```
tag_sublist_layer  THM

⊢  ∀E:TaggedEventStruct. tag_splitable(E;adR(E))
| by Unfolds ``tag_splitable R_ad`` 0
THEN Unfold `str_trace` 0

|    ...
THEN MoveToConcl 3 THEN MoveToConcl 2

|    THEN NatInd (-2) THEN RecUnfold `rel_exp` 0 THEN Reduce 0
|
|\
| 1. E : TaggedEventStruct
| 2. m : Label
| ⊢  ∀tr_1,tr_2:|E| List.
|    tr_1 = tr_2 ⇒
|    (<tr_1>_m ((delayableR(E) ∨ asyncR(E))^*) <tr_2>_m)
|   by ...
| THEN Auto
|
.\
. 1. E : TaggedEventStruct
. 2. m : Label
. 3. n : ℤ
. 4. 0<n
. 5. ∀tr_1,tr_2:|E| List.
. |  (tr_1 delayableR(E) ∨ asyncR(E)^n-1 tr_2) ⇒
. |  (<tr_1>_m ((delayableR(E) ∨ asyncR(E))^*) <tr_2>_m)
. ⊢  ∀tr_1,tr_2:|E| List.
. |  (tr_1
. |   if n=₂0→ λx,y. x = y
. |   else λx,y. ∃z:|E| List.
. |        (x (delayableR(E) ∨ asyncR(E)) z)
. |        & (z delayableR(E) ∨ asyncR(E)^n-1 y) fi tr_2)
. |  ⇒
. |  (<tr_1>_m ((delayableR(E) ∨ asyncR(E))^*) <tr_2>_m)
. | by SplitOnConclITE THEN Reduce 0 THEN Auto THEN ExRepD
.
. |    THEN InstLemma `rel_star_transitivity`
. [|E| List;
. |    delayableR(E) ∨ asyncR(E);<tr_1>_m;<z>_m;<tr_2>_m]
.
. |    THEN Try (Complete (Auto THEN EasyHyp))
. |
. .....antecedent .....
. 1. E : TaggedEventStruct
. 2. m : Label
. 3. n : ℤ
. 4. 0<n
. 5. ∀tr_1,tr_2:|E| List.
.    (tr_1 delayableR(E) ∨ asyncR(E)^n-1 tr_2) ⇒
.    (<tr_1>_m ((delayableR(E) ∨ asyncR(E))^*) <tr_2>_m)
. 6. ¬n = 0
. 7. tr_1 : |E| List
. 8. tr_2 : |E| List
```

```
. 9. z : |E| List
. 10. tr_1 (delayableR(E) ∨ asyncR(E)) z
. 11. z delayableR(E) ∨ asyncR(E)^n-1 tr_2
. ⊢  <tr_1>_m ((delayableR(E) ∨ asyncR(E))^*) <z>_m
.   by ...
. THEN Unfolds ``R_delayable R_async`` (-1) THEN Reduce (-1)
.
. THEN Using [`f`,λe.tag(E)(e) =₁ m]
.
.      (FwdThruLemma `filter_swap_adjacent` [(-1)] THENA Auto)
.
.      THEN All (Folds ``R_delayable R_async tag_sublist``)
.
.      THEN (SplitOrHyps
.
.           THENL [BackThruLemma `rel_rel_star` THEN Auto
.
.                  THEN Unfold `rel_or` 0 THEN Reduce 0 THEN SimpConcl
.
.            ;
.             HypSubst (-1) 0 THENA Auto
.
.                  THEN BackThruLemma `rel_star_weakening` THEN Auto
.
.                 ])
END
```