Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Proposed Process for the Development of IEEE 802.16m System Description Document**
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Re:	IEEE 802.16m System Description Document
Abstract	This document proposes a process for the development of IEEE 802.16m SDD
Purpose	For discussion and approval by TGm
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1. Introduction and Background

There was a consensus in IEEE 802.16 WG TGm to develop a system description document (i.e., a stage 2 document per 3GPP and 3GPP2 terminology) as part of IEEE 802.16m standardization process.

The ultimate goal of the IEEE 802.16m System Description Document (SDD) is to facilitate the development of the IEEE 802.16m standard specification based on the general architecture and key functional and performance features selected during the SDD development.

Therefore, the SDD should define the general framework and the key concepts (at a high-level) that would comprise IEEE 802.16m air-interface. For this purpose, 3GPP 36.300 [1] may be used as an example of scope and depth of content for a stage 2 document.

Since in the current IEEE 802.16m work plan, there is no consideration for study item phase, development of a stage 2 document from scratch becomes more challenging. This is the authors' belief that an undisciplined selection process for the technical concepts can result in a standard specification that for each function there exist multitude of options and complicated parameter sets, delaying the implementations and requiring extensive profiling efforts following the standardization process.

This contribution attempts to lay out a process through which a consistent and coherent system description document comprising of all essential system concepts that adhere to a general architecture and meet/exceed system requirements for IEEE 802.16m can be developed. The proposed process and timelines are consistent with the current IEEE 802.16m work plan.

This would streamline and discipline the process for entertaining and selecting detailed stage 3 technical proposals that adhere to the SDD framework.

2. Proposed Process

According to the IEEE 802.16m work plan, a call for proposals related to system description document is expected to be issued in May 2007 following the 49th meetings of IEEE 802.16 WG.

The authors suggest that this call for proposals should ask the proponents to submit their views on general system architecture (key MAC and PHY functional components and their relationships) and their rationale (that may include justification based on theory or simulation) on why they believe such architecture is suitable for IEEE 802.16m. It is strongly recommended that the System Requirement Document (SRD) should be used as a guideline for the contributions to SDD.

The first batch of contributions should also include proposals for SDD document outline in addition to the views on system architecture. Once the system architecture and the SDD outline are defined, it is further recommended that the key concepts be partitioned into a number of clusters. For example, all functional upper-MAC components such as handoff, sleep and idle protocols, etc. can be included in one cluster (see Figure 2).

It is recommended that in the SDD document those features, functions, protocols reused from the legacy system shall refer to the appropriate sections in IEEE 802.16 STD specification. This is to maintain SDD as simple as possible by not re-writing or copying text from existing specification.
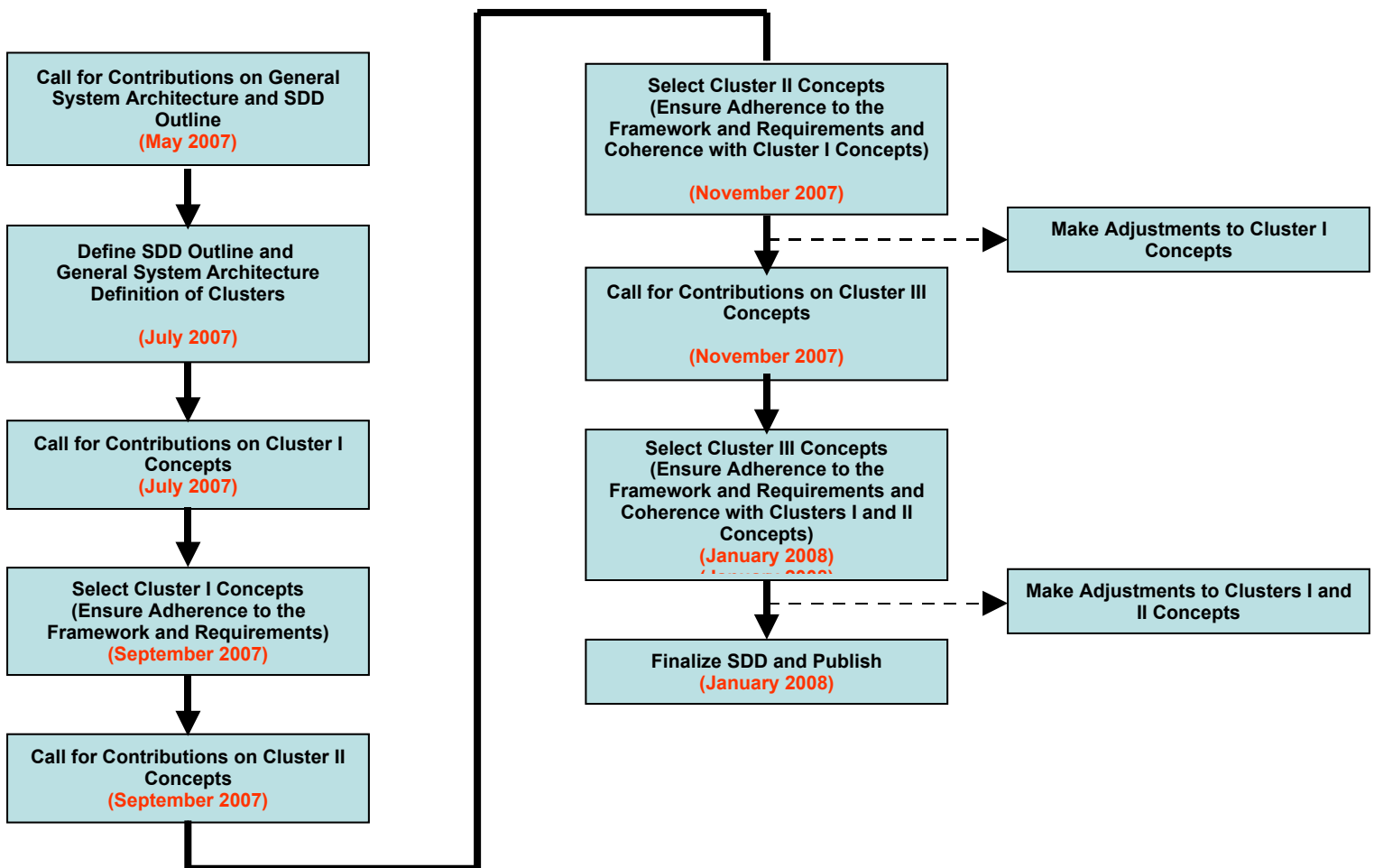

Figure 1: Illustration of the proposed process.

Figure 1 illustrates the proposed process within the time schedule of current 802.16m work plan. In this figure, the key concepts are partitioned into three clusters and the cluster elements are selected sequentially to comply with the IEEE 802.16m work plan and timelines. However, the cluster concepts can be discussed in parallel in ad-hoc groups as well. Regardless of sequential or parallel developments of clusters, it must be understood that this is an iterative process (due to interdependency of the clusters) and some adjustments or changes in the framework or cluster definitions may be needed to

ensure that proposed concepts meet the system requirements and adhere to the framework and architecture.

Also it must be noted that the ultimate system shall include minimal number of options and constitute a well-performing system to facilitate implementations and deployments.

As an example of how clusters can be defined and developed, the IEEE 802.16m SDD can be partitioned into PHY, Lower-MAC, and Upper-MAC clusters (see Figure 2 for more details) and the proposed concepts related to these clusters can be discussed and selected according to the proposed process. Alternative partitioning of the concepts is also possible, e.g., PHY and MAC, provided that the IEEE work plan can accommodate the sequential or parallel development of these clusters with the understanding of the interdependences among these clusters.

The SDD document must be a standalone document through which the underling concepts of the entire system architecture can be described and understood. However, as mentioned earlier, those concepts that are in common with the WirelessMAN-OFDMA Reference System must refer to the IEEE 802.16 STD specification and should not be repeated, for simplicity.

The next question would be how to select the concepts in to the SDD. It is proposed that the proponents provide theoretical or simulation results proving that their proposed concepts meet/exceed the requirements, have significant performance gain over the legacy counterparts, and are consistent with the adopted IEEE 802.16m system architecture. The iteration process will ensure that partial proposals that are selected can be coherently integrated into the adopted system architecture.

A simple majority vote can be used to down select concepts for which multiple equally-performing proposals exist.

The proponents should include sufficient and convincing rationale that could include simulation results on why they believe that the concept should be incorporated into the SDD.

To ensure that SDD development serves its purpose, those concepts that are not part of the SDD shall not be considered during the development of stage 3 specification. Therefore, the stage 3 proposals shall clearly state to which particular concept in the IEEE 802.16m SDD (or section in the SDD outline) they are mapped.

3. References
[1] 3GPP TS 36.300 V8.0.0, Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN);Overall description; Stage 2, March 2007.
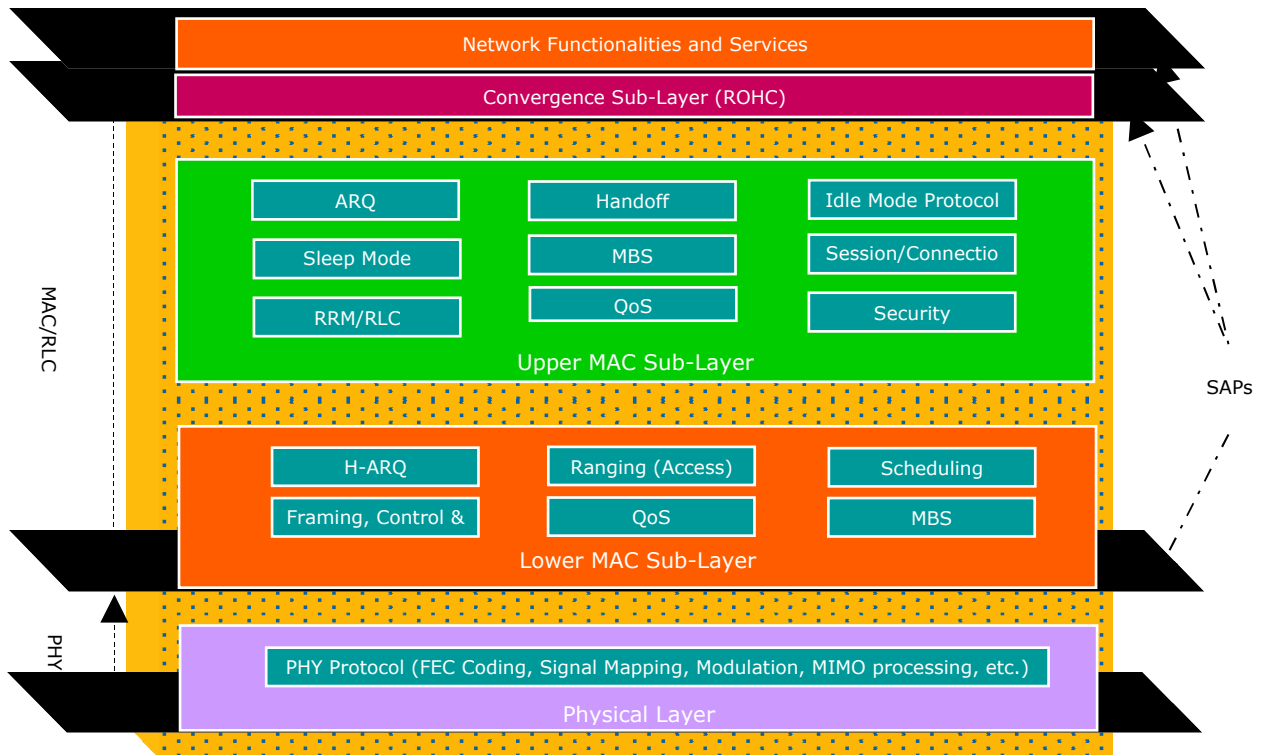
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Figure 2: Air-interface protocol stack functional elements

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