



BMW<sub>LAB</sub> OAI Project Team

# FAPI in LTE

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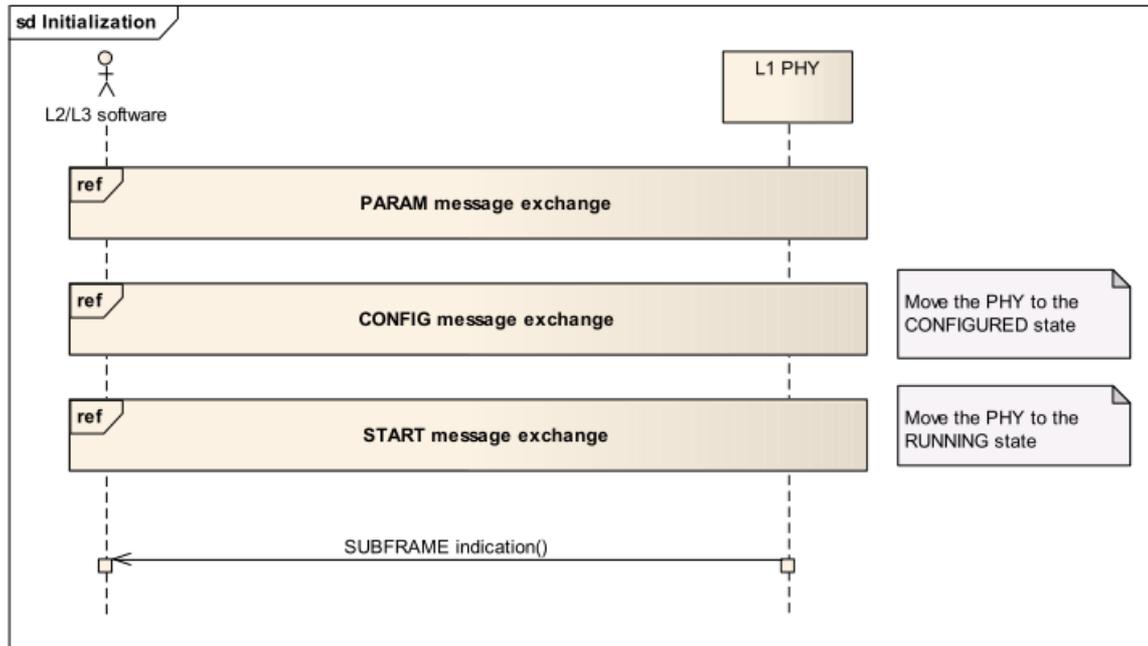


# Abbreviation

FAPI	Femto Application Platform Interface
nFAPI	Network femto application platform interface
VNF	Virtual Network Function
PNF	Physical Network Function

# Startup FAPI message order

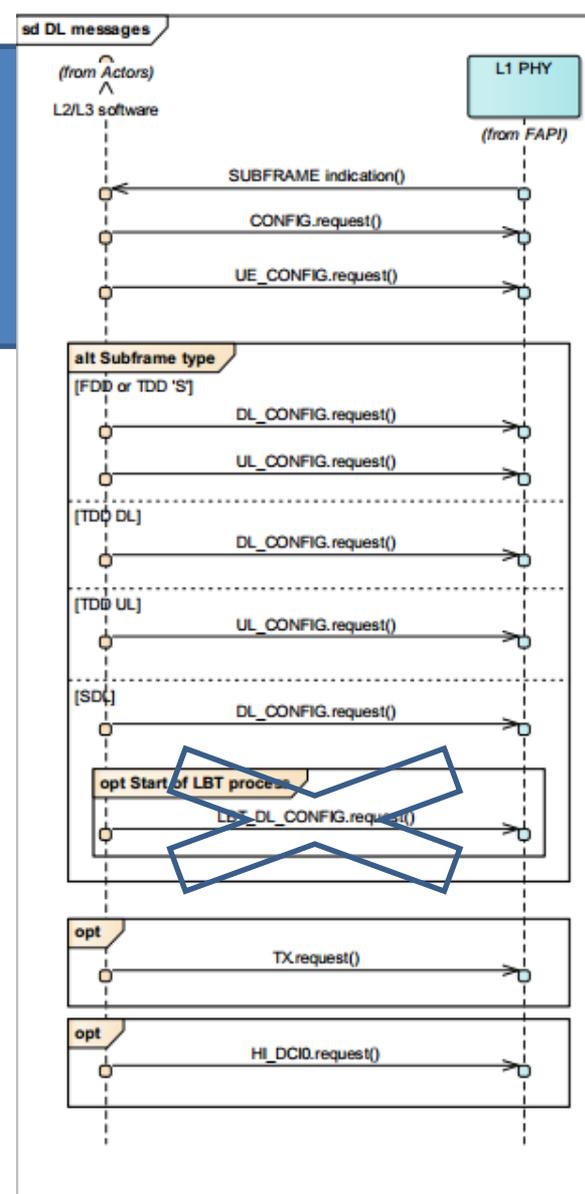
## ➔ LTE eNB L1 API Definition



- Between L2/L1, there are some functions like PNF, VNF for L2 to trigger/ configure L1.
- Control Route :  
L2->VNF->PNF->L1

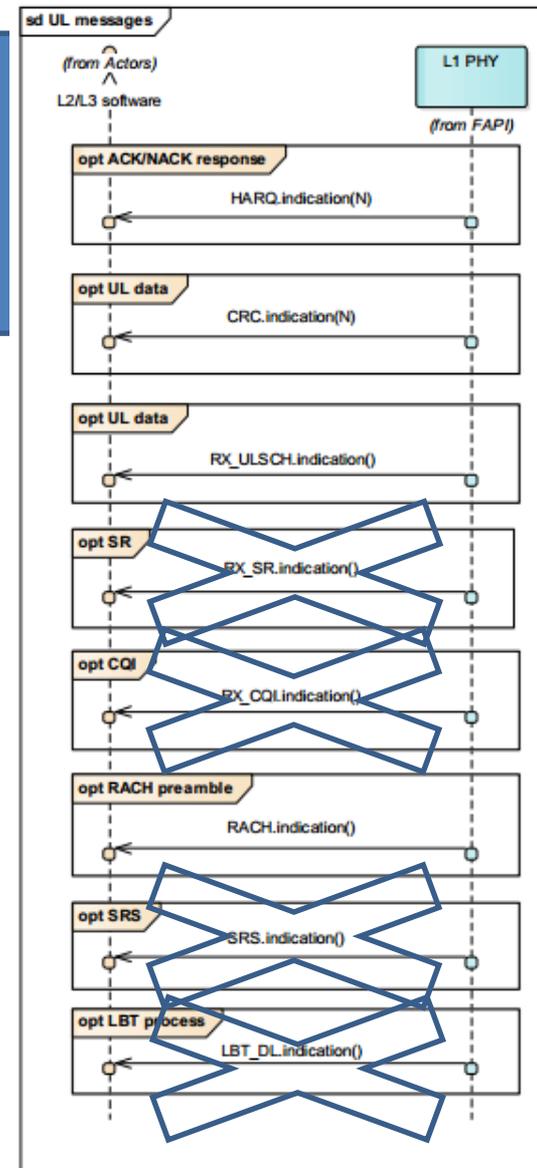
# DL FAPI message order

- ❑ The SFN/SF included in the SUBFRAME.indicationmessage is expected in the corresponding DL\_CONFIG.request
- ❑ The SFN/SF included in the SUBFRAME.indication message with the offset defined in the LAA config section of the CONFIG.request, is expected in the corresponding LBT\_DL\_CONFIG.request
- ❑ If the PHY is being reconfigured using the CONFIG.request message, this must be the first message for the subframe.
- ❑ If the PHY is being reconfigured using the UE\_CONFIG.requestmessage, this must be the next message for the subframe.
- ❑ The DL\_CONFIG.requestmust be sent for every downlink subframe and must be the next message.
- ❑ The UL\_CONFIG.requestmust be sent for every uplink subframe and must be the next message.
- ❑ The LBT\_DL\_CONFIG.request is optional and is not a requirement to be sent every subframe.
- ❑ The TX.requestand HI\_DCIO.requestmessages are optional. It is not a requirement that they are sent in every downlink subframe.
- ❑ There must be only 1 DL\_CONFIG.request, 1 UL\_CONFIG.request, 1 LBT\_DL\_CONFIG.request, 1 HI\_DCIO.request and 1 TX.request for a subframe.
- ❑ There must be only 1 LBT\_DL\_CONFIG.requestfor an LBT process (an LBT process may contain several subframes)

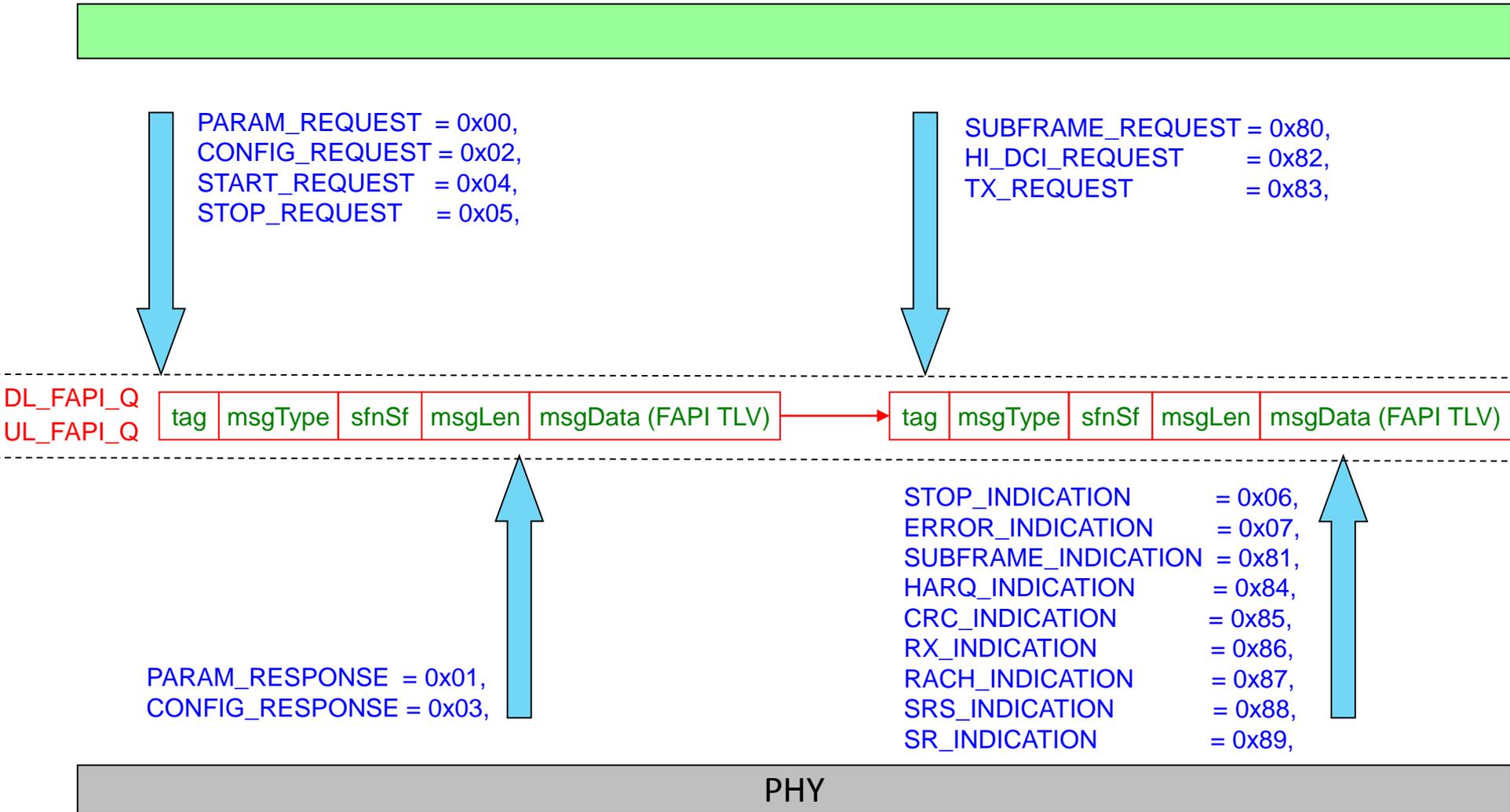


# UL FAPI message order

- ❑ The HARQ.indicationmessage is included if ACK/NACK responses were expected in the subframe.
- ❑ The CRC.indicationmessage is included if uplink data PDUs were expected in the subframe.
- ❑ The RX\_ULSCH.indicationmessage is included if uplink data PDUs were expected in the subframe.
- ❑ The RX\_SR.indicationmessage is included if SR PDUs were expected in the subframe.
- ❑ The RX\_CQI.indicationmessage is included if CQI were expected in the subframe.
- ❑ The RACH.indicationmessage is included if any RACH preambles were detected in the subframe
- ❑ The SRS.indicationmessage is included if any sounding reference symbol information is expected in the subframe.
- ❑ The LBT\_DL.indicationmessage is included during the subframes containing the LBT process.



# FAPI over IPC



# IPC & FAPI structure

- ➔ Interface with PHY via FAPI message
- ➔ FAPI exchanged between L2/L1 via Linux message queue

```
– struct{  
    Long tag; /*message type*/  
    uint8_t msgType; /*FAPI message id*/  
    uint16_t sfnsf; /*Frame Number*/  
    Uint32_t msgLen; /*FAPI length*/  
    Uint8_t msgData; /*FAPI TLV*/  
}
```

# NFAPI/OAI subframe processing

