
Work Item Description

Title: AGPS Minimum Performance Specification Development

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 **Linked work items**

This Work Item is not related to other Work Items.

3 **Justification**

A-GPS has already been standardized as one of UE location technologies supported by 3GPP in R99. Associated signalling support for A-GPS has also been completed in Release 4 and 5. However, the minimum performance requirements for A-GPS measurement are currently missing in TS 25.133 (RAN WG4). Thus, there is no active effort to pursue A-GPS performance test specification in TS 34.121 (T1-RF). As a result, the location measurement reporting accuracy from different UE vendors could be different, which makes it difficult for a network operator to use these location reports to fulfil the service requirements for location clients.

Operators have already committed to deploy A-GPS with initial release of UMTS network service. It is important to speed up the standard process on A-GPS minimum performance specification in order to meet operator's early deployment requirement.

4 **Objective**

The objective of this WI is developing A-GPS minimum performance specification for both UE based and UE assisted A-GPS.

5 **Service Aspects**

None.

6 **MMI-Aspects**

None.

7 **Charging Aspects**

None.

8 **Security Aspects**

None.

9 **Impacts**

Affects:	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
Affected existing specifications						
Spec No.	CR	Subject		Approved at plenary#	Comments	
25.133		Requirements for support of radio resource management (FDD)		RAN #23		
34.121		Terminal conformance specification; Radio transmission and reception (FDD)		T # 23		

11 Work item raporteurs
Donglin Shen – AT&T Wireless Services

12 Work item leadership
3GPP TSG RAN (WG4)

13 Supporting Companies
AWS, Nokia, Siemens, China Mobile, Rogers Wireless, Nortel, Motorola, Ericsson and Cingular Wireless

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

14b The WI is a Building Block: parent Feature

14c The WI is a Work Task: parent Building Block

Title: Proposed Requirement for AGPS Minimum Performance Specification Development

Agenda item: 5.6

Source: AT&T Wireless Services, Nokia, Siemens, China Mobile, Nortel Network, Rogers Wireless, Motorola, Ericsson, Cingular Wireless LLC

Document for: Discussion and Approval

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1. INTRODUCTION

A-GPS has already been standardized as one of UE location technologies supported by 3GPP in R99. Associated signaling support for A-GPS has also been completed in Release 4 and 5. However, the minimum performance requirements for A-GPS measurement are currently missing in TS 25.133 (RAN WG4). Thus, there is no active effort to pursue A-GPS performance test specification in TS 34.121 (T1-RF). As a result, the location measurement reporting accuracy from different vendor's UE could be different, which makes it difficult for an operator to use these location reports to fulfill their service requirements.

Operators have already committed to deploy A-GPS with initial release of UMTS network service. It is important to speed up the standard process on A-GPS minimum performance specification in order to meet operator's early deployment requirement.

The purpose of this contribution is to urge the work in RAN4 and T and also provide some fundamental requirements for A-GPS minimum performance requirements.

2. DISCUSSION

Currently two A-GPS options are specified in 3GPP.

- UE- based where assistance data is provided by the network to improve the performance of the location accuracy calculated at the UE.
- UE- assisted solution where assistance data is provided by the network to improve the performance of the UE GPS code phase measurement report for the location accuracy calculated at the network

The minimum performance requirement of a UE varies by test conditions, as well as the location method. The test verdict may be different dependent on UE based or UE assisted solution, e.g. in UE based case, it is clearly a location estimate, but on UE assisted case it is the GPS code phase measurement results. However, the same test signal conditions shall be used for the tests of both solutions. In latter case, the performance specification should be the accuracy of the code phase measurement, or it may be considered as well whether a location estimate would be applied, but in that case the SMLC algorithms must be publicly available to assess the performance of each unit.

In progress for developing performance requirements, RAN4 could consider to progress the work with several different satellite signal conditions, such as open area, with shadow or blocking and

indoor environment.

In following sections, we aim to deliver complete position accuracy requirement in UE based case, and GPS code phase measurement accuracy in UE assisted case.

3. PROPOSED REQUIREMENTS FOR AGPS MINIMUM PERFORMANCE SPECIFICATION

- 1) A-GPS minimum performance specification is developed in order to control the consistency of UE's reporting accuracy, the actual content of the report depending on positioning method. Under certain test conditions, UE reported location for UE based case, or measurement reports in UE assisted case, should meet the minimum performance specifications.
- 2) A-GPS minimum performance should include both UE based and UE assisted A-GPS aspects. ~~However, UE based A-GPS measurement specification should have a higher priority than UE assisted A-GPS.~~
- 3) Simulated satellite signal should be used for minimum performance specification verification
- 4) Following satellite signal conditions for the UE performance tests should be considered. The reporting of location estimate or GPS code phase measurement should be defined based on these signal conditions:

Stationary channel conditions	
Good signal condition – open environment	Bad signal condition – indoor environment
1. Multi path Test	5. Multi path Test
2. Accuracy Test (under different signal conditions)	6. Accuracy Test (under different signal conditions)
3. Sensitivity Test	7. Sensitivity Test
4. Dynamic Range Test	8. Dynamic Range Test

For fading channel test
1. Urban Shadowing Test for GPS Signal
2. Moving Scenario Test for assistance data.

The accuracy of assistance data and the error of reference time shall be considered as “predefined reference test conditions” in the performance specification.

- 5) The minimum performance requirements for the UE are the position estimate accuracy (UE based case) or GPS code phase measurement accuracy (UE assisted case) and the initial time to first fix (TTFF). In addition, consequent time of fix should also be defined as part of minimum specification.

4. SCHEDULE REQUIREMENT

UE based A-GPS minimum performance specification should be completed by the ~~end-first~~ quarter of 2004³. Since the test signal conditions and procedures for UE assisted A-GPS minimum

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performance specification are similar to UE based A-GPS, they can be developed together. However, the final agreement on the [minimum specification of UE based A-GPS shall not tie to the agreement of the](#) accuracy of code-phase measurement for UE assisted AGPS ~~could be completed in 3 to 6 months later.~~

RAN4 should progress on different tests on GPS signal cases in TS 25.133. Accordingly, the signaling and performance tests in TSG-T need to be progressing. RAN4 should facilitate this work on considering whether it is sufficient to test measurement accuracy and relevant assistance data reception in the same tests. Here it could be assumed that in UTRAN signal levels could be on the same level as in signaling test. Hence it could be possible to define test cases only in 34.121 covering all aspects of terminal testing.

5. CONCLUSION AND ACTIONS

In this document it is urged to progress on testing issues with A-GPS in 3GPP. It proposed that the work would progress to include also the GPS performance requirements into the 3GPP specifications. RAN4 is asked to discuss and review this proposal and approve the document as a guideline of the work.