting product availability to support deployment as early 2008.

In the following sections, major issues, as identified in the Future Evolution Workshop are summarized for further discussion and may be helpful in guiding detail work plan preparations.

2. Market & Market Driver Views

Vodafone:

“Increased uplink and down link user throughput independent of the user location in the cell. The higher user throughput in rural area even at the expense of lower cell capacity.”

Siemens:

“Voice traffic volume is growing with about 6% per year due to increasing subscriptions, fixed-mobile substitution, etc. Data traffic volume is exponentially growing and will build about 34% of the total mobile networks traffic volume in year 2009.”

General Synopsis of Submissions:

It is a common understanding among both operators and vendors that 3GPP specifications need to first meet the market requirements and customer needs. It is more important that the service is satisfied rather than which technology is used, because customers only know the services they are offered, but not necessarily which technology

² Version 2 updates some of the information in the tables based on feedback from the specific entity.

³ TSG RAN Future Evolution Workshop, 2-3 November, 2004, Toronto, Canada. Documents may be found on 3GPP FTP server at http://www.3gpp.org/ftp/workshop/2004_11_RAN_future_evo/

they are using. Below is a summary, from the Future Evolution Workshop of the common views on market and market drivers:

- UMTS development should be more market driven rather than technology driven
- Customers expect their wireless experience to be the same as wire-line (DSL or Cable Modem) internet service. This is one of the most important factors to enable seamless wireless data services. It is also the key to drive the improvement of 3GPP performance specifications including latency
- Consistent customer experience on data throughput in urban, suburban and rural area is expected
- Global roaming for both voice and data must be supported and improved
- All services shall be backward compatible

3. Service Views

TIM:

“Customers buy services, not WCDMA, OFDM, TDD, ...”

Lucent:

“Future IP based applications are expected to stretch the UTRAN beyond its current capabilities”

General Synopsis of Submissions:

This section summarizes the common views dealing with issues and concerns that operators and service providers have that may not be visible to customers or end users:

- Meet growing demand for high capacity and high data rates for both near and long term future needs with flexible, symmetric and asymmetric channel deployment
- Coexistence and harmonization with other technologies, such as WiFi, WiMAX and possible cdma2000, but make 3GPP a more competitive technology in the market place
- Support pure IP based network and services as one option of the future network configuration for service flexibility
- Flexible network scalability and configurations to meet different market requirements and ease network deployment problems
- High reliability and avoidance of single point system failures
- Improve UTRAN’s performance to ensure customer satisfaction on an on-going basis.
- Efficient 3GPP specification development to support aggressive deployment schedules

4. Time Frames

Orange:

“It is only worth defining a new radio interface provided that a significant performance benefit is obtained, e.g. factor of 2-3 in spectral efficiency. The commercially available timeframe for this kind of performance is anticipated to be around 2009.”

Ericsson:

Long term UTRA evolution: “Target for specification: 2007 => Deployment around 2009”

General Synopsis of Submissions:

A common view of operators and vendors concerning UTRAN evolution generally falls into three (3) identified stages - near-term, mid-term and long term evolution though most companies have different time frames in mind. However, the submitting entities concepts, as presented to the RAN evolution workshop, are summarized in Tables 1 and 2 below.

- Near Term (up to 2008):
Focus on the issues directly related to market deployment and the customer experience. The target for near term is focused on UMTS immediate deployment related issues, with aims at a time frame of 2007 and 2008. Smooth transition from GSM to UMTS and capacity and performance enhancement of current specifications and HSDPA should be given the highest priority to make sure that HSDPA and HSUPA are fully deployable with high satisfaction with regards to the customer experience
- Midterm (2008 to 2012):
Targeting capacity and data rate enhancements. The data rate can be up to 100 Mbits with necessary network architecture and technology enhancements. It could include the support of full IP based network and harmonization with other RAT
- Long term (beyond 2012):
Data rate higher than 100 MB is required

The time frame proposed for UTRAN evolution could be varied according to objectives of enhancement. Most companies expect the midterm enhancement to be completed around 2010. The “dates” associated with the above discussions should be finalized in the process of detailed work plan preparation.

5. Spectrum Aspects

Vodafone:

“4X spectrum efficiency is a must both in the HSDPA and EDCH areas of the radio access.”

Ericsson:

“Allow for operation in all cellular bands and be able to spectrum co-exist with any 2G/3G/3.5G technology”

General Synopsis of Submissions:

Spectrum is one of the most valuable resources for UMTS services. It is the common understanding that 3GPP specifications need to improve the efficiency of spectrum utilization and also support more diversified spectrum allocations around the globe. Here is the consensus on spectrum related issues:

- Support more diversified spectrum as release independence features. New band definition has to give full consideration of co-existence with other RATs in the same and adjacent service areas. The negative impact to service coverage, network capacity and service quality has to be avoided or minimized.
- New modulation technology should be introduced into UMTS to improve existing spectrum efficiency by 3 to 4 x. OFDM has been recognized as one of most prominent candidates for this new, proposed physical layer
- Support flexible bandwidth configurations including asymmetric bandwidth allocation for unbalanced application and broadcasting/simulcasting services. Bandwidth allocation could be arranged from 2.5, 5, 10, 15 and 20 MHz either symmetric or asymmetric

6. RAN Performance

T-Mobile:

“Lower latency should be achieved in all areas: When resource is allocated, When resource needs to be allocated, Under load. Competitive technologies claim latencies of 20-30 ms.”

Qualcomm:

“Low latency is the foundation for evolving UTRAN towards increased throughput and improved user experience and as such a top priority requirement for UMTS (AS & NAS)”

General Synopsis of Submissions:

UTRAN performance is one of the most important issues that have directly impacted subscriber’s satisfaction to UMTS services and market penetration. It was mentioned many times in the workshop presentations from both operators and vendors as one important aspect for UTRAN evolution, which includes the following aspects:

- **Enhancement on network capacity and data throughput.**
Each company has different numbers for data throughput on uplink and downlink. They range from:

Uplink: 5 to 100 Mbits, and
Downlink: 30 to 100 Mbits

For long term enhancement, 100Mbits (or more) is expected. Please refer to Table 1 and 2 for proposed numbers by several submitting companies.

- **Reduce Network Latency:**

In the UMTS network, the following latencies need to be reduced or optimized to improve wireless service subscribers' experience:

- Call establishment delay (< 1S)
- Network access delay (< 100-300 ms)
- State transition delay (e.g. FACH to DCH delay)
- End-to-end transmission delay or RTT (10 - 20 ms)
- Handover delay (No submitted opinions)

Please refer to Tables 1 (Operators) & 2 (Vendors) for each company's detailed proposal.

No clear performance is defined in the current UMTS specifications for all the above mentioned critical performance criteria, but collectively, they are really important for customer satisfaction

- **PS domain optimization with full QoS support**

IP based real time and non real time services are introduced in UMTS However, the performance and QoS control have not been fully optimized on either user or control plane. In order to support VoIP or IMS in the future, IP QoS on both user and control planes must be enhanced and optimized

- **Additional performance requirements and UE conformance specs**

Proper performance and UE conformance test specifications are critical to make sure a proper implementation of the technology can be achieved and the products and services offered by operators can meet customers' fundamental requirements. Performance specifications are also an important aspect that can help reduce CAPEX and OPEX to operators

7. **Architecture and Technology**

Vodafone:

"It seems a good time and opportunity to study the whole architecture again."

TIM:

"Flexibility and scalability shall be facilitated wherever possible by the introduction of new interfaces", such as common radio interface between RF and base band.

Ericsson:

"An opportunity to plan for the long-term UTRA evolution to ensure competitiveness in a 10+years perspective" ...

General Synopsis of Submissions:

This section summarizes the common view on technological and architectural enhancements that can be used to achieve the service objectives as summarized in other sections.

- **UTRAN architecture:**
UTRAN architecture needs to support asymmetric variable UL/DL band widths from 5 to 20 MHz. flexible bandwidth with 5 MHz granularity with possible asymmetric deployment of up and down links is recommended by the majority of the submitting companies. However, a few companies are recommending 2.5MHz as the minimum deployable bandwidth. Nokia proposes 1.25 MHz as the minimum channel bandwidth.
- **Support of OFDM to improve spectrum efficiency**
It is a common understanding that OFDM is a key technology for 3GPP's consideration to achieve the desired spectrum efficiency, link capacity and throughput. Nortel has made a detail technical proposal for OFDM, which needs to be further investigated in the detailed 3GPP work plan
- **MIMO**
MIMO can further improve link efficiency and network capacity. Several companies have recommended considering MIMO for UTRAN evolution in the future. The cost of deployment is the main concern for operators
- **VoIP and all IP network**
It is a common understanding that UTRAN architecture needs to be enhanced to fully support VoIP and IMS services in the future network. More studies need to be completed on both user and control planes' architecture.
- **Open interface and multi-vendor deployment**
This is strongly recommended by operators for the flexibility of network deployment and also introduction of more equipment competition in the market place
- **Service Aware Common Radio Resource Management (RRM) for multiple radio access technologies**
 - Future network contains multiple RATs, such as GSM, EDGE, WCDMA and possible OFDM, WiFi, and/or others
 - It is important to provide access to different RATs on the basis of service characteristics and traffic load to optimize the utilization of the spectrum

8. Cost Impacts

Vodafone:

“Backhaul transmission costs are already huge”

Siemens:

“3G evolution should assure that system migration can be achieved with competitive costs [CAPEX & OPEX]”

General Synopsis of Submissions:

Low CAPEX and OPAX are always important requirements for operators in existing and evolved UTRAN networks. A very clear message has been presented from operators and vendors that the cost per bit in UTRAN networks has to be continuously reduced in order to meet the market expansion requirements. Here are the key areas that have been identified for immediate investigation and study in order to reduce the overall cost per bit of UTRAN network.

- Continue to improve physical layer efficiency to reduce the cost per bit
- The cost of backhaul transmission is one of the high cost items that needs to be further studied and optimized. Existing backhaul technology and communication protocols should be optimized. Further study on new backhaul transport technology is expected to significantly improve the link efficiency and reduce the cost in the future.
- Open UTRAN interfaces are essential for multi-vendor equipment interoperability and is another method to reduce CAPEX and OPEX for network operators
- Complexity is another factor that increases overall CAPEX and OPEX. Complicated UTRAN architecture and unnecessary interfaces need to be avoided to reduce product cost and the test, verification, and OAM cost
- Several companies also mentioned a common radio interface of BTS, such as CPRI and OBSAI to reduce BTS costs

9. Process Issues

Cingular Wireless:

“Specifications developed by 3GPP are crucial to our daily business needs, such as global roaming, contract negotiations, performance assessment, product acceptance, and ensuring quality of services.”

Vendor:

No vendor addressed 3GPP process issues

General Synopsis of Submissions:

The issues listed here have been identified from existing standard development processes, which need to be carefully studied, debated and as necessary apply improvements to the procedures, in order to make the standard development process more effective and efficient while addressing market needs.

- How to keep the pace of standard development time-frames consistent with market and customer needs
- Handle quick technology transition (short life cycle of some technologies)
- Properly handle UE conformance test and performance specifications to address both customer’s requirements and the maturity level of technology implementation. A proper procedure or method to handle long term

performance target and near term achievable product specification needs to be developed

- More effective ways to settle disputes and avoid delays in 3GPP specification development are needed. WG leaders need to be encouraged to settle disagreements within the working groups without appealing to the Plenary for difficult decision resolution.

10. Other Issues

Cingular Wireless:

“Need to work to achieve a clear and more distinct picture of what exactly is needed for 07—08 product”

No Vendor discussion:

General Synopsis of Submissions:

This section addresses the issues which have been mentioned in some presentations, but have not been clearly identified on how to handle them in UTRAN evolution, such as:

- 3GPP needs to work out a plan on how to address UTRAN evolution proposals. This should include a near term, mid-term and long-term goals with agreed project schedule. A work plan for near term solutions for immediate UMTS deployment need should be prepared with high priority
- The requirement for low backhaul cost versus all IP network
The link utilization is very low when IP protocol is used for real time voice communications. This conflicts with the requirement for high efficiency and low cost backhaul link. IETF has been working on several different solutions on IP header compression algorithms. How should 3GPP handle the issue and optimize the network to handle these valid “conflict” requirements?

The intent is that this summary document of the 3GPP RAN Future Evolution Workshop should reveal the foundation of viewpoints being expressed and can act as the starting point for future development activities in 3GPP with regard to current/near term evolution activities and developments. In essence the workshop can be seen to “jumpstart” the work endeavors.

This summary (and the workshop contributions it is drawn from) should become a part of the working documents in the Study Item that address Future Evolution.

Table 1: Summary of Operators' Proposals

	Vodafone	Orange	TIM	DoCoMo	China Mobile	T-Mobile	Telia Sonera	Cingular
Service and Performance								
Similar customer experience as wire-line	✓					✓		✓
Consistence performance in coverage area	✓		✓	✓		✓		
Smooth network migration	✓	✓	✓		✓	✓	✓	✓
UL/DL data throughput enhancement (MB)	✓	5/30	✓	30 - 100	✓	✓	✓	✓
Latency improvement	< 20 ms	✓	✓	< 10 ms	✓	20 – 30 ms	✓	✓
Reduce call set up and network access delay	✓	✓	✓	< 1 S	✓	✓	✓	✓
Support IP services with end-to-end QoS	✓	✓		✓	✓			✓
High speed MBMS				✓				
Multiple RATs mobility management	✓	✓	✓	✓		✓		✓
Network and service backward compatibility	✓	✓	✓	✓		✓	✓	✓
Spectrum and Bandwidth								
Flexible spectrum deployment (channel MHz)	2.5 – 20	5, 10, 20	✓	5 – 20		✓	✓	
Asymmetric channel allocation support	✓	✓	✓	✓	✓	✓	✓	✓
Increase Spectrum Efficiency	4X	2 – 3X	✓	2 x HSDPA	✓	✓	✓	✓
Co-existence with other RATs	✓		✓	✓		✓	✓	✓
Architecture & Technology Evolution								
Physical layer technology	✓	✓	✓	✓OFDM, & MIMO	✓OFDM	✓OFDM	✓OFDM	✓OFDM & MIMO
Optimized for efficient IP network support	✓	✓				✓PS only		
Convergence with other network	✓			✓		✓	✓	✓
Open interfaces & flexibility	✓	✓	✓	✓		✓	✓	
Include CPRI and OBSAI?			✓					
Service Aware (Common) RRM	✓		✓				✓	
Interworking with other RATs						✓	✓	
Cost and Complexity								
CAPEX and OPEX reduction	✓	✓	✓	✓	✓	✓	✓	✓
Cost effective backhaul	✓					✓		
Multi-vendor interoperability	✓	✓	✓			✓		✓
Less complexity & easy to be deployed	✓	✓		✓	✓	✓		
Minimize 2G to 3G transition cost		✓						✓
More complete and explicit performance specs	✓	✓	✓					✓
Requirements for Terminal								
Smaller size, low cost and power consumption					✓			
Improve standard working efficiency			✓	✓				✓
Expected deployment time	2010	2009						2008
Workshop Document Number WS-xx	02, 22	03, 32, 33	04	05, 25	06	07	08	09

Legend

✓ symbol in a cell: proposed idea

numbers in a cell: proposed target numbers/values

empty cell: not

mentioned in the proposal

Table 2: Summary of Vendors' Proposals

	Siemens	Motorola	Qualcom	Nokia	LG	Ericsson	Alcatel	Samsung	Wavecom	Huawei	IPW	ETRI	Nortel	Lucent
Service and Performance														
Similar customer experience as wire-line	✓		✓	✓	✓	✓				✓	✓		✓	✓
Consistence performance in coverage area						✓				✓	✓			
Smooth network migration	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	
UL/DL data throughput enhancement (Mbits)	✓	✓	✓	100/200	100/1000	10-40/ 25-100	✓	50/100		✓	✓		✓	✓
Latency improvement	✓	✓ 30 ms	✓	✓ 30 ms	✓	< 10 ms	✓						✓	✓
Call set up delay reduction			✓	< 300 ms	✓	100s ms	✓						✓	✓
Support IP services with end-to-end QoS	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
High speed MBMS		✓	✓			✓						✓	✓	
Multi-RATs mobility management & roaming	✓			✓		✓	✓					✓	✓	
Network & service backward compatibility	✓	✓	✓	✓		✓	✓						✓	
Spectrum and Bandwidth														
Flexible spectrum deployment (channel MHz)	5 – 20	2.5 – 20	✓	1.25 – 20	10 - 500	5 – 20	✓	10, 20, 100				✓	✓	10 – 20
Asymmetric Channel. Allocation support	✓	✓	✓	✓	✓	✓	✓					✓		
Increase Spectrum Efficiency	✓	✓	✓	✓	✓	✓ (2 X)	✓	✓	✓	✓	✓	✓	✓	✓
Co-existence with. Legacy & other RATs	✓	✓		✓	✓	✓	✓	✓				✓		
Architecture & Technology Evolution														
Physical layer technology	OFDM	OFDM/M AS/OFDM	OFDM	OFDM	DS-CDMA OFDM	OFDM	OFDM	OFDM/MIMO	OFDM	OFDM	HCR-TDD TD-CDMA	OFDM MIMO	OFDM MIMO	OFDM MIMO
Optimized for efficient IP support	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓
Convergence with other network		✓					✓					✓	✓	✓
Open interfaces					✓							✓		
Include CPRI and OBSAI?													✓	
Common multi-RATs RRM		✓		✓			✓					✓		
Interworking with other RATs							✓	✓					✓	✓
Cost and Complexity														
Avoid unnecessary complexity	✓	✓	✓	✓	✓	✓						✓		
CAPEX and OPEX reduction	✓	✓								✓	✓	✓		✓
Cost effective backhaul														
Multi-vendor interoperability														
Minimize 2G to 3G transition cost	✓	✓												✓
More complete and explicit performance specs			✓											
Requirements for Terminal														
Smaller size, low cost and power consumption				✓		✓	✓			✓				
Improve Standard Working Efficiency														
Expected deployment time			2008			2009		2009				2012		
Workshop Document Number WS-xx														
	10, 31	11, 23	12, 37, 38	13, 24	14	15, 27	16, 29	17, 28	18	19	20	26	41	42

Legend ✓ symbol in a cell: proposed idea
mentioned in the proposal

numbers in a cell: proposed target numbers/values

empty cell: not

- **TSG RAN Future Evolution Workshop**
Toronto, Canada 2-3 November 2004 -RP-040285
- **Title:**
REV-WS009: 3GPP Actions to Support Evolving Market Needs
- **Source:**
Cingular Wireless LLC
- **Agenda Item:**
2.1

REV-WS009-R1

3GPP Actions to Support Evolving Market Needs

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Abstract

3GPP needs to assess how the technology capabilities and specifications under its domain need to be improved to meet newly identified market needs in the immediate term.

Furthermore, shortened time to market intervals for the near to medium term should cause 3GPP to reassess not only the specific market needs of each region for 2007-2008, but also to critically examine its working methods to determine how specifications can be more rapidly produced with higher quality (e.g., less change requests) and greater assurance of proper functioning of deployed product.

Standards Are Important



Specifications developed by 3GPP and Standardized by the Regional SDO's (such as ATIS) are important to Cingular Wireless.

- Crucial to our every day business needs
- Crucial in contract negotiations, performance assessment, product acceptance, and ensuring quality of service
- Critical to global roaming
- Some of Cingular's needs are somewhat unique to our particular region (e.g. frequency bands)

- **Cingular's definition of successful technology standardization/development:**
 - Standardized Technology that is readily available, delivers best performance at the best price and is capable of continual development along a well defined evolutionary path.
 - That is, internationally agreed specifications that enable delivery of products from multiple vendors to provide operators with competitive, time-to-market focused solutions, addressing a complex voice and data marketplace with evolving needs and tastes.

UMTS Needs Further Tune-Up



- UMTS currently has a number of deficiencies when compared with other existing and emerging technologies
- For example:
 - Too much latency
 - Too little performance in some areas
 - Spectrum efficiency

North America Has Intense Technology and Market Competition



- North American market place is very competitive
 - UMTS Release 5 falls short in performance when compared to 1x-DO^[1]
 - UMTS Release 6 has defined performance improvements-but competitive pressures require even better performance & more capabilities
 - Development & evolution of UMTS including HSDPA, etc., must surpass competing technologies in all areas including:
 - Terminals (UE's),
 - Radio,
 - Core Network,
 - Services,
 - Spectrum and Spectrum efficiencies
 - Advances should be considered and applied across entire family – that is, GSM, GPRS, EDGE, UMTS, HSDPA, and emerging technologies

[1] 1x-DO is defined in IS-856 a TIA/EIA standard

Is the Technology Meeting Market Needs?

- Industry needs to assess and grade ourselves on the current technical specifications and how they map against the present and future market view/needs.
 - In the past, technology has been developed, implemented into the market place, and then improved as part of overall life cycle management – i.e., invent it, deploy it, see if it fits the need...
 - Today, the marketplace requirements are evolving in near real time driven by competitive pressure in the business to grow customers and revenue in a near saturated market
 - Today, technology is being developed so fast that there is very little time in the product cycle to ride through a full life cycle before advancing the capabilities
 - We need to be more clever in standardization so that we can effectively by-pass the need for a full life cycle of evolution
 - While we need to foster new development, we should be critical of “gee whiz” technology, even from established players, if there is not sufficient justification to use finite resources for an unproven market
- What is the process fix?

- **Gap Assessment/Gap Fix**

- Market prospects of 2005 were conceived/envisioned in 2002/2003 (or earlier).
- Specifications for the 2005 marketplace were developed 3 to 5 years ago in anticipation of the 2005/2006 market needs.
 - We got it about 85% right....
- Specifications continue to be developed today/near term for products with an “introduction of product” view of 24 to 36 months in the future
- We feel that this 24 to 36 months of development is too long and a hard-core assessment is needed of both the processes and procedures that have evolved in 3GPP
- Both a short term and long term development plan is needed to update the technical capabilities based on the 2004/5 view of the 2005-2010 Market Needs
- Simply stated, no need to re-invent the wheel (UMTS/HSDPA), just tune up the motor, so the car will drive better and go faster using less gas.

Market Needs?

- Future assessment -
- What does the market place need in each of the global regions?
 - These regions may have distinctly different needs
 - Deficiencies in past views are more apparent as more market implementations are happening around the world.
 - We need to be thinking what products do we need in the 2008-2010 time frame.
- Question: How to resolve a consensus on “globally harmonized capabilities” versus “regional needs” and accommodate both?

How to Address the Gap

- **4Q - 2004 may seem too late to plan for the 07/08 fielded product if we utilize a traditional standards pace.**
 - We sometimes seem to apply a broad brush approach to developing capabilities against a vast universe of perceived market needs.
 - That is, we'll spend our resources working on all kinds of solutions whether we need them or not
 - Need to work to achieve a clearer and more distinct picture of exactly what is needed for 07/08 products.
 - Operators/manufacturers/market development organizations – agree and proceed to define and implement – no long study intervals, improved work progress, ...
 - This change needs to be implemented in concert with potential adjustments to the SI, WID and contribution driven environment – can internal task forces/ad hocs be equivalent to individualized WIDs and contributions as a means of concentrating the focus?

Must Look at System View

- What aspects of the technology are important to the business?
 - Terminal
 - Radio Infrastructure
 - Core Network
 - Services
 - Spectrum & Spectrum Efficiencies
- The above applies across GSM, GPRS, EDGE, UMTS, HSDPA & Emerging Technologies

- **Competitive Market Needs**

- We need a new way to manage what is being developed
- Highly focused market need prognostication. i.e., predict the future right & only the relevant future.
- Attack the problems with a task force approach.
- It is not sufficient to just put specs on paper & then find out if they work when you implement the product into the market place (too late then to fix and will lose market window).
 - We need to do a better job of crafting program simulations, develop prototype programs, industry test beds, interoperability fests, and test case development to validate the implementation of the specification before we get to the field.
 - *In other words: Reduce the number of “major fix” CRs!!*

Process Should be Reviewed

- The process we've used in the past may longer be the best process to meet current/near term time to market criterion
 - We must be more dynamic
 - We must be more attuned
 - We must be more focused
 - We must adhere to agreed aggressive schedules

Process/Procedure improvements- is that a partial solution?

Work Item Prioritization-is that a partial solution?

Other ideas?

Some Procedure Ideas-

- Working Groups should start handling both the easy and tough problems
 - WG's should make technical decisions and move the work forward.
 - WG's should be prepared at each meeting to resolve tough problems and advance the work and thus maintain the development schedule – *avoid stalemate situations*
 - WGs should not needlessly shift the decision burden to the Plenary
 - Reinforce the value of reaching consensus
 - When consensus can't be reached at the Working Group level, “strawman/indicative voting” as an indicator of positions of the delegates does little to help achieve consensus
 - If consensus cannot be obtained and work is stalemated, then is “binding” voting at the end of the meeting a way forward?
 - Delegates discussing the issues “outside the formal meeting” with the knowledge that they will be voting toward the end of the meeting may stimulate agreement
 - Developing resolutions/agreements in conference calls/ email reflectors...as a means to work off line between meetings and obtain common agreement should be utilized to advance the work especially in controversial areas.

- Technology in Wireless
 - Technology can be used in three principal ways in wireless;
 - Reduce overall costs of the business
 - Enable new services and capabilities
 - Promoting increased benefit (value) of existing equipment for both the operator/service provider and customer

Prioritization Ideas Using Business Metrics

INDEX		1	2	3	4	5
		“Cost” To Provide	Cell “Coverage”	Spectrum & Utilization	End User Performance & Quality	Service Enabler
V	VOICE	Cost/Mou	Cell Size 850 MHz 1900 MHz	Capacity & Efficiency	MOS	Capability
D	DATA	Cost/Mb	Cell Size 850 MHz 1900 MHz	Capacity & Efficiency	User Data Rate QOS	Capability

Table 1

This table is a qualitative framework for review of radio standards work items which Cingular Wireless uses in conjunction with other tools to assay their impacts to the business.

Examples for Prioritization

INDEX		1	2	3	4	5
		“Cost” To Provide	Cell “Coverage”	Spectrum & Utilization	End User Performance & Quality	Service Enabler
V	VOICE	A-GPS MIMO	MIMO	MIMO	MIMO	U-TDOA A-GPS
D	DATA	MBMS, A-GPS, VoIP-over HSDPA, MIMO	RX Diversity for HSDPA, UE Pwr Back-Off, MIMO	MBMS, MIMO	RX Diversity for HSDPA, UE Pwr Back-Off, MIMO	A-GPS

Table 2

This table shows examples of the qualitative framework and maps the selected work items into the business impacting areas

Example Using Table 2

MIMO

- **V1 & D1: “Cost” To Provide**
 - What hardware & software is required to implement and will the business case support this effort? Is tower wind & ice loading due to additional antennas and feeder lines significant to the business case?
- **V2 & D2: “Cell “Coverage”**
 - Will cell coverage be affected, how much, have simulations been done, should some type of trial be done to verify the simulations?
- **V3 & D3: Spectrum & Utilization**
 - Will this allow a more efficient usage of spectrum and associated resources?
- **V4 & D4: End User Performance & Quality**
 - How will voice and data services be enhanced with MIMO?

Another Example Using Table 2

- PA back-off for HSDPA UE PA's
 - D2: “Cell “Coverage”
 - Will cell coverage be affected, how much, have simulations been done, should some type of trial be done to verify the simulations?
 - D4: End User Performance & Quality
 - Will voice and data services be affected when UE power reduction is active? Will QoS be adequate to support the business case?

Action Item & Recommendation – Current/Future Competitiveness of UMTS



Recommendation (1):

An Ad Hoc group on “Near Term Future” should be formed to study the competitiveness of UMTS against existing and evolving wireless technologies.

- Purpose of the Ad Hoc will be to study the strengths and weaknesses of UMTS (*mind the gap!*) compared with 1X-DO, OFDM, 802.XX, and other emerging wireless technologies
 - Performance, latency, and spectrum efficiencies are vital areas for the Ad Hoc to study
 - A futuristic road map should be one of the outputs of this group including timeframes & development milestones
 - The Ad Hoc should be composed of Manufacturers, Vendors, Operators, and Service Providers & Market Development Organization.
- This Ad Hoc should be convened in December 2004 with a mandate to reach initial findings in February 2005 and final conclusions before April 2005 *to report to the PCG.*
- RAN Future Evolution Workshop contributions are excellent starting point**
- Results of this Ad Hoc should drive adjustments to 3GPP overall workplan beginning with 2005 activities.

Action Item & Recommendation – Review Working Methods



- Recommendation (2):

A Second Ad Hoc on Work Methods should be set up to look at how 3GPP can work more effectively to address the conclusions reached by the Ad Hoc on “Near Term Future”.

The processes and procedures that have evolved in 3GPP shall be reviewed with the idea that specification development should be more timely and efficient.

Areas such as UE Conformance Testing should be reviewed, with the idea that timeliness is extremely important

Leadership shall be encouraged to resist delays and move the work forward and minimize the “IPR feasts”

Methods of work that promote more rapid consensus are sought

Methods that continue to foster innovation *yet minimize expensive CR's* should be investigated (V&V - verification & validation, peer review, etc).

This Ad Hoc on Work Methods should work in concert with the Ad Hoc on Near Term Future to bring its initial and final conclusions forward in same time frames.

Possible Format for Summary of Workshop

1. Common Themes (Executive Summary)
2. Market & Market Driver Views
3. Time Frames
4. RAN Technology
5. Architecture
6. Service Views
7. Spectrum Aspects
8. Cost Impacts
9. Process Issues
10. Other

- Under each summary a synopsis (by operator/vendor categorization with attribution) should be done of key points to be taken from the presentations.
- The intent is that this summary document should reveal the foundation of viewpoints being expressed and can act as the starting point for future development activities in 3GPP with regard to current/near term evolution activities and developments. In essence the workshop can be seen to “jumpstart” the work endeavors.

Thank You