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Title	**Ranging for non-synchronized AMSs**
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Re:	"802.16m AWD text": IEEE 802.16m-08/0010, "Call for contributions 802.16m-09/0012". Target topic: "15.3.9 Uplink physical control".
Abstract	Proposes ranging
Purpose	Review and adopt
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Ranging for non-synchronized AMSs

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Introduction

The contribution proposes text for ranging section in the AWD.

Proposed text

15.3.9.1.4.1 Ranging channel structure for non-synchronized AMSs

[Fill in the table in 09/0386 in the corresponding section as]

Table UL- 1, Ranging Channel Formats and Parameters.

Format No.	Ranging Channel Format	T_{RCP}	T_{RP}	Δf_{RP}
0	Structure 3	$T_g + 0.5\,T_s$	$T_b + T_s$	Δf
1	Structure 3	$T_g + 0.5\,T_s$	$T_b + 4T_s$	Δf

15.3.9.2.4.1.1 Ranging preamble codes

[Insert in 09/0386 at the end of the corresponding section]

The length of preamble codes is 72, for the Formats 0 and 1 provided in Table UL-1. The ranging code is used to modulate the subcarriers in uplink tiles in the frequency domain. For the *p*-th group, $p \in \{0,1,2,..,N_p\}$ [N_p is TBD], there are 70 ranging codes.

The ranging code in the frequency domain is defined as

$$r_i^p(k) = c^p(k) z_i(k), \quad p \in \{0,1,2,..,N_p\}, \quad i \in \{1,2,..,I\}, \quad k = 1,2,..,K. \qquad \text{(xxx a)}$$

Where,

- $c^p(k)$ [TBD] is *p*-th group specific code.
- *I*=70 and *K*=72 for generating length 72 codes.

For *K*=72, the ranging code generator, $z_i^{72}(k)$, is given by (xxxa).

$$z_i^{72}(k) = \begin{cases} \exp(\dfrac{-j2\pi ik(k+1)}{K-1}) & ,k = 1,2,..,K-1. \\ 0 & ,k = K. \end{cases} \qquad \text{(xxxb)}$$

15.3.9.2.4.1.2 Ranging channel configurations

[Insert in 09/0386 at the end of the corresponding section]

The ranging opportunity durations for Format 0 and 1 are 3 OFDMA and 6 OFDMA symbols, respectively.

15.3.9.2.4.1.3 Ranging signal transmission

[Insert in 09/0386 at the end of the corresponding section]

For the Formats 0 and 1 presented in Table UL-1, the initial ranging transmission shall be performed for $T_{tot} = T_{RCP} + T_{RP}$, during which the same ranging sequence is transmitted on the ranging channel without any phase discontinuity. For this purpose the transmitted signal shall be generated according to 15.3.2.5, equation (173), except that T_{RCP} is used instead of T_g , Δf_{RP} is used instead of Δf, and $0 \leq t \leq T_{tot}$, where T_{RCP} , T_{RP} and Δf_{RP} are given in Table UL-1.
If the initial ranging channel follows the TTG, the AMS shall transmit the initial ranging signal time-advanced by 0.5 Ts relative to the corresponding ranging opportunity. Figure x3 shows such an example where Format 0 is used for transmission (initial ranging opportunity duration is 3 OFDMA symbols). The time-advancing transmission shall be applied irrespective of which initial ranging opportunity is selected in the ranging channel. This can be noticed in the figure as case b), where although the AMS chooses for transmission the second initial ranging opportunity, the transmission is still time-advanced by 0.5 Ts. By using time-advance transmission of the initial ranging code, the intercarrier interference is suppressed for the first UL OFDMA symbol at infrastructure receiver.

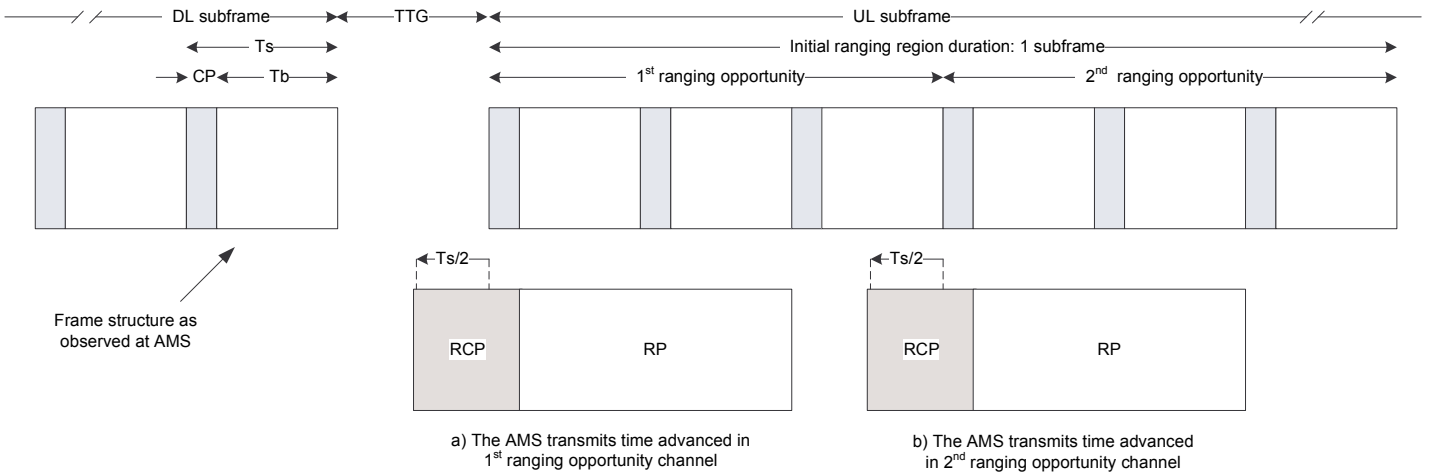

Figure x3 – Time-advancing transmission when the initial ranging region follows the TTG.