Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**MAC enhancements for VoIP delay minimization**
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Source(s)	Marianna Goldhammer BreezeCOM Atidim Technology Park, Bldg.1 Tel Aviv, 61131, Israel Voice: +972 3 6456241 Fax: +972 3 6456290 mailto: mariannag@breezecom.co.il
Re:	IEEE 802.16.3-00/25r1 – Call for Contributions: Proposed MAC enhancements
Abstract	The proposal introduce the necessary MAC messages to reduce the VoIP delay in up-link
Purpose	To introduce the proposed method in the 802.16 MAC adaptation for 802.16.3
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VoIP Delay Minimization

Marianna Goldhammer
BreezeCOM

References

[1] IEEE 802.16.3-00/02r4. Functional Requirements for the 802.16.3 Interoperability Standard

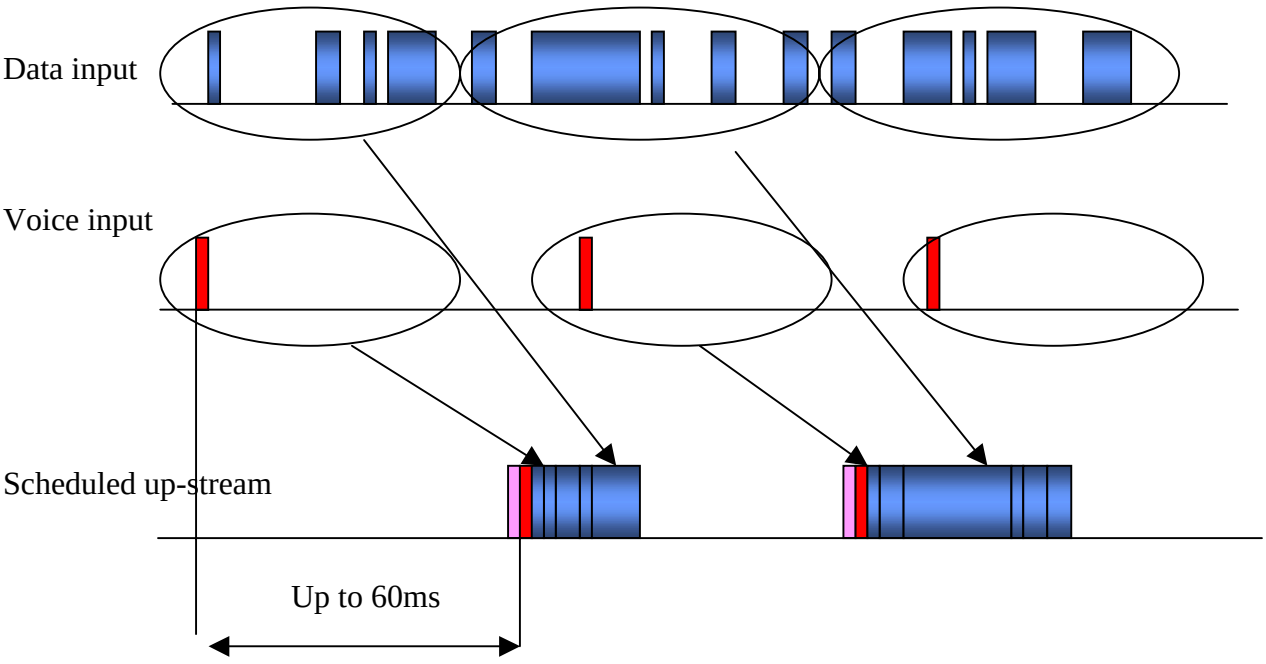
[2] IEEE 802.16.1/D1 - 2 000 Draft Standard for Air Interface for Fixed Broadband Wireless Access Systems

Introduction

The FRD specifies requirements for delay in full-quality telephony or time critical packet services.
There are cases in which the packets are generated with a period of 30ms or 60ms, but the end-to-end delay, not including codecs, has to be under 20ms.

The critical path, from delay point of view, is the up-link direction. The Fig. 1 shows how these packets are generated and transmitted in the CPE to BS direction. The voice packet periodicity is supposed to be 60ms.

From the figure results that the BS, having no information regarding the amount of time the voice packets waits for transmission, can schedule the up-link transmission with a big delay.



Proposal

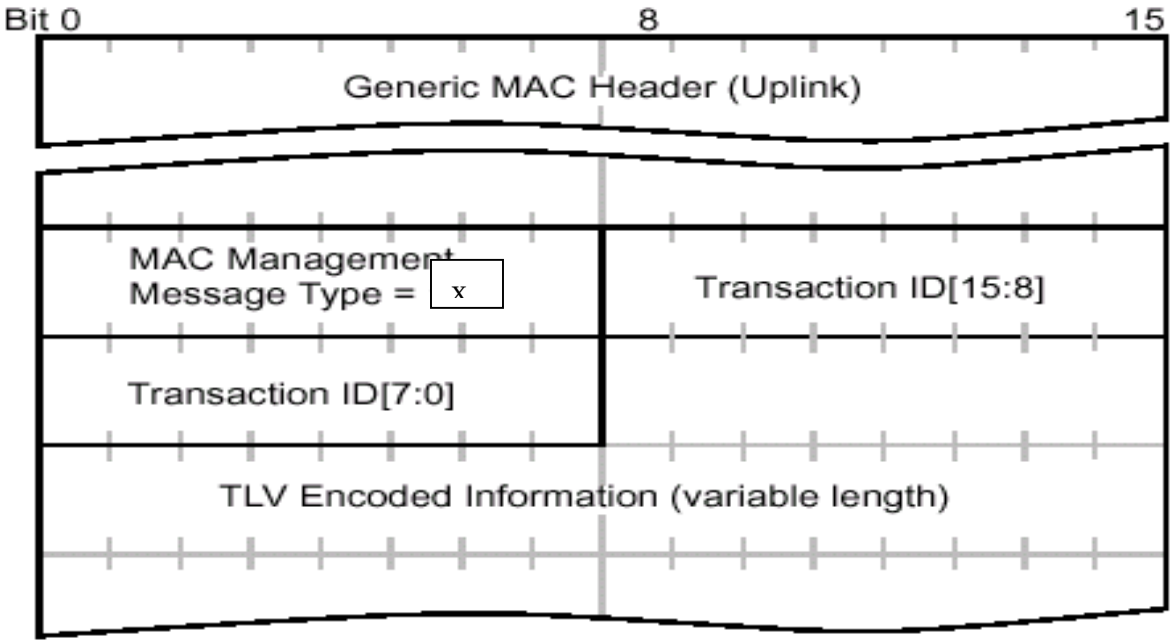
The CPE shall have the possibility to request, relative to the previous scheduled transmission, for a scheduling advance of x ms.

The MAC Management Messages will be:

- Scheduling Advance Request – ADV-REQ
- Scheduling Advance Confirmation – ADV-CONF

Scheduling Advance Request – ADV-REQ

The message can be sent by SS only.
The message format is:

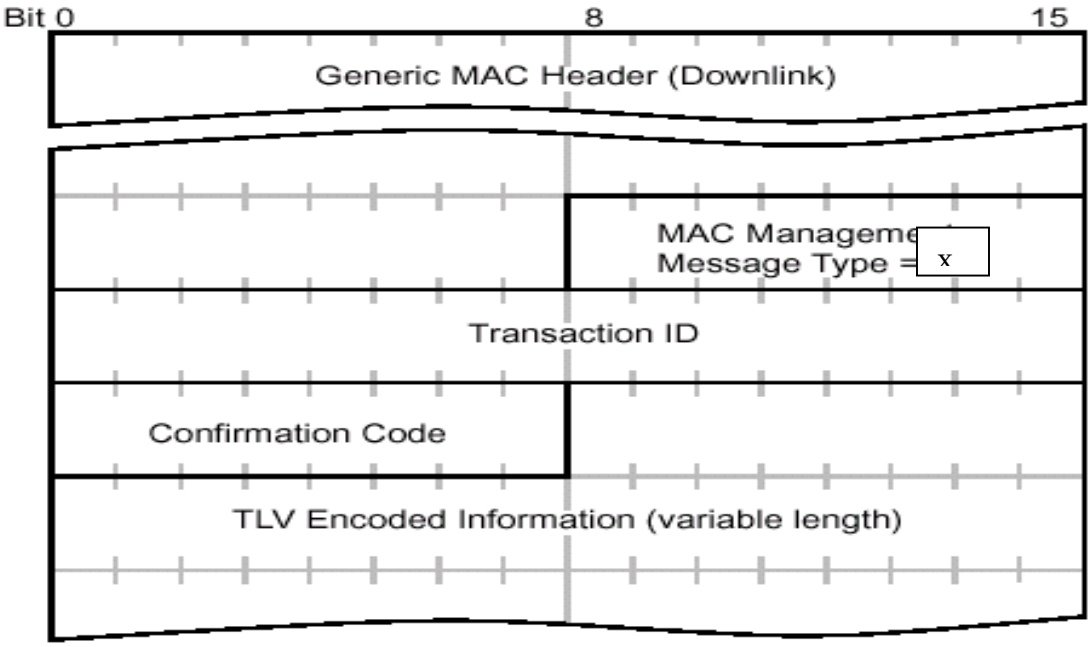


where:

- **Transaction ID -** Unique identifier for this transaction assigned by the sender.
- **TLV encoded information:** time advance requested by the sender, in ms.

Scheduling Advance Confirmation – ADV-CONF

The message can be sent by BS only.
The message format is:



where:

- **Confirmation Code:** indicates the scheduling time advance (in ms) in the next scheduling period.

Conclusion:

This mechanism will permit the minimization of the delay in the up-link.
The delay in the downlink is fully under BS control and no messages are needed.