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<tr>
<th><strong>Project</strong></th>
<th>IEEE 802.16 Broadband Wireless Access Working Group <a href="http://ieee802.org/16">http://ieee802.org/16</a></th>
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<tr>
<td><strong>Title</strong></td>
<td>RS Autonomous Synchronization</td>
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<td><strong>Date</strong></td>
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<td><strong>Submitted</strong></td>
<td>2006-03-05</td>
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<td><strong>Source(s)</strong></td>
<td>Kanchei (Ken) Loa, Yi-Hsueh Tsai, Shiann-Tsong Sheu, Hua-Chiang Yin, Yung-Ting Lee, Chih-Chiang Hsieh, Frank C.D. Tsai, Youn-Tai Lee, Heng-Iang Hsu Institute for Information Industry 8F., No. 218, Sec. 2, Dunhua S. Rd., Taipei City, Taiwan. [add co-authors here]</td>
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<td><strong>Re:</strong></td>
<td>IEEE 802.16j-07/007r2: “Call for Technical Comments and Contributions regarding IEEE Project 802.16j”</td>
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<tr>
<td><strong>Abstract</strong></td>
<td>This contribution proposes procedures for RS autonomous synchronization</td>
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<td><strong>Purpose</strong></td>
<td>Text proposal for 802.16j Baseline Document</td>
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RS Autonomous Synchronization

Global navigation satellite system (GNSS) is the generic name given to the satellite-based navigation systems including GPS (global positioning system), GLONASS (global navigation satellite system), and Galileo. GPS is the first passive one-way ranging satellite system to become operational. While GPS was under development by United States (US), the Soviet Union undertook to develop a similar system, called GLONASS. Like GPS, GLONASS was designed primarily for the military, and was also offered for civil use. In a later time, the European Union decided to develop a similar system planed to under civil control. This system is called Galileo, which is now developed by European Space Agency (ESA).

This contribution describes RS time synchronization with MR-BS. In order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the baseline working document IEEE 802.16j-06/026r2 are listed below.

Text Proposal

6.3.2.3 MAC management messages

6.3.2.3.25 Clock Comparison (CLK-CMP) message

6.3.2.3.25.1 RS Clock Synchronization (CLK-SYNC) message

In MR network systems with service flows carrying information that requires the RSs to transmit preamble synchronously, CLK-SYNC messages shall be periodically broadcast by access stations. Implementation of the CLK-SYNC message at RS is optional. If provisioned to do so, the access station shall keep a fixed time difference between preamble and GPS time at each frame and transmit one CLK-SYNC message according to the format shown in Table xxx.

Upon receiving CLK-SYNC message, RS shall synchronize with the access station and send its DL frame start preamble synchronously with MR-BS. Algorithms to synchronize with the access station are out of scope of this specification.

Table xxx – CLK-SYNC message format

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLK-SYNC_message_format() {</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Management Message Type = xx</td>
<td>8 bits</td>
<td>-</td>
</tr>
<tr>
<td>Frame Sequence Number</td>
<td>8 bits</td>
<td>8-LSB Frame Sequence Number</td>
</tr>
<tr>
<td>Fraction GPS time</td>
<td>16 bits</td>
<td>Fraction GPS time for frame-start DL preamble of current frame in unit of 1 micro second, where fraction GPS time defined as the GPS time minus the integer part of GPS time in unit of frame duration. fraction GPS time [ \equiv GPS \text{ time} - \text{frame duration} \times \frac{GPS \text{ time}}{\text{frame duration}} ]</td>
</tr>
<tr>
<td>}</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
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