

Clause 45 changes for US Superframe

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Parameter Summary

Durations

D_{Cu} - US cyclic Prefix duration (us)
= {1.25, 1.875, 2.5, 3.125, 3.75 us}

D_{Su} - US Symbol duration including CP (us)
= 20us + D_{Cu}

D_{RB} - Resource Block duration (us)
= $N_{RB} * D_{Su} = \{8, 12, 16\} * D_{Su}$

D_P - Probe duration (us)
= $N_P * D_{Su} = \{2, 3, 4, ?\} * D_{Su}$

D_{PLU} - US PHY Link Frame duration (us)
= $D_{SF} - D_P$

D_{SF} - Superframe duration (us)
= $N_{SF} * D_{RB} + D_P$

D_{PD} - PHY Discovery response duration (us)
= 32 * D_{Su} (fixed in standard)

D_{PDW} - PHY Discovery Window duration (us)
= $N_{PDW} * D_{RB}$

D_{FR} - Fine Ranging duration (us)
= 8 * D_{Su} (fixed in standard?)

Spectrums

S_{Ou} - US OFDM spectrum (Resource Elements)

S_{RB} - Resource Block spectrum (kHz)
= 50kHz * {1, 4, or 8}

S_{PLU} - US PHY Link (kHz)
= $N_{PLU} * S_{RB}$ (see details)

S_{PD} - PHY Discovery response spectrum (kHz)
= (32?) * 50 kHz (fixed in standard?)

S_{PDG} - PHY Discovery Window Guardband spectrum (kHz)
= TBD * 50 kHz (fixed in standard)

S_{FR} - Fine Ranging spectrum (kHz)
= 128 * 50 kHz (fixed in standard)

S_{FRG} - Fine Ranging Guardband spectrum (RB)
= TBD * 50 (fixed in standard)

Volumes

$V_{PLU} = (D_{SF} - D_P) * S_{PLU} \approx V_{FR} \approx V_{PDW}/2$
(if straddling Probe)

$V_{PD} = D_{PD} * S_{PD}$

Constants

Symbol duration (D_B) = 20us

Subcarrier spectrum
= 50 kHz

PHY Discovery response duration
= TBD (32?) symbols

PHY Discovery response spectrum (N_{PDS})
= TBD (32?) Subcarriers

Fine Ranging duration (Sym)
= 8 symbols

Fine Ranging spectrum (N_{FRS})
= 128 Subcarriers = 6400 kHz

TBD

S_{PDG} – PHY Discovery Window Guardband spectrum (kHz)
= TBD * 50 kHz (fixed in standard)

S_{FRG} – Fine Ranging Guardband spectrum (RB)
= TBD * 50 (fixed in standard)

DRR > update if $D_{FR} = D_{DR}$

CI 45 additions needed

Resource Block definitions

Resource Block duration [1.19bb.7:8]

the number of symbols in a resource block (N_{RBD}), also the number of symbols in an OFDMA frame and the length of the US Time interleaver
enum {8, 12, 16}

Resource Block spectrum [1.19bb.9:10];

the number of subcarriers in a Resource block (N_{RBS})
enum {1, 4, or 8}

Probe definitions

Probe duration [1.19bb.11:12];

the number of symbols in a Probe (N_p)
enum {2, 3, 4, ?}

Superframe definitions

Superframe duration [TBD] (N_{SF});

the number of OFDMA frames in a Superframe
4b integer (?)
constraint: $\min \leq (N_{SF} * N_{RBD} + 2) \leq \max$ (sym)

US PHY Link, PHY Discovery & Fine Ranging definitions

US PHY Link spectrum [1.19ff.12:15] ($NPLu$);

the number of resource blocks in the US PHY Link spectrum range
4b integer (?)

constraint: $\min \leq (NPLu * N_{RBS}) \leq \max$ (SC)

PHY Discovery starting subcarrier [1.19gh.11:0];

starting sub-carrier for the PHY Discovery response signal from 0 to 4095 in steps of 1 Sub-carriers
12b integer

Fine Ranging starting subcarrier [1.19xx.11:0];

starting sub-carrier for the Fine Ranging response signal from 0 to 4095 in steps of 1 Sub-carriers
12b integer

TBD

S_{PD} – PHY Discovery response spectrum (kHz)

= $32 * 50$ kHz (fixed in standard?)

S_{PDG} – PHY Discovery Window Guardband spectrum (kHz)

= TBD * 50 kHz (fixed in standard)

S_{FRG} – Fine Ranging Guardband spectrum (RB)

= TBD * 50 (fixed in standard)

CI 45 modifications needed

45.2.a.115.1 PHY Discovery duration [1.19gh.15:13]

Current:; The PHY Discovery duration bits 1.19gg.15:13 are used to set the duration, in PHY Link frames, of the next PHY Discovery window.

Proposed: The PHY Discovery **Window** duration bits **1.19gh.15:12** are used to set the duration, in **OFDMA** frames, of the next PHY Discovery window.

(N_{PDW})

this equates to a max RTT of 2,550 us at D_{Su} of 21.25 us

45.2.a.115.2 PHY Discovery **Window** start [1.19gg.15:0]

Current: The PHY Discovery start bits 1.19gg.12:0 determine when the next PHY Discovery window is opened relative to the local PHY Link frame counter

Proposed: The PHY Discovery **Window** start bits **1.19gg.15:0** determine when the next PHY Discovery window is opened relative to the **Timestamp**

Note: existing CNU's are not allowed to transmit in a resource block overlapping the PHY Discovery Window spectrum that would be transmitted coincident with this timestamp. New CNU's are not permitted to transmit before this timestamp (see 102.4)

Resource Block register definition (proposed)

- Resource Block duration

- the number of symbols in Resource Blocks

- 2 b field

x x

1 1 = reserved

1 0 = 16 symbols per resource block

0 1 = 12 symbols per resource block

0 0 = 8 symbols per resource block

- RW

- Part of US OFDM desc. .
(Reg 19bb)

- Resource Block spectrum

- the number of subcarriers in Resource Blocks

- 2b field

x x

1 1 = reserved

1 0 = 8 subcarriers per resource block

0 1 = 4 subcarriers per resource block

0 0 = 1 subcarrier per resource block

- RW

- Part of US OFDM desc.
(Reg 19bb)

Other registers to think about

- Burst Marker in use
 - Enum List
 - Part of profile definition
- US/DS Signal Quality (MER?)
 - Per SC?, Pilot?, RB?
 - Units/range of parameter?
- Probe control
 - Some parameters defined in baseline text, nothing in CL 45
- RF On/Off time?
- US/DS errored FEC Frames (CRC errors)
 - Data path & PHY Link
- US/DS error free FEC Frames
 - Data path & PHY Link
- US/DS Symbol count?
- Other???
 - CLT/CNU Rx Equalize Coefficients?
 - Trigger mechanism?

Questions?

Comments?

THANK YOU

Motion

Adopt Clause 45 additions and changes described in remein_3bn_06_0514.pdf Slides 4-5 necessary to accommodate the upstream Superframe and incorporate in the draft.

Moved: Duane Remein

Second:

For:

Against:

Abstain:

Motion is Technical ($\geq 75\%$) Procedural ($> 50\%$)

Motion Passed/Failed

BACKUP, OLD & DEAD SLIDES