To:
Roger Marks
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Reference: TWG Inter-Operability Problem Reports (IOPR39985, IOPR40150)

March 3, 2009

Subject: Liaison Statement to IEEE 802.16 WG on modifications to the IEEE 802.16 standard needed to support WiMAX certification.

Dear Dr. Marks,

In the course of development and validation of product certification test cases based on IEEE Std 802.16, the WiMAX Forum TWG has identified critical issues with the 802.16 specification that impede product interoperability. The WiMAX Forum TWG believes these issues require clarification and/or correction. TWG respectfully requests that IEEE 802.16:

- review the attached problem statements and/or WiMAX contemplated remedies for each one of the problem statements (see Annexes),
- develop a remedy for each one of the issues,
- and inform the WiMAX Forum TWG of the results of IEEE 802.16's actions on this matter.

Should the IEEE 802.16 develop any specific remedy in response to the problems identified in Annex, and should these remedies be incorporated into IEEE 802.16 standard, WiMAX Forum TWG would appreciate further communication giving specific details of the remedies including affected IEEE Std 802.16 document sections.

Thank you very much for your attention to this matter of mutual importance.

Sincerely,

Sylvain Labonte, IEEE-IOPR Rapporteur

for

Wonil Roh and Vladimir Yanover
Chairs, WiMAX Forum Technical Working Group (TWG)

Annex A IOPR on Uncontrolled Handover (IOPR39985)

A.1 Interoperability Problem Statement

Due to suboptimal radio planning conditions, link loss, or MS implementation, when a MS detects a drop, the MS might begin ranging at a preferred BS which was not contacted by the serving BS for handover preparation.

In such a case, if the MS provides Ranging Purpose Indication TLV Bit #0 set to 1 and Serving BSID TLV in RNG-REQ, the target BS is able to handle the unexpected handover within a reduced amount of time, comparing to the required time for full initial network entry.

This concept that has been called Uncontrolled Handover and has been considered by NWG is missing in IEEE P802.16Rev2[1].

This IOPR identifies the case when Uncontrolled Handover can occur and provides the appropriate usage of TLVs in the air link for the BS to handle such a case.

A.2 Possible Changes in the IEEE 802.16 Standards

[Modify 6.3.21.2.6 of P802.16Rev2/D9, pages 456- 457 as indicated:]

6.3.21.2.6 Drops ~~during HO~~

A drop is defined as the situation where an MS has stopped communication with its serving BS ~~(either in the DL or in the UL)~~ before the normal HO sequence outlined in Cell Res~~S~~election (see 6.3.21.2.1), HO Decision and Initiation (see 6.3.21.2.2), and Termination with the serving BS (see 6.3.21.2.5) has been started, or the normal HO sequence was started but has not been completed.

An MS can detect a drop by its failure to demodulate the DL, or by exceeding the RNG-REQ retries limit ~~allowed for the periodic ranging mechanism~~. A BS can detect a drop when the Number of retries limit allowed on inviting ranging requests for the periodic ranging mechanism is exceeded.

A drop during HO is defined as the situation where the MS loses communication to a target BS during network reentry attempt to this target BS. An MS can detect a drop during HO by its failure to demodulate the DL signals from this target BS, or by exceeding the RNG-REQ retries limit.

~~When the MS has detected a drop during network reentry with a target BS, it may attempt network reentry with its preferred target BS as through Cell Reselection (see 6.3.21.2.1), which may include resuming communication with the serving BS by sending MOB_HO-IND message with HO_IND type = 0b01 (HO cancel) or performing network reentry at the serving BS.~~

When the MS has detected a drop, it may attempt resumption of communication with the network through its preferred target BS. For resumption of communication with the preferred target BS, the MS may perform network reentry at the preferred target BS as described in 6.3.21.2.7. The preferred target BS may be the serving BS. In addition, for drop during HO, a resumption of communication with the serving BS may be executed by sending MOB_HO-IND message with HO_IND type = 0b01 (HO cancel) using HO Cancellation procedure specified in 6.3.21.2.3.

The network reentry process at the serving BS is identical to the network reentry process at any other target BS, both for the serving BS and for the MS (see 6.3.21.2.7). If the serving BS has discarded the MS context, the network re-entry procedure shall be the same as full network reentry with HO optimization rules and scenarios defined in 6.3.21.2.10.

MS shall perform CDMA ranging with target BS using codes from HO codes domain.

The network reentry with another target BS after drop during HO is identical to the reentry after a drop.

Upon the target BS's sending RNG-RSP with Ranging Status = success, the target BS shall provide CDMA A~~LLOC~~llocation IE with appropriate UL allocation for RNG-REQ from MS. MS shall send RNG-REQ with MAC address and HMAC/CMAC. Serving BSID TLV and Ranging Purpose Indication TLV Bit #0 set to 1 shall be included in RNG-REQ as well. The target BS may now identify that HO attempt by MS was not coordinated with the serving BS and may request all relevant MS context from the serving BS. Using this information, the target BS shall now send RNG-RSP with HO process optimization bitmap and network reentry may continue as in the typical, nondrop case.

When the serving BS has detected a drop, it shall react as if a MOB_HO-IND message has been received with HO_IND_type indicating serving BS release.

A.3 References

[1] IEEE 802.16 WG. P802.16Rev2/D9, January 2009.

Annex B IOPR on Clarification on the RCID_Type Override within HARQ_MAP_IE (#40150)

B.1 Interoperability Problem Statement

There is ambiguity in the IEEE 802.16 standard with respect to the usage of RCID_IE and the RCID_Type override within HARQ DL-MAP IE or HARQ UL-MAP IE.

RCID_IE is supported within HARQ DL-MAP IE and HARQ UL-MAP IE for HARQ or HARQ ACK disable bursts, which are mandatory in the profile.

On the other hand, RCID_IE in Sub-DL-UL-MAP is a different feature since it is used for normal bursts (non-HARQ bursts without CRC16 attached) allocated using normal MAP IE in Sub-DL-UL-MAP. According to the profile, RCID_IE in Sub-DL-UL-MAP is a mandatory item as well.

Even though not clearly stated in the standard, if HARQ DL-MAP IE or HARQ UL-MAP IE is used in Sub-DL-UL-MAP the RCID_Type in the HARQ DL-MAP IE or HARQ UL-MAP IE should override the RCID_Type field in the Sub-DL-UL-MAP, but only within the scope of the said HARQ DL-MAP IE or HARQ UL-MAP IE.

B.2 Possible Changes in the IEEE 802.16 Standards

[Modify the description of the field "RCID_TYPE" in SUB-DL-UL-MAP message in section 6.3.2.3.55 of Rev2/D9 as follows]

6.3.2.3.55 OFDMA SUB-DL-UL-MAP message

RCID_TYPE

The RCID type used for RCID IEs specified in DL-MAP IEs that are described in this SUB-DL-UL-MAP. For the MAP IE containing RCID_Type field of its own (e.g., HARQ_DL_MAP_IE, HARQ_UL_MAP_IE), the RCID_Type in the corresponding MAP_IE shall override the RCID_Type in this SUB-DL-UL-MAP within the scope of the said MAP_IE.