**SA WG2 Meeting #154-AH-eS2-221**

**January 16th – 20th, 2023, Electronic** (revision of S2-221XXXX)

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.501** | **CR** |  | **rev** | **-** | **Current version:** | **17.6.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | 5GC Support for low round-trip latency for XR/media traffic | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | **DUMMY** | | | | |  | ***Date:*** | | | 2022-11-1 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | This CR aims at specifying 5GC Support to meet the very low Round-Trip latency requirement with the variable and unbalanced uplink/downlink latency overhead.  Adds general clause to introduce XRM | | | | | | | | |
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| ***Summary of change:*** | | The PCF shall have preconfigured RT latency or RT latency requirements can be provided by AF. The PCF shall provision UL/DL PDB and UL/DL QoS monitoring policies for UL and DL flows by splitting RT latency.  QoS monitoring shall be used to re-adjust the PDBs to meet RT latency | | | | | | | | |
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| ***Consequences if not approved:*** | | No support for meeting round-trip latency in XRM, as concluded in TR 23.700-60, clause 8.6 | | | | | | | | |
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| ***Clauses affected:*** | | 5.37 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.503 CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*FIRST CHANGE*

## 5.37 Support for high data rate low latency services

### 5.37.1 General

This clause provides an overview of 5GS optimizations and functionality for support of interactive services that require high data rate and low latency communication, e.g. cloud gaming, AR/VR/XR services, and tactile/multi-modal communication services according to service requirements described in TS 22.261 [2].

Standardized 5QI characteristics for such services are provided in Table 5.7.4-1 and TSCAI can be used to describe the related traffic characteristics as defined in clause 5.27.2.

The following features described in 5.37 can be used independently or in combination to enhance 5G System support for interactive services that require high data rate and low latency communication services:

* Support of policy enhancement for coordinated transmission for multi-modality flows
* Network information exposure for XR/media enhancment
* Support of PDU Set handling
* Support of uplink-downlink transmission coordination to meet RTT (Round-Trip Time)
* Policy enhancement for jitter minimization
* 5GS enhancements to UE power saving for XR services

### 5.37.X Support of uplink-downlink transmission coordination to meet RTT (Round-Trip Time)

Real-time interaction using XR/media services requires very low Round-Trip latency. The 5G System can coordinate between uplink and downlink transmission delay to meet RTT latency. The RT (Round-Trip) delay requirement is the requested RT delay between UE and N6 termination point at the UPF. The RT delay requirement indicates the application flow needs to meet the RT delay overhead to not exceed the RT delay requirement. The RT delay requirement can be preconfigured in PCF or provided by the AF. The AF provides the RT delay requirement to the PCF during the AF session with the required QoS procedure.

The following aspects shall apply to service requirements for RTT latency management based on uplink-downlink transmission delay:

* The AF can provide a RT latency indication together with one of the service requirements using the QoS Reference parameter or individual QoS parameter (as defined in clause 6.1.3.22 of TS 23.503 [45]). The RT latency indication indicates the application flow needs to meet the RT delay overhead that doesn't exceed the doubling of the one way delay requirement expressed by the QoS Reference parameter or individual QoS parameter.

- Based on the RT latency requirement, the PCF shall split the RT latency into a UL PDB and a DL PDB. The UL PDB and DL PDB can be unequal but their sum shall not exceed the RT latency.

NOTE 1: The split ratio between UL PDB and DL PDB is up to the implementation and operator environment. Deployment needs to consider the unevenness of UL and DL delay overhead in the network.

- The PCF shall generate two PCC rules for the application flow, one for the UL and one for the DL direction and assigns the 5QIs according to derived PDBs respectively.

- The two PCC rules can also have associated QoS monitoring policies to enable RT latency tracking (as defined in clause 6.1.3.21 of TS 23.503 [45]). This enables the UL/DL PDB to be tracked independently.

- The RT latency can be tracked by monitoring the UL delay for UL QoS flow and DL delay for DL QoS Flow respectively. The QoS monitoring methods are defined in clause 5.33.3. Based on the QoS monitoring result, the PCF can adjust the UL PDB or DL PDB or both UL and DL PDB to meet RT latency.

*END OF CHANGES*