

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b>	
Title	<b>Level of Standardization for Proposed 802.16.3 – BWA under 11 GHz</b>	
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Re:	Proposed PAR for BWA Standardization below 11GHz	
Abstract	Describes the different levels of standardization and the situation of standardization in the FWA world in the context of the proposed PAR	
Purpose	Choose an appropriate level of standardization for the proposed 802.16.3 activity	
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# Level of Standardization for the proposed 802.16.3 under 11 GHz

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## Introduction

Standards are needed for the operation of telecommunications systems as well as for cost reduction thanks to mass production and ease of implementation. However, there are various degrees of standardization, and, in order for a standard to be beneficial for the community and industry as a whole, an appropriate level of standardization should be chosen. 802.16 was originally concerned with standardization for the air interface of BWA systems in the LMDS band, which is a “green field” from the point of view of standardization. When considering BWA for the lower frequency bands, one should carefully review the existing standardization situation of FWA, assess the various levels of standardization and choose the one, which are the most appropriate for the customers, operators and manufacturers of this kind of equipment.

## Levels of Standardization

Standards contain a large variety of requirements, performance requirements and operational requirements and specifications aimed to:

- Comply to safety and regulatory requirements.
- Achieve a minimal acceptable performance level.
- Coexist with other systems without causing harmful interference.
- Inter-operate with other systems.
- Inter-operate with various subparts of the standardized system.

In order to achieve this goal, standards of various degrees of details are published, ranging from performance requirements to fully interoperability specifications, which include all the details of the system interface. In between one can find a variety of possibilities, such as spectrum etiquette for co-existence, options and possibilities, which are not mandatory for standard compliance, or interoperability etiquette allowing a piece of equipment to negotiate the protocol with another piece of equipment.

A FWA system has three main interfaces, two to the “outside world” (to the network and to the CPE) and one major internal point of interface – the air interface. 802.16, and hence this document, refer mainly to this interface.

Unlike Wireless LAN or mobile telephony, for which full interoperability at the air interface is a threshold for entering the market, the fixed domain addressed by the proposed 802.16.3 does not call for full interoperability for the service to physically operate. In the fixed domain, arguments for interoperability stem from other market consideration such as multi-vendor supply, increased market confidence, higher product or component volumes. Market experience of narrow-band FWA indicates that interoperability standards are not a necessity, and the cost reduction offered by systems based on interoperability standards, like DECT and GSM, was not enough to compensate for the increased cost of adapting the standards for the FWA environment. The plethora of successful proprietary narrowband FWA systems is, by its mere existence, a proof.

Broadband Wireless Access (BWA) systems, to which the proposed 802.16.3 refers, will probably require careful planning and professional installation at the end user premises, thus making the operator responsible for both ends of the radio link. As bandwidth increases, terminal stations are built to support a larger number of end users. This decreases the cost per end-user, but on the other hand it increases the operator responsibility for the terminal station. In a lot of cases, this responsibility is further delegated to the vendor, who provides the equipment, planning tools and ever so often the actual planning, installation and financial support. The outcome is that the need for full interoperability is reduced.

Operators might enjoy interoperability, as it gives them, in addition to the cost reduction anticipated by standardization, a point of strength and more flexibility in negotiating with vendors. However, the fact remains that nowadays they (especially CLECs and CAPs) are looking for integrated end-to-end solutions which enable them to differentiate their service to a variety of end-user market segments

The proposed 802.16.3 PAR has chosen to address a very wide scope of markets, services and operation frequencies, thus making it very difficult for a single piece of equipment, or even a single prescriptive standard which does not permit substantial variations in equipment, to comply cost effectively with the full set of requirements. In 802.16 for that matter, one finds a large number of manufacturers, as well as operators and regulators, each with its own vested interests and needs. The requirement for full interoperability poses conflict of interests. This conflict of interests might delay the development of an interoperability standard, which precludes substantial product variation and technology or market innovation.

The development of a full interoperability air interface is a lengthy procedure and not always successful, as demonstrated by the efforts taken in IMT-2000, 802.11, ADSL group etc. A set of comparison criteria should be established, with proper weighting and a proper method to evaluate each criterion. Then, proposals for such an interface should be solicited, time to build up consensus and converge the proposals must be allowed. The comparison should be done carefully, preferably with the aid of prototypes and laboratory and field tests, and finally one has to select the best of all offers, integrating it with ideas taken from other proposals. However, this approach has a very big drawback - the time-to-market.

A way forward, which might seem very tempting, is the way of "cutting options off". This might seem a straightforward or easy way to achieve a solution, however, a consensus achieved by a majority voting is not a true consensus. It simply emphasizes the conflict of interests instead of bridging over them towards a widest possible consensus. From the technical point of view it will certainly lead to a less than sub-optimal solution (or at least one which is sub-optimal for many market segments and frequency bands). From the market point of view, it will become a non-standard, as more and more manufacturers will most likely produce better and more cost-effective proprietary solutions for broadband access. Both the regulatory environment and the market environment allow, and even encourage such development, innovation and variety, indeed the regulatory and spectrum management policies in different markets are specifically set up to do this.

## **Conclusions**

In order to achieve a timely and beneficial standard for the air interface under 11GHz, the proposed 802.16.3 activity should be able to consider the level of standardization appropriate for each target market., frequency band, country / region or regulatory and spectrum management regime. Launching prematurely a full interoperability air interface standard may lead to a failure of this standard. The proposed PAR does not contain the flexibility needed to allow for this consideration, and could lead to a failure of the standardization process, an irrelevant standard for many of the targeted markets and bands and/or a reduction in credibility for 802.16 as a whole. For these reasons, plus the other reasons enumerated by Paul Thompson's Dissenting Comment in the sub10 Study Group, the proposed PAR should be rejected, or revised and resubmitted.