WF on channel codes for NR eMBB data

AccelerComm, Ericsson, Orange, IMT, LG, NEC, Sony, LG Uplus

Based on the agreed observations

Observation: There is significant risk associated with the implementation of polar codes

Supported by:

- "Polar codes are implementable, although there are currently no commercial implementations, and in relation to NR, there are some concerns"
- "For decoding hardware that can achieve acceptable latency, performance and flexibility, there are some concerns about the area efficiency and energy efficiency that are achievable with polar codes"

Observation: Concerns have been raised about the implementation of flexible LDPC

Supported by:

- "For LDPC there are concerns that implementation with attractive area and energy efficiency may be challenging when simultaneously targeting the peak throughput and flexibility requirements of NR"
- "some other companies consider the applicable flexibility to be limited, for example because a flexible switched network (if used) has an impact on increasing the power, area and latency"

Based on the agreed observations

Observation: LDPC and turbo codes are complementary

Supported by:

- "LDPC codes are widely implemented in commercial hardware supporting several Gbps throughput and attractive area and energy efficiency with some flexibility, but with flexibility and features that are more limited than required for NR"

- "Turbo codes are widely implemented in commercial hardware, supporting HARQ and flexibility similar to what is required for NR, but not at the high data rates or low latencies required for NR"

- For LDPC codes, "The area efficiency reduces for lower coding rates"

- For turbo codes, "In some implementations suitable for lower throughputs, the area and energy efficiency is constant when varying the puncturing and repetition rate"

Observation: The combination of LDPC and turbo codes avoids the risks of polar codes and the concerns of LDPC-only

Proposal

– **Adopt LDPC code and turbo code, to mitigate the concerns associated with the implementation of flexible LDPC.**