eCPRI Transport Network Requirements Updates

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eCPRI Transport Network Requirements

- Preliminary draft 0.1 available on the 31st of August 2017
- First version 1.0 published 24-October 2017
- The updated version 1.1, published 31st of January 2018, make a few editorial updates primarily for clarity
- Main changes in Version 1.2, published 25th of June 2018:
  - Table 1 “Split E and splits I_D, II_D, I_U requirements” has its High CoS Maximum One-way Frame Delay Performance split into 4 Latency classes (http://www.ieee802.org/1/files/public/docs2018/cm-mustala-eCPRI-update-0718.pdf)
  - Table 2 “Timing accuracy requirement” has its “Typical Applications” column removed and contents moved to a new Table 3. Also, a few notes are updated
    - Note 6: reference to [13] 3GPP TS38.104 “NR; Base Station (BS) radio transmission and reception”, V15.1.0 added
    - Note 10: reference to [14] 3GPP TS38.133 “NR; Requirements for support of radio resource management”, V15.1.0 added
    - Note 10: reference for Dual Connectivity added

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One-way Packet Delay Requirements in 1.0

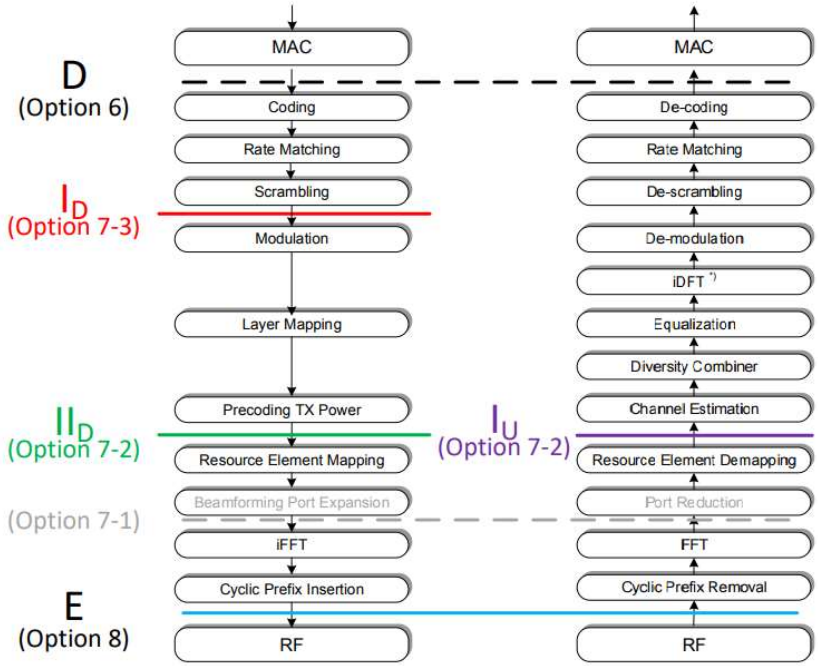
4.1. Per flow requirements

4.1.1. Split E and splits ID, IID, IU when running E-UTRA

Table 1 is applicable for the functional decompositions splits E and I_D, II_D, I_U as defined in [1].

Table 1 Split E and splits I_D, II_D, I_U requirements

CoS Name	Example use	One-way maximum packet delay	One-way Packet Loss Ratio
High	User Plane	100 µs	10^{-7}
Medium	User Plane (slow), C&M Plane (fast)	1 ms	10^{-7}
Low	C&M Plane	100 ms	10^{-6}



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One-way Frame Delay Requirements in 1.2

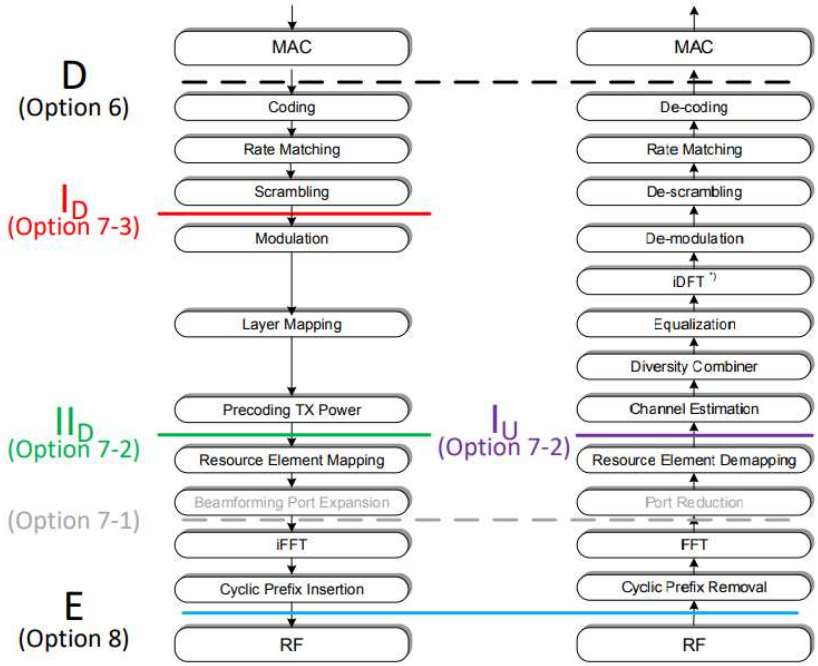
4.1. Per flow requirements

4.1.1. Split E and splits ID, IID, IU

Table 1 is applicable for the functional decompositions splits E and I_D, II_D, I_U as defined in [1].

Table 1 Split E and splits I_D, II_D, I_U requirements

CoS Name	Example use	Maximum One-way Frame Delay Performance (see section 2.3.1)	Maximum One-way Frame Loss Ratio Performance (see section 2.3.2)
High	User Plane (fast)	See Table 1.A	10^{-7}
Medium	User Plane (slow), C&M Plane (fast)	1 ms	10^{-7}
Low	C&M Plane	100 ms	10^{-6}



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One-way Frame Delay Requirements in 1.2
Table 1. Requirements for fast User Plane

To enable usage of Transport Networks with different characteristics (different number of switching hops, different length of fiber links, ...), four different latency classes for CoS 'High' are defined in Table 1A. The maximum one-way frame delay requirement value includes fiber propagation delay and switching delay (see section 2.3.1).

A Transport Network supplier needs either to comply with per data-flow requirements or to state which latency classes for data flows the Network supports for a given average bandwidth usage.

Table 1A Split E and splits Id, IId, Iu Latency classes for CoS 'High'

Latency Class	Maximum One-way Frame Delay Performance (see section 2.3.1)	Use case
High25	25 µs	Ultra-low latency performance
High100	100 µs	For full E-UTRA or NR performance
High200	200 µs	For installations where the lengths of fiber links are in the 40 km range
High500	500 µs	Large latency installations

For latency classes High25 and High100, a transport network delay budget larger than the one specified (thus a smaller delay budget for the eREC/eRE) may degrade the mobile network performance.

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eCPRI Timing Accuracy Requirements

- Version 1.2, published 25th of June 2018, made the following changes.
  - A new Table 3 “Timing accuracy category requirement for various 3GPP features and RANs” added

V1.0/1.1

Table 2 Timing accuracy requirement

Category (note 1)	Time error requirements at UNI, |TE|			Typical applications and time alignment error (TAE) requirements at antenna ports of eREs (for information)	
	Case 1 (note 2)		Case 2 (note 3)	Typical applications	TAE
	Case 1.1 (note 4)	Case 1.2 (note 5)			
A+	N.A.	N.A.	20 ns (relative)	MIMO or TX diversity transmissions, at each carrier frequency	65 ns (note 6)
A	N.A.	60 ns (relative) (note 7)	70 ns (relative)	Intra-band contiguous carrier aggregation, with or without MIMO or TX diversity	130 ns (note 6)
B	100ns (relative) (note 7)	190 ns (relative) (note 7)	200 ns (relative)	Intra-band non-contiguous carrier aggregation, with or without MIMO or TX diversity, and Inter-band carrier aggregation, with or without MIMO or TX diversity	260 ns (note 6)
C (note 8)	1100 ns (absolute) (note 9)		1100 ns (absolute) (note 9)	3GPP LTE TDD	3 us (note 10)

V1.2

Table 3 Timing accuracy category requirement for various 3GPP features and RANs

3GPP feature	RAN	
	LTE	NR
MIMO or TX-diversity transmission	Category A+	Category A+
Intra-band contiguous carrier aggregation	Category A	BS Type 1: Category B BS Type 2: Category A
Intra-band non-contiguous carrier aggregation	Category B	Category C
Inter-band carrier aggregation	Category B	Category C
TDD	Category C	Category C
Dual Connectivity	Category C	Category C
COMP	Not specified in 3GPP	Not ready in 3GPP
Supplementary Uplink	Not applicable for LTE	Not ready in 3GPP
In-band Spectrum Sharing	Not ready in 3GPP	Not ready in 3GPP
Positioning	Not specified in 3GPP	Not ready in 3GPP
MBSFN	Not specified in 3GPP	Not ready in 3GPP

Added features in Table 3

  - Version number on References [7] 3GPP TS36.104 and [8] 3GPP TS36.133 added

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Thank you.