**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |  |
| --- | --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | **IEEE 802.15 ULP Study Group 5 Criteria** | |
| Date Submitted | [] | |
| Source | [Shahriar Emami, Samsung] [3000 Orchard PKWY] [San Jose, CA 95134] | Voice: [ ] Fax: [ ] E-mail: [ Shahriar.e@samsung.com] |
| Re: | [Request to IEEE 802.15 for an ultra low power PHY amendment to IEEE 802.15.4.] | |
| Abstract | [During the March 2012 IEEE 802 Plenary the ultra low power Study Group was formed to study and submit a Project Authorization Request along with the supporting 5 Criteria.] | |
| Purpose | [Submit the PAR to the P802.15 Working Group] | |
| Notice | This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. | |
| Release | The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15. | |

**Five Criteria**

1. **11.5.1 Broad Market Potential**

**A standards project authorized by IEEE 802 LMSC shall have a broad market potential. Specifically, it shall have the potential for:**

**a) Broad sets of applicability.**

*Wireless connectivity is already used for a number of different applications including home networking, home automation, health care, industrial/environmental monitoring, digital signage, inventory management, commercial building automation and smart utility. An ultra low power PHY amendment would be beneficial to all those applications.*

**b) Multiple vendors and numerous users.**

*The membership of IEEE 802.15 demonstrates the interest in WPANs. Members include international wireless industry leaders, academic researchers, semiconductor manufacturers, communication equipment manufacturers, system integrators and end users.*

*There are at least 14 semiconductor manufacturers that are already providing chipsets for IEEE 802.15.4. The 802.15.4 based solutions have been used and are being used in a wide range of applications.*

**c) Balanced costs (LAN versus attached stations).**

*The Ultra Low Power (ULP) solutions are a reasonably small fraction of the cost of the target applications.*

1. **11.5.2 Compatibility**

IEEE 802 LMSC defines a family of standards. All standards should be in conformance with IEEE Std 802, IEEE Std 802.1D, and IEEE Std 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with the IEEE 802.1 Working Group. In order to demonstrate compatibility with this criterion, the Five Criteria statement must answer the following questions:

1. (a) Does the PAR mandate that the standard will comply with IEEE Std 802, IEEE Std 802.1D, and IEEE Std 802.1Q?
2. *This standard will be compatible with the IEEE 802 requirements of Architecture, Management, and Inter-networking documents as required. There is no specific technology feature anticipated in the standard that could preclude this compliance. Managed objects will be defined, if needed, consistent with existing policies and practices for IEEE 802 standards.*
3. (b) If not, how will the Working Group ensure that the resulting draft standard is compliant or, if not, receives appropriate review from the IEEE 802.1 Working Group?

*NA*

1. **11.5.3 Distinct Identity**

**Each IEEE 802 LMSC standard shall have a distinct identity. To achieve this, each authorized project shall be:**

**a) Substantially different from other IEEE 802 LMSC standards.**

*IEEE 802.15.4 inherently supports wireless sensor and control in low data rate applications. However, coin cell batteries cannot be used to power the majority of the existing 802.15.4 chipsets in these applications. Coin cell battery pulse current is often lower than transmit/receive currents of the vast majority of the existing chipsets. This 802.15.4 PHY amendment allows the use of smaller battery form factors such as coin cell batteries. As such is distinctly different from other IEEE 802.15 standards.*

**b) One unique solution per problem (not two solutions to a problem).**

*The proposed amendment to IEEE 802.15.4 will provide a unique solution for ultra low power applications.*

**c) Easy for the document reader to select the relevant specification.**

*The proposed amendment for IEEE 802.15.4 will be clearly identified as an amendment for the ultra low power WPAN design.*

1. **11.5.4 Technical Feasibility**

**For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:**

1. **Demonstrated system feasibility.**

*A number of ultra low power approaches as well as working chipsets have surfaced in the market over the past few years. A well thought out approach in IEEE 802.15.4 along with advances in wireless sensor networks makes it possible to achieve an ultra low power radio design.*

1. **Proven technology, reasonable testing.**

*Many examples of ultra low power radios as well as working prototypes with very long battery lives have been published in the literature and demonstrated in laboratories worldwide.*

1. **Confidence in reliability.**

*There are many proprietary and standard low power solutions available in the targeted frequency bands. One can be confident that a reliable ultra low power solution is feasible.*

**11.5.4.1 Coexistence of IEEE 802 LMSC wireless standards specifying terminal equipments for unlicensed operation**

* A WG proposing a wireless project is required to demonstrate coexistence through the preparation of a Coexistence Assurance (CA) document unless it is not applicable.
* The WG will create a CA document as part of the WG balloting process.
* If the WG elects not to create a CA document, it will explain to the Sponsor the reason  the CA document is not applicable.

The task group will not be changing any existing wireless project and will not be creating a CA document as part of the WG balloting process.

1. **11.5.5 Economic Feasibility**

**For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated) for its intended applications. At a minimum, the proposed project shall show:**

**a) Known cost factors, reliable data.**

*IEEE 802.15.4 ULP devices will make use of the existing high volume applications in the targeted frequency bands.*

**b) Reasonable cost for performance.**

*Performance and costs associated with low power solutions for the targeted frequency bands have been shown to be reasonable.*

**c) Consideration of installation costs**.

*One of the IEEE 802.15.4 standard objectives includes low cost installation with minimal or no operator intervention. This amendment supports that capability.*