Text proposal for repetitive pilot pattern definition in US EPoC

Background

In TD#135 we agree to "Adopt Burst rules in slide 5 and Pilots rules in slide 6 and Pilot Type definition in slide 4 of kliger_3bn_02b_0714.pdf". Included in this concept was the idea of a repetitive pilot pattern for Type 1 and Type 2 pilots but no formal definition was proposed. This proposal addresses the topic of repetitive pilot pattern definition in the standard.

Proposed new text

Change the text of 101.4.3.7 as shown below (using MS mark-up)

101.4.3.7 Pilot ~~and Burst Marker~~ patterns

Resource Block may be any one of three types as illustrated in Figure 101–23. Type 0 Resource Blocks contain only data resource elements modulated per the 10GPASS-XR US profile descriptor control (see 45.2.7a.2), Type 1 Resource Blocks contain two pilots in the first and second resource element transmitted. Type 3 Resource Blocks contain a Low Density Pilot, in the last and third from last resource elements transmitted, in addition to the two pilots of the type 1 Resource Block. Low Density Pilots contain data but at a bit loading lower than the resource element would normally use. The Low Density Pilot resource element is modulated using either BPSK or 4 bits lower than normal, or which-ever is higher. Each RB type is configured via the ~~TBD parameters (see Cl45Ref)~~ variables Type1_StartSC, Type1_Repeat, Type2_StartSC, and Type2_Repeat as described below. The~~is~~ configuration of these variables determines the upstream transmission pilot pattern that all CNUs in the network use. however the pattern is defined over the entire 4095 subcarrier range with subcarrier 0 being the first subcarrier and subcarrier 4095 being the last subcarrier in the range. Excluded subcarrier settings override the pilot pattern definition, and Type 2 pilot definitions override Type 1 definitions. See section 101.4.3.3 for additional rule on Pilot Type usage in burst transmissions.

The TypeN_StartSC variable determines on which subcarrier the repeating pattern for Type N pilot starts and the TypeN_Repeat variable determine how often the Type N pilot pattern repeats. US_ModTypeSCn excluded subcarriers override the repetitive pilot pattern and the Type 2 Pilot pattern overrides the Type 1 Pilot pattern.

For example take an OFDMA channel with 240 active subcarriers where subcarrier 1003 is the first active subcarrier and subcarrier 1243 is the last active subcarrier and all other subcarriers are excluded. If Type1_StartSC = 8, Type1_Repeat = 10, Type2_StartSC = 15 and Type2_Repeat = 17 then the first Type 1 Pilot due to the pattern definition occurs on subcarrier 1008. The first Type 2 Pilot due to the pattern definition occurs on subcarrier 1018; because the Type 2 pattern overrides the Type 1 pattern.

Should a table of PMA/PMD to MDIO register mapping be included in the draft the following is suggested as the table format and initial content.

MDIO parameter name	PMA/PMD register name	Register/bit number	PMA/PMD variable		
			Name	Index	Bit(s)
Type 1 Repeat	US OFDMA pilot pattern	1.19xx.10:5	Type1_Repeat	tbd	10:5
Type 1 Start	US OFDMA pilot pattern	1.19xx.4:0	Type1_Start	tbd	4:0
Type 2 Repeat	US OFDMA pilot pattern	1.19y.14:12	Type2_Repeat	tbd	10:5
Type 2 Start	US OFDMA pilot pattern	1.19xy.11:7	Type2_Start	tbd	4:0

Add the following registers to Clause 45 (location and register number at editor's discretion although following sections 45.2.1.110 "10GPASS-XR US OFDM control" and 45.2.1.111 "10GPASS-XR US OFDM channel center frequency" might be a good location if subsequent registers were renumbered).

45.2.1.xxx US OFDMA pilot pattern registers (Register 1.19xx and 1.19xy)

The assignment of bits in the US OFDMA pilot pattern registers are shown in Table 45-78x. For additional information on the use of the parameters in this register see 101.4.3.7.

Table 148-78x US OFDMA pilot pattern registers bit definitions

Bits(s)	Name	Description	R/W[a]
1.19xx.15:11	Reserved	Ignore on read	RO
1.19xx.10:5	Type 1 Repeat	Indicates the number of subcarriers between Type 1 Pilots	R/W
1.19xx.4:0	Type 1 Start	Indicates the number of subcarrier on which the Type 1 Pilot pattern starts	R/W
1.19xy.15:11	Reserved	Ignore on read	RO
1.19xy.10:5	Type 2 Repeat	Indicates the number of subcarriers between Type 2 Pilots	R/W
1.19xy.4:0	Type 2 Start	Indicates the number of subcarrier on which the Type 2 Pilot pattern starts	R/W

[a]RO = Read only, R/W = Read/Write

45.2.1.xxx.1 Type 1 Repeat (1.19xx.10:5)

Register bits 1.19xx.10 through 1.19xx.5 indicate the number, as a binary integer between 1 and 31, of subcarriers between repeating Type 1 Pilots. The Type 1 Repeat parameter cannot be zero, whereas a value of 1 would indicate that all subcarrier would be Type 1 Pilots unless otherwise specified via the 10GPASS-XR US profile descriptor (see 45.2.7a.2).

45.2.1.xxx.2 Type 1 Start (1.19xx.4:0)

Register bits 1.19xx.4 through 1.19xx.0 indicate the number, as a binary integer between 0 and 31, of the first subcarrier designated as a Type 1 Pilot.

45.2.1.xxx.3 Type 2 Repeat (1.19xy.10:5)

Register bits 1.19xy.10 through 1.19xy.5 indicate the number, as a binary integer between 1 and 31, of subcarriers between repeating Type 2 Pilots. The Type 2 Repeat parameter cannot be zero, whereas a

value of 1 would indicate that all subcarrier would be Type 2 Pilots unless otherwise specified via the 10GPASS-XR US profile descriptor (see 45.2.7a.2).

45.2.1.xxx.4 Type 2 Start (1.19xy.4:0)

Register bits 1.19xy.4 through 1.19xy.0 indicate the number, as a binary integer between 0 and 31, of the first subcarrier designated as a Type 2 Pilot.