Quasi-Random Ranging Code and Ranging Sub-channel Selection in OFDMA System

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Purpose: This proposal should be used for the Ranging design.

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2002. 3.

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Quasi-random Selection of Ranging Code

- We Proposed the Quasi-random ranging code and sub-channel selection procedure for the avoidance of the collision of the ranging signals.

  Ranging Code Index = \{\text{Connection ID}\} \mod \{\text{The number of allocated Ranging Codes}\}

  Ranging Sub-channel Index = \{\text{Connection ID}\} \mod \{\text{The number of available Ranging sub-channel}\}

- Connection ID is Unique within one cell and is handled by AP.
The number of Allocated Ranging Code: \( N \)
The number of Available Ranging Sub-channel: \( M \)

<table>
<thead>
<tr>
<th>Ranging Code Index</th>
<th>Ranging Code (RC)</th>
<th>Ranging Sub-channel Index</th>
<th>Ranging Sub-channel (RS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>( RC_1 )</td>
<td>0</td>
<td>( RS_1 )</td>
</tr>
<tr>
<td>1</td>
<td>( RC_2 )</td>
<td>1</td>
<td>( RS_2 )</td>
</tr>
<tr>
<td>2</td>
<td>( RC_3 )</td>
<td>2</td>
<td>( RS_3 )</td>
</tr>
<tr>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
<td>\vdots</td>
</tr>
<tr>
<td>( N-1 )</td>
<td>( RC_N )</td>
<td>( M-1 )</td>
<td>( RS_M )</td>
</tr>
</tbody>
</table>

Note: Ranging Code (RC) and Ranging Sub-channel (RS) may be enumerated ascending order (or any other rule).
Summary

- AP can manage the number of Ranging code and sub-channel depend on the number of users on Bandwidth Request Ranging status
- No impact to Message Fields
- Reduce the delay of back-off cause of collision
- Support the higher contention resolution

→ The performance of the bandwidth request ranging procedure shall be enhanced.