Smart Grid using Heterogeneous Networks for GRIDMAN

IEEE 802.16 Presentation Submission Template (Rev. 9)

Document Number:

> IEEE C802.16gman-10/0009

Date Submitted:

> 2010-03-16

Source:

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Venue:

> Orlando, FL, USA

Base Contribution:

> None

Purpose:

> For discussion in the GRIDMAN SG

Notice:

Release:

Patent Policy:

Objective and Outline

- Objective of this contribution
  - " to discuss on Smart Grid application as an GRIDMAN study item candidate"

- Outline
  - Background
  - Targeted Scope
  - Use Cases of Smart Grid using Heterogeneous Networks
  - Summary

Background

- Smart Grid seems suitable target as an 802.16 application.
- Some careful considerations required for high reliable networking as follows;
  - An 802.16 device for MAN connection
  - Home area network (HAN) devices (802.15.4, Bluetooth, etc.) for inter-smart meter connection as an alternative for path redundancy.
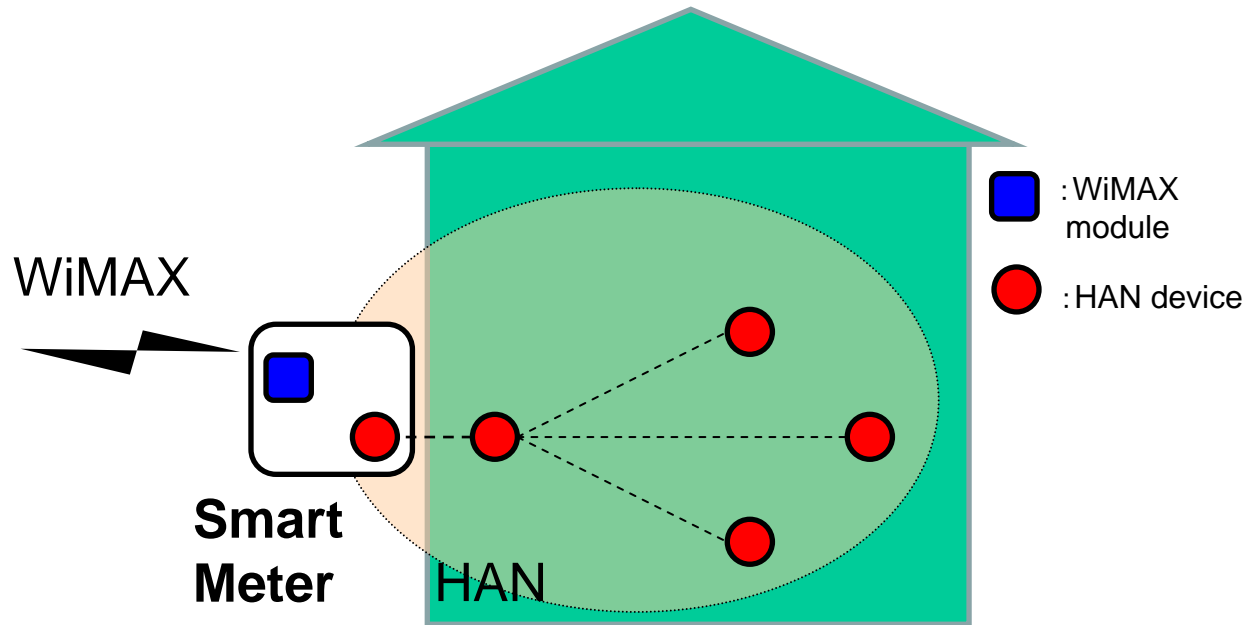
Targeted Scope of the Study

- Draft PAR and 5 Criteria For formation of an 802.16 Greater Reliability In Disrupted Metropolitan Area Network (GRIDMAN) Task Group

  5.2 Scope of Proposed Standard:

  – This amendment specifies changes to the most recently approved version of the IEEE 802.16 MAC with its management and data interfaces for operation with increased robustness in degraded infrastructure. It will make no PHY changes. This amendment will support **path redundancy**, mobile and local relaying, multi-hop relaying, Mobile Base Station, Low Duty Ratio, as well as operation in licensed, unlicensed and lightly licensed spectrum bands below 6 GHz **with means and mechanisms to coexist with other radio access technologies (RATs).**

Smart Meter w/ HAN

WiMAX

**Smart
Meter**

HAN

: WiMAX module

: HAN device

Use Case

- Path redundancy
  1. Routing to neighbor smart meters via HAN

Example of a path redundancy

SUN（Smart Utility Network）

Outdoor ← → **Indoor**

WiMAX Macro BS

MAN disruption

Smart Meter

Circuit breaker

Inter-Smart Meter connection using HAN

■ :WiMAX module

● :HAN device

Summary

- Efforts ongoing to push for a 802.16 based Heterogeneous system for consideration in smart grid networks

- Topology & Requirements of multi-hop to neighbor smart meters appear to be in accordance with GRIDMAN

- Propose to include HAN multi-hop Use Case in GRIDMAN