# **[100b-e-NR-5G\_V2X\_NRSL-SL\_PHY\_Procedure-01] Handling TX and RX of multiple PSFCHs**

[100b-e-NR-5G\_V2X\_NRSL-PHY-Procedure-01] Email discussion/approval regarding handling TX and RX of multiple PSFCHs

* PSD of each PSFCH when transmitting multiple PSFCH TX
* Prioritization between TX and RX when the UE is required to TX/RX multiple PSFCH

till 4/23, with potential TPs by 4/28 (Hanbyul, LGE)

**1. PSD of each PSFCH when transmitting multiple PSFCH TX**

Assumption: The UE supports up to Nmax simultaneous PSFCH transmissions in a PSFCH TX occasion, and Nreq PSFCH transmissions are requested for the UE in a given PSFCH TX occasion. The UE selects N PSFCH transmissions for the actual PSFCH transmission.

Q1: How does the UE determine N for the following cases?

Q1-1: Nreq<=Nmax and TX power limit is not reached (i.e., the sum of Nreq PSFCH transmissions power before applying the upper limit does not exceed Pc,max)

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| Company | Answer |
| NTT DOCOMO | N = Nreq.In case that TX power limit is not reached, the UE should transmit PSFCHs as many as possible. |
| Apple | N=Nreq |
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Q1-2: Nreq<=Nmax and TX power limit is reached (i.e., the sum of Nreq PSFCH transmissions power before applying the upper limit exceeds Pc,max)

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| Company | Answer |
| NTT DOCOMO | N is up to UE implementation.If N = Nreq, power of each PSFCH transmission could be quite small. PSFCH transmission with higher priority is failed due to PSFCH transmission with lower priority. This means, a UE which supports larger Nmax has disadvantage from reliability perspective of PSFCH transmissions with higher priority. We believe that it is undesirable situation. |
| Apple | $N=\left⌊10^{\frac{P\_{CMAX}-P}{10}}\right⌋, $where P is the transmit power calculated with the existing formula in Section 16.2.3 of TS38.213, for a single PSFCH transmission.  |
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Q1-3: Nreq>Nmax and TX power limit is not reached (i.e., the sum of Nmax PSFCH transmissions power before applying the upper limit does not exceed Pc,max)

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| Company | Answer |
| NTT DOCOMO | N = Nmax.In case that TX power limit is not reached, the UE should transmit PSFCHs as many as possible. |
| Apple | N=Nmax |
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Q1-4: Nreq>Nmax and TX power limit is reached (i.e., the sum of Nmax PSFCH transmissions power before applying the upper limit exceeds Pc,max)

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| Company | Answer |
| NTT DOCOMO | N is up to UE implementation.If N = Nmax, power of each PSFCH transmission could be quite small. PSFCH transmission with higher priority is failed due to PSFCH transmission with lower priority. This means, a UE which supports larger Nmax has disadvantage from reliability perspective of PSFCH transmissions with higher priority. We believe that it is undesirable situation. |
| Apple | $N=\left⌊10^{\frac{P\_{CMAX}-P}{10}}\right⌋, $where P is the transmit power calculated with the existing formula in Section 16.2.3 of TS38.213, for a single PSFCH transmission. |
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Q2: Once N is determined by the answer to Q1, do you agree that the TX power of each PSFCH is given by the following modified equation (to replace the one in Section 16.2.3 of TS 38.213)?

$P\_{PSFCH,k}(i)=min\left(P\_{CMAX}-10log\_{10}\left(N\right),P\_{O,PSFCH}+10log\_{10}\left(2^{μ}\right)+α\_{PFSCH}⋅PL\right)$ [dBm]

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| Company | Answer |
| NTT DOCOMO | OK |
| Apple | We think each PSFCH transmit power is still given by the existing formula in Section 16.2.3 of TS38.213. No need to modify the equation. |
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**2. Prioritization between TX and RX when the UE is required to TX/RX multiple PSFCH**

Q3: Do you agree the following proposal to determine the priority of PSFCH TX and RX when the UE is required to transmit/receive multiple PSFCHs?

* Proposal:
	+ When the UE is required to transmit more than one PSFCH, the highest priority of the associated PSCCH/PSSCH is used for prioritization of the PSFCH transmission.
	+ When the UE is required to receive more than one PSFCH, the highest priority of the associated PSCCH/PSSCH is used for prioritization of the PSFCH reception.

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| Company | Answer |
| NTT DOCOMO | Direction is OK.One comment is, the proposal should be clarified that the assumed case is collision between PSFCH TX and PSFCH RX, where at least either TX or RX is more than one.Question is saying that, while proposal does not. We believe that other case does not use the above rule. |
| Apple | Agree |
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