Recommendations for the PAR and Five Criteria Mobile Multihop Relay Task Group

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Purpose:

discussion

PAR instructions

- Scope: “output including technical boundaries”
- Purpose: “why is the document being created”
- Reason: “problem being addressed and benefit to stakeholders”

Recommendation for “Scope...”

This project will create an amendment to IEEE 802.16-2004 as modified by IEEE 802.16e-2005 that defines mobile multi-hop relay (MMR) functionality. All relayed paths shall begin/end at a subscriber or mobile station and end/begin at a base station. Minimally modified legacy subscriber and mobile stations shall have relay support when operating in OFDM and OFDMA PMP modes. Relay Stations (RS) may be fixed, nomadic, or mobile and may be installed by a service provider or by a service-provider-approved subscriber. All RS shall be controlled by the relay-enhanced base station and associated system controller. Communications between a BS and an RS may utilize any viable communications medium including but not limited to licensed and license-exempt spectrum. Support for the relay function from communications protocol stack layers above layer 2 may be considered. The creation of a new class of subscriber and mobile stations having relay station functionality may be considered as a system option.

This amendment also enhances IEEE 802.16-2004 as modified by IEEE 802.16e-2005 by defining multi-hop relay functionality for wireless backhaul between base stations and a central controller where physical connection to wired infrastructure is achieved.

Recommendation for “Scope...”

This project will create an amendment to IEEE 802.16-2004 as modified by IEEE 802.16e-2005 that defines mobile multi-hop relay (MMR) functionality.

Rationale:
Instructions for Section 13 of PAR request a definition of “projected output” and that output is an amendment to the standard.

Recommendation for “Scope...”

All relayed paths shall begin/end at a subscriber or mobile station and end/begin at a base station.

Rationale:
Readability

Recommendation for “Scope...”

Minimally modified legacy subscriber and mobile stations shall have relay support when operating in OFDM and OFDMA PMP modes.

Rationale:
It is important to state the conditions under which a subscriber or mobile station will indeed have relay support.

Recommendation for “Scope...”

Relay Stations (RS) may be fixed, nomadic, or mobile and may be installed by a service provider or by a service-provider-approved subscriber.

Rationale:
The potential mobility charistics of the RS were not presented in the discussion document. Being silent may be interpreted as limiting scope to fixed relays.

We believe, also, that it is important to explicitly allow the installation of RS by a subscriber under service provider supervision. Being silent implies installation by service provider only.

Recommendation for “Scope...”

All RS shall be controlled by the relay-enhanced base station and associated system controller.

Rationale:
The discussion document is silent on this. Silence could be interpreted as allowing fully distributed relay control.

Recommendation for “Scope...”

Communications between a BS and an RS may utilize any viable communications medium including but not limited to licensed and license-exempt spectrum.

Rationale:
The discussion document is silent on this. Silence could be interpreted as limiting the scope to consideration of only in-band relay.

Recommendation for “Scope...”

Support for the relay function from communications protocol stack layers above layer 2 may be considered.

Rationale:
The discussion document is silent on this. Silence could be interpreted as limiting the scope to consideration of only layers 1 & 2.

Recommendation for “Scope...”

The creation of a new class of subscriber and mobile stations having relay station functionality may be considered as a system option.

Rationale:

The definition of a class of subscriber or mobile station with relay functionality can provide essential capability for public safety applications of 802.16 relay.

This class of station may also enhance coverage, throughput, and range by permitting opportunistic exploitation of the location of these stations.

Recommendation for “Scope...”

This amendment also enhances IEEE 802.16-2004 as modified by IEEE 802.16e-2005 by defining multi-hop relay functionality for wireless backhaul between base stations and a central controller where physical connection to wired infrastructure is achieved.

Rationale:
IEEE 802.16 may find application as backhaul for start up 802.16 systems and/or for 802.11 systems.
Allowing relay for backhaul may have the same economic benefits as application of relay to the BS to SS/MS links.

Recommendation for “Scope...”

This project will create an amendment to IEEE 802.16-2004 as modified by IEEE 802.16e-2005 that defines mobile multi-hop relay (MMR) functionality. All relayed paths shall begin/end at a subscriber or mobile station and end/begin at a base station. Minimally modified legacy subscriber and mobile stations shall have relay support when operating in OFDM and OFDMA PMP modes. Relay Stations (RS) may be fixed, nomadic, or mobile and may be installed by a service provider or by a service-provider-approved subscriber. All RS shall be controlled by the relay-enhanced base station and associated system controller. Communications between a BS and an RS may utilize any viable communications medium including but not limited to licensed and license-exempt spectrum. Support for the relay function from communications protocol stack layers above layer 2 may be considered. The creation of a new class of subscriber and mobile stations having relay station functionality may be considered as a system option.

This amendment also enhances IEEE 802.16-2004 as modified by IEEE 802.16e-2005 by defining multi-hop relay functionality for wireless backhaul between base stations and a central controller where physical connection to wired infrastructure is achieved.

Recommendation for “Purpose...”

The purpose of the proposed project is to create an amendment to the IEEE 802.16 WirelessMAN standard that defines mobile multi-hop relay functionality compatible with the IEEE 802.16e-2005 amendment. The previously defined mesh mode of IEEE 802.16-2004 is not compatible with IEEE 802.16e-2005. The proposed amendment also defines multi-hop relay functionality for wireless backhaul between base stations and a central controller that is connected to the wired infrastructure. Wireless multi-hop backhaul is not currently defined for IEEE 802.16 WirelessMAN..

Rationale:

The discussion document addresses the “why use MMR” issue which, we believe, is more appropriate for the “Reason for...” paragraph of the PAR. We believe the “purpose” is to amend the standard to provide a functionality that is not already present.

Recommendation for “Reason for...”

The public technical literature contains numerous analyses showing that multi-hop relay technology may improve the coverage & throughput and possibly the capacity of wireless networks. One reason for this project is therefore to enable IEEE 802.16 WirelessMAN systems to experience the gains described in this literature. It is expected that the complexity of relay stations will be considerably less than the complexity of legacy IEEE 802.16 base stations. Therefore, the gains in coverage & throughput can be leveraged to reduce total system cost for a given system performance requirement and thereby improve the economic viability of IEEE 802.16 systems. Further, it is also known that a significant component of the cost of wireless networks is the cost of backhaul. The application of wireless relayed backhaul to IEEE 802.16 WirelessMAN systems will further reduce the total system costs. Wireless relayed backhaul may also result in improved overall system reliability by allowing backhaul path selection diversity.

Recommendation for “Reason for…”

The public technical literature contains numerous analyses...

Rationale:
The PAR instructions request that the technical benefit and benefit to stakeholders be placed in this section. The discussion document addresses these issues. The purpose of this proposed text is to improve readability.