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Abstract	
Purpose	Adoption
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OFDM PHY Components

1. Introduction

This document introduces OFDM PHY components to allow for additional link-budget necessitated by the reduced antenna gain of mobile systems compared to those of fixed systems. The proposed text also allows for fixed systems to use these features.

In general, the proposed text consists of components adopted recently by ETSI BRAN HIPERMAN, which provide a simple and efficient means to achieve the above stated goal. It is recommeneded that TGe adopt this language from the HIPERMAN draft TS 102 177 v0.0.7. As a reminder, non-ETSI members may access this document through the 802.16/.11 private BRAN mirror, or request a copy from the liaison officer.

The recommendation is to define 16 subchannels, with a minor change to the interleaver and per-OFDM symbol interleaving as currently defined.

2. PHY Component Changes

6.2.2.3.6 Ranging Response (RNG-RSP) message

[In [B2], 6.2.2.3.6, change]

The following ~~WirelessMAN-OFDM and~~ WirelessMAN-SCa PHY specific parameters may also be included in the RNG-RSP message:

Frame Number
Frame number in which the corresponding RNG-REQ message was received. When Frame Number is included, SS MAC Address shall not appear in the same message.

Initial Ranging Opportunity Number
Initial Ranging opportunity within the frame in which the corresponding RNG-REQ message was received. If not provided, and Frame Number is included in the message, Initial Ranging Opportunity is assumed to be one.

The following WirelessMAN-OFDM PHY specific parameters may also be included in the RNG-RSP message:

Frame Number
Frame number in which the correspondin RNG-REQ message or subchannelized initial ranging indicatation was received. When Frame Number is included, SS MAC Address shall not appear in the same message.

Initial Ranging Opportunity Number
Initial Ranging opportunity within the frame in which the corresponding RNG-REQ message or subchannelized initial ranging indicatation was received. If not provided, and Frame Number is included in the message, Initial Ranging Opportunity is assumed to be one.

8.4.2.4 Parameters of transmitted signal

[[B1] 4.2, Table 1, row labeled 'Frequency offset indices of pilots' replace [B2] 8.4.2.4, Table 116ae 'Frequency offset indices of BaseicFixedLocationPilots'.]

Table 116ac—OFDM Symbol Parameters

Parameter	Value
N_{FFT}	256
N_{used}	200
F_s/BW	licensed channel bandwidths which are multiples of 1.75 MHz and license-exempt: 8/7 any other bandwidth: 7/6
(T_g/T_b)	1/4, 1/8, 1/16, 1/32
Frequency offset indices of guard carriers	-128,-127...,-101 +101,+102,...,127
Frequency offset indices of pilots	-88, -63, -38, -13, 13, 38, 63, 88
Subchannel Index: 0b00001: 0b00010 0b00011: 0b00100 0b00101: 0b00110 0b00111: 0b01000 0b01001: 0b01010 0b01011: 0b01100 0b01101: 0b01110 0b01111: 0b10001: 0b10010 0b10011: 0b10100 0b10101: 0b10110 0b10111: 0b11000 0b11001: 0b11010 0b11011: 0b11100 0b11101: 0b11110 0b11111:	Allocated Frequency offset indices of carriers: {-100:-98 -37:-35 1:3 64:66} {-38} { -97:-95 -34:-32 4:6 67:69} { -94:-92 -31:-29 7:9 70:72} {13} { -91:-89 -28:-26 10:12 73:75} { -87:-85 -50:-48 14:16 51:53} {-88} { -84:-82 -47:-45 17:19 54:56} { -81:-79 -44:-42 20:22 57:59 } {63} { -78:-76 -41:-39 23:25 60:62} { -75:-73 -12:-10 26:28 89:91} {-13} { -72:-70 -9:-7 29:31 92:94} { -69:-67 -6:-4 32:34 95:97} {38} { -66:-64 -3:-1 35:37 98:100} { -62:-60 -25:-23 39:41 76:78} {-63} { -59:-57 -22:-20 42:44 79:81} { -56:-54 -19:-17 45:47 82:84} {88} {-53:-51 -16:-14 48:50 85:87} Note that pilot carriers are allocated only if two or more subchannels are allocated.

Note that pilot carriers are allocated only if two or more subchannels are allocated.

8.4.3.2.1 Concatinated Reed-Solomon Coding

[Replace the last paragraph of [B2] section 8.4.3.2.1 with the last paragraph of [B1] section 5.2.1, ignore the blue text in [B1]]

When sub-channelization is applied in the UL, the FEC shall bypass the RS encoder and use the Overall Coding Rate as indicated in Table 3 as CC Code Rate. The Uncoded Block Size and Coded Block Size may be computed by multiplying the values listed in Table 3 by the number of allocated subchannels divided by 16.

8.4.3.3 Interleaving

[[B1] 5.3, equations (5), (6), (7), (8), replace [B2] 8.4.3.3 equations (44), (45), (46), (47).]

(44)

$$m = (N_{cps}/N_{mod}) \times k_{mod(N_{mod})} + floor(k/N_{mod}) k = 0, 1, \ldots, N_{cbps} - 1$$

(45)

$$j = sfloor(m/s) + (m + N_{cbps} - floor(N_{mod} \times m/N_{cbps}))_{mod(s))} m = 0, 1, \ldots, N_{cbps} - 1$$

(46)

$$j = s \times floor(j/s) + (j + floor(N_{mod} \times j/N_{cbps}))_{mod(s)} j = 0, 1, \ldots, N_{cbps} - 1$$

(47)

$$k = N_{mod} \times m - (N_{cbps} - 1) \times floor(N_{mod} \times m/N_{cbps}) k = 0, 1, \ldots, N_{cbps} - 1$$

[[B1] 5.3, Table 7,, replace [B2] 8.4.3.3 Table 116al.]

Table 116al—Block Sizes of the Bit Interleaver

	Default (16 Subchannels)	8 Subchannels	4 Subchannels	2 Subchannels	1 Subchannel
	N_{cbps}				
QPSK	384	192	96	48	24
16 QAM	768	384	192	96	48
64 QAM	1152	576	288	144	72
	N_{mod}				
	16	16	16	16	12

8.4.3.4.2 Pilot Modulation

[[B1] 5.4.2, Table 8, use the carrier values in the top row for [B2] 8.4.3.4.2 equations (48) & (49).]

[DL:]

(48)

$$c_{-88} = c_{-38} = c_{63} = c_{88} = 1 - 2w_k$$

$$c_{-63} = c_{-13} = c_{13} = c_{38} = 1 - 2\overline{w_k}$$

[UL:]

(49)

$$c_{-88} = c_{-38} = c_{13} = c_{38} = c_{63} = c_{88} = 1 - 2w_k$$

$$c_{-63} = c_{-13} = 1 - 2\overline{w_k}$$

8.4.3.5 Example OFDM UL RS-CC encoding

[[B1] 5.5, Carrier Mapping, replace [B2] 8.4.3.5 Carrier Mapping.]

Carrier Mapping (frequency offset index: I value Q value)

-100:-1 -1, -99:-1 1, -98:-1 -1, -97:-1 1, -96:1 -1, -95:-1 -1, -94:1 1, -93:-1 -1, -92:1 1, -91:-1 1,

-90:-1 -1, -89:-1 -1, -88:pilot= 1 0, -87:-1 1, -86:-1 1, -85:1 -1, -84:-1 -1, -83:1 1, -82:-1 -1, -81:-1 1,

-80:1 1, -79:1 1, -78:-1 1, -77:1 -1, -76:-1 1, -75:1 1, -74:-1 1, -73:-1 1, -72:-1 1, -71:1 -1,

-70:-1 1, -69:1 -1, -68:-1 1, -67:-1 1, -66:-1 -1, -65:-1 1, -64:-1 -1, -63:pilot=-1 0, -62:-1 -1, -61:-1 -1,

-60:1 -1, -59:1 1, -58:-1 1, -57:1 -1, -56:-1 1, -55:1 1, -54:-1 1, -53:-1 1, -52:1 -1, -51:-1 -1,

-50:1 1, -49:-1 -1, -48:-1 1, -47:1 1, -46:1 -1, -45:1 1, -44:1 -1, -43:-1 1, -42:-1 1, -41:-1 -1,

-40:1 -1, -39:-1 1, -38:pilot=1 0, -37:-1 -1, -36:-1 -1, -35:-1 1, -34:-1 -1, -33:1 -1, -32:1 -1, -31:-1 1,

-30:1 -1, -29:-1 1, -28:1 -1, -27:1 1, -26:1 1, -25:1 -1, -24:-1 -1, -23:-1 -1, -22:1 1, -21:-1 -1,

-20:-1 1, -19:-1 -1, -18:1 -1, -17:-1 -1, -16:1 1, -15:-1 -1, -14:1 -1, -13:pilot=-1 0, -12:-1 1, -11:1 1,

-10:-1 -1, -9:1 -1, -8:-1 -1, -7:-1 -1, -6:-1 1, -5:-1 1, -4:-1 -1, -3:1 -1, -2:1 -1, -1:1 -1,

0:0 0, 1:1 1, 2:-1 1, 3:1 1, 4:-1 -1, 5:-1 1, 6:-1 1, 7:-1 -1, 8:1 1, 9:-1 -1,

10:-1 1, 11:-1 -1, 12:-1 1, 13:pilot=1 0, 14:1 1, 15:1 -1, 16:1 -1, 17:1 1, 18:-1 1, 19:1 1,

20:-1 -1, 21:-1 -1, 22:-1 1, 23:-1 1, 24:-1 -1, 25:1 -1, 26:-1 -1, 27:1 -1, 28:1 1, 29:1 1,

30:1 -1, 31:-1 1, 32:1 -1, 33:-1 -1, 34:-1 1, 35:-1 -1, 36:-1 1, 37:1 1, 38:pilot=1 0, 39:1 -1,

40:-1 1, 41:-1 1, 42:1 1, 43:-1 1, 44:-1 1, 45:1 -1, 46:-1 -1, 47:-1 -1, 48:1 -1, 49:1 -1,

50:1 1, 51:-1 -1, 52:1 -1, 53:1 1, 54:-1 -1, 55:1 1, 56:1 -1, 57:1 1, 58:1 1, 59:1 1,

60:-1 1, 61:1 1, 62:-1 -1, 63:pilot=1 0, 64:-1 1, 65:1 1, 66:-1 -1, 67:1 -1, 68:-1 -1, 69:1 1,

70:1 1, 71:1 1, 72:1 -1, 73:-1 1, 74:1 1, 75:-1 -1, 76:-1 1, 77:-1 -1, 78:-1 1, 79:-1 -1,

80:-1 -1, 81:-1 -1, 82:1 1, 83:-1 1, 84:1 1, 85:1 1, 86:1 -1, 87:-1 1, 88:pilot=1 0, 89:1 1,

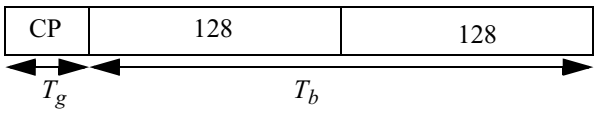
90:-1 1, 91:-1 1, 92:-1 -1, 93:1 -1, 94:1 1, 95:-1 -1, 96:-1 -1, 97:-1 -1, 98:-1 1, 99:1 1, 100:1 1

8.4.3.6 Preamble structure and modulation

[[B1] 5.6, Preamble structure and modulation from paragraph starting with "In the UL..." up to the paragraph starting with "The AAS...", replace similar section in [B2] 8.4.3.6.]

In the UL, when all the 16 subchannel are used, the data preamble, as shown in Figure 1 consists of 2 times 128 samples preceded by a CP whose length is the same as the cyclic prefix for data OFDM symbols. This preamble is referred to as the short preamble. This preamble shall also preceed all allocations during the AAS portion of a frame and shall be used as burst preamble on the DL bursts when indicated in the DL-MAP_IE.

Figure 1—UL Data and DL AAS Preamble Structure



The first preamble in the DL PHY PDU, the initial ranging preamble consists of a CP followed by 4 times 64 samples followed by a CP and 2 times 128 samples, as shown in Figure 2. This preamble is referred to as the long preamble.

Figure 2—DL and Network Entry Preamble Structure

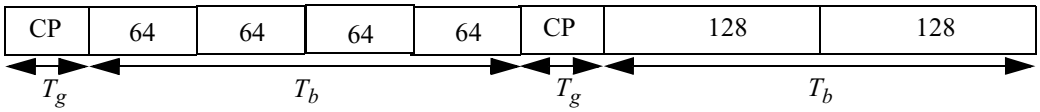


Figure 2: DL and network entry preamble structure

The frequency domain sequence for the 4 times 64 sequence is defined by:

S(-100:100) = sqrt(2)*sqrt(2)*{+1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1+j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1-j, 0, 0, 0, +1-j, 0, 0, 0, +1-j, 0, 0, 0, -1-j, 0, 0, 0, +1+j, 0, 0, 0, -1+j, 0, 0, 0, -1+j, 0, 0, 0, -1+j, 0, 0, 0, +1+j, 0, 0, 0, -1-j, 0, 0, 0, 0, 0, 0, 0,-1-j, 0, 0, 0, +1-j, 0, 0, 0, +1+j, 0, 0, 0, -1-j, 0, 0, 0, -1+j, 0, 0, 0, +1-j, 0, 0, 0, +1+j, 0, 0, 0, -1+j, 0, 0, 0, +1-j, 0, 0, 0, -1-j, 0, 0, 0, +1+j, 0, 0, 0, -1+j, 0, 0, 0, -1-j, 0, 0, 0, +1+j, 0, 0, 0, +1-j, 0, 0, 0, -1-j, 0, 0, 0, +1-j, 0, 0, 0, +1+j, 0, 0, 0, -1-j, 0, 0, 0, -1+j, 0, 0, 0, -1+j, 0, 0, 0, -1-j, 0, 0, 0, +1-j, 0, 0, 0, -1+j, 0, 0, 0, +1+j}*sqrt(2)*sqrt(2)

The frequency domain sequence for the 2 times 128 sequence is defined by:

P_{FULL}= sqrt(2)*sqrt(2)*{ 1, 0, -1, 0, -1, 0, -1, 0, 1, 0, 1, 0, 1, 0, 1, 0, -1, 0, 1, 0, -1, 0, -1, 0, -1,0, 1, 0,-1, 0, 1, 0, 1, 0, 1, 0, 1, 0,-1, 0, 1, 0, 1, 0, 1, 0, -1, 0, 1, 0, -1, 0, 1, 0, 1, 0, -1, 0, -1, 0, 1, 0, 1, 0, 1, 0, -1, 0, -1, 0, -1, 0, 1, 0, -1, 0, -1, 0, -1, 0, -1, 0, -1, 0, 1, 0, 1, 0, 0, 0, 1, 0, -1, 0, -1, 0, 1, 0, -1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, -1, 0, 1, 0, 1, 0, 1, 0, 1, 0, -1, 0, 1, 0, 1, 0, -1, 0, 1, 0, -1, 0, -1, 0, -1,0, -1, 0, 1, 0, 1, 0, -1, 0, 1, 0, -1,

0, -1, 0, -1, 0, -1, 0, -1, 0, -1, 0, -1, 0,-1, 0, 1, 0, 1, 0, 1, 0, -1, 0, -1, 0,-1, 0, 1, 0, 1, 0, -1, 0, -1, 0, -1, 0, 1, 0, -1, 0, -1, 0, 1, 0, -1, 0, -1, 0, 1, 0, -1, 0, -1}

In P_{FULL}, the factor of sqrt(2) equates the Root-Mean-Square (RMS) power with that of the data section. The additional factor of sqrt(2) is related to the 3 dB boost.

Using mesh, bursts sent in the control subframe shall start with the long preamble. In the data subframe, the bursts shall by default start with the long preamble, but neighbors may negotiate to use the short preamble by setting the preamble flag in the Neighbor Link Info field (see 6.2.2.3.34).

In the UL, when subchannelization transmissions are employed (1, 2, 4 or 8 subchannels), the data preamble consists of a 256 sample sequence preceded by a CP whose length is the same as the cyclic prefix for data OFDM symbols, as shown in Figure 3. This preamble is referred to as the subchannelization preamble. The frequency domain sequence for the 256 samples is defined by P_{SUB} below. Preamble carriers that do not fall within the allocated subchannels shall be set to zero. In the case that all 16 subchannels are allocated to a single station, the regular full bandwidth preamble P_{FULL} shall be used.

Figure 3—Subchannelized UL Data Preamble Structure

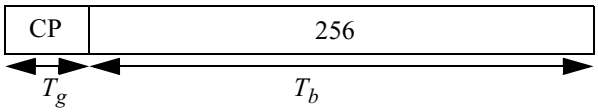


Figure 3: UL data and DL AAS preamble structure

P_{SUB}(-100:100) = {

1+j, 1+j, -1-j, 1+j, -1+j, 1+j, 1+j, 1+j, -1-j, -1-j, 1-j, -1-j, 1-j, 1+j, 1-j, 1+j, 1+j, -1-j, -1-j, 1+j,

1-j, 1+j, -1-j, 1+j, 1+j, 1+j, 1+j, -1-j, 1+j, -1+j, 1+j, 1+j, 1+j, -1-j, -1-j, 1-j, -1-j, -1-j, 1+j, 1-j,

1+j, 1+j, -1-j, -1-j, 1+j, 1-j, 1+j, -1-j, 1+j, 1+j, 1+j, 1+j, -1-j, 1+j, -1+j, 1+j, 1+j, 1+j, -1-j, -1-j,

1-j, -1-j, 1-j, -1-j, -1+j, -1-j, -1-j, 1+j, 1+j, -1-j, -1+j, -1-j, 1+j, -1-j, -1-j, 1+j, 1+j, -1-j, 1+j, -1+j,

1+j, 1+j, 1+j, -1-j, -1-j, 1-j, -1-j, 1-j, -1-j, -1+j, -1-j, -1-j, 1+j, 1+j, -1-j, -1+j, -1-j, 1+j, -1-j, -1-j,

0,1+j, 1+j, -1-j, 1+j, -1+j, 1+j, 1+j, 1+j, -1-j, -1-j, 1-j, -1-j, 1-j, 1+j, 1-j, 1+j, 1+j, -1-j, -1-j,

1+j, 1-j, 1+j, -1-j, 1+j, 1+j, -1-j, -1-j, 1+j, -1-j, 1-j, -1-j, -1-j, -1-j, 1+j, 1+j, -1+j, 1+j, 1-j, -1-j,

-1+j, -1-j, -1-j, 1+j, 1+j, -1-j, -1+j, -1-j, 1+j, -1-j, -1-j, -1-j, -1-j, 1+j, -1-j, 1-j, -1-j, -1-j, -1-j, 1+j,

1+j, -1+j, 1+j, -1+j, 1+j, 1-j, 1+j, 1+j, -1-j, -1-j, 1+j, 1-j, 1+j, -1-j, 1+j, 1+j, 1+j, 1+j, -1-j, 1+j,

-1+j, 1+j, 1+j, 1+j, -1-j, -1-j, 1-j, -1-j, -1-j, -1-j, -1+j, -1-j, -1-j, 1+j, 1+j, -1-j, -1+j, -1-j, 1+j, -1-j,

-1-j}

3. MAP support

The recommendation is to support a per-burst preamble on the DL, 16 subchannels on the UL and indicate using the subchannelization_IE the number of bytes used in the UL-MAP and the number of OFDM symbols allocated in the UL subframe for subchannelization..

8.4.5.2 DL-MAP Information Element Format

[[B1] 7.2, Table 20 and the definition of preamble present, replace [B2] 8.4.5.2 Table 116au and insert definition of preamble present underneath.]

DL-MAP Information Elements shall have the format shown in 116au.

Table 116au—OFDM DL-MAP Information Element Format

Syntax	Size	Notes
DL-MAP_information_element() {		
DIUC	4 bits	
if (DIUC == 15)		
Extended DIUC dependent IE	variable	Report_IE() or AAS_DL_IE() or STC_IE()
else		
{		
Preamble present	1 bit	0 = not present, 1 = present
Start Time	11 bits	
}		
}		

Downlink Interval Usage Code

A four-bit Downlink Interval Usage Code (DIUC) shall be used to define the burst type associated with that time interval. Burst Descriptor shall be included into DCD Message for each DIUC used in the DL-MAP except those associated with Gap, End of Map and Extended. The DIUC shall be one of the values defined in Table Error! Bookmark not defined.

Preamble present

If set, the indicated burst shall start with the short preamble.

Start Time

Indicates the start time, in units of symbol duration, relative to the allocation start time defined by the Allocation_Start_Time field in the DL-MAP PHY synchronization. The end of the last allocated burst is indicated by allocating a NULL burst (DIUC = 14) with zero duration. The time instants indicated by the Start Time values are the transmission times of the first symbol of the burst including preamble.

8.4.5.3 UL-MAP Information Element Format

[[B1] 7.3, Table 25 and the definition of subchannel index, replace [B2] 8.4.5.3 Table 116az and insert definition of subchannel index underneath.]

The UL-MAP Information Element defines the physical parameters and the start time for UL PHY bursts. The format of UL-MAP elements is shown in 116ax.

Appearance of the Extended UIUC, means that the UL-MAP information element contains an additional byte with UIUC sub-code immediately following the UIUC plus the value of the corresponding parameter.

When sub-channelization is active (see 8.4.5.3.5), UIUC's 1 and 3 shall not be used.

Table 116ax—OFDM UL-MAP Information Element Format

Syntax	Size	Notes
UL-MAP_information_element() {		
CID	16 bits	
UIUC	4 bits	
if (UIUC == 4)		
Focused_contention_IE()	16 bits	
if (UIUC == 15)		
Extended UIUC dependent IE	variable	Power_Control_IE() or AAS_UL_IE() or Subchannelization_IE()
else if (subchannelization) {		
Start Time	11 bits	in OFDM symbols
Subchannel Index	5 bits	
Reserved	2 bits	
Midamble Present	2 bits	0b00: No Midamble 0b01: Midamble after every 8 data symbols 0b10: Midamble after every 16 data symbols 0b11: Midamble after every 32 data symbols
Duration	8 bits	in OFDM symbols
} else		
Duration	12 bits	in OFDM symbols
}		

Connection Identifier (CID)

Represents the assignment of the IE to a unicast, multicast, or broadcast address. When specifically addressed to allocate a bandwidth grant, the CID shall be the Basic CID of the SS.

Uplink Interval Usage Code (UIUC)

Shall be used to define the type of uplink access and the burst type associated with that access. A Burst Descriptor shall be included into an UCD message for each Uplink Interval Usage Code that is to be used in the UL-MAP. The UIUC shall be one of the values defined in Table 116ba.

Duration

Indicates the length, in units of OFDM symbols, of the allocation. The start time of the first allocation shall be the Allocation Start Time given in the UL-MAP message. The last allocated burst shall be indicated by allocating a NULL burst (CID = 0 and UIUC = 14) with zero duration.

Subchannel Index

See Table 116ac.

Midamble Present

Indicates the preamble repetition interval in OFDM symbols.

8.4.5.3.2 UL-MAP Focused Contention IE Format

[[B1] 7.3.2, replace [B2] 8.4.5.3.2 Table 116az., remove "Duration" description in text.]

Table 116az—OFDM Focused Contention Information Element Format

Syntax	Size	Notes
Focused_Contention_IE() {		
Transmit Opportunity Index	6 bits	
Contention Channel Index	6 bits	
Contention Code Index	4 bits	
}		

8.4.5.3.5 UL-MAP Subchannelization Information Element Format

[[B1] 7.3.5, replace [B2] 8.4.5.3.5.]

Within a frame, the BS may allocate a portion of the UL allocations to sub-channelized traffic.

The UL Subchannelization_IE implicitly indicates the start of the allocation and explicitly indicates the Duration and the Length of allocations.

Table 116bc—OFDM Subchannelization Information Element Format

Syntax	Size	Notes
subchannelization_information_element() {		
extended UIUC	4 bits	subchannelization = 0x03
Duration	12 bits	
Length of allocations	12 bits	
}		

Duration
Cumulative duration of the allocations in the UL sub-frame in OFDM symbols.

Length of allocations
The number of bytes, following the subchannelization_IE, that are used to define subchannelized allocations. A SS not capable of using subchannelization may skip interpreting this number of bytes in the UL-MAP.

A SS capable of sub-channelization shall decode the sub-channelized allocations following the subchannelization_IE.

4. Initial ranging

Initial ranging using subchannelization takes place in the same slot as that for mandatory mode initial ranging. However, instead of sending an RNG-REQ, the SS only sends the preamble defined for the single subchannel transmission on one random subchannel, allowing the BS to detect the energy and to respond as if an unrecoverable ranging message was received.

8.4.6.2 Ranging

[[B1] 8.2, last 4 paragraphs, add at end of [B2] 8.4.5.2.]

SSs which compute their $P_{TX\_IR\_max}$ to exceed their maximum power level and SSs which have attempted initial ranging with the maximum power level using RNG-REQ may, if the BS supports sub-channelization, attempt initial ranging in an initial ranging slot using the following burst format:

The SS shall transmit the long preamble as defined in 8.4.3.6. This shall be followed by one OFDM symbol, containing random data, on a single randomly selected subchannel.

The BS need only detect that energy is sent on a single subchannel and may respond by allocating a single subchannel identifying the SS by the Transmit Opportunity and Frame Number in which the transmission was received.

A SS attempting subchannelized initial ranging shall use its maximum power setting for the initial ranging burst

5. Other changes

[Correct [B2], figure 128aq to move pilot from -84 to -88]

6. Bibliography

[B1] dTS 102 177 v0.0.7; Broadband Radio Access Networks (BRAN); HIPERMAN; Physical (PHY) Layer

[B2] IEEE Std 802.16a-2003 IEEE Standard for Local and metropolitan area networks; Part 16: Air Interface for Fixed Broadband Wireless Access Systems— Amendment 2: Medium Access Control Modifications and Additional Physical Layer Specifications for 2–11 GHz