**3GPP TSG-SA1 Meeting #99e *S1-222130r1-samsung***

**Electronic Meeting,** **22 August – 01 September 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **22.261** | **CR** | **0638** | **Rev** | **2** | **Current version:** | **18.6.1** |  |
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| *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:*** | Interworking of Non-3GPP NTN (Satellite access network) with 5GS Multicast Broadcast Services | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Saankhya Labs, IIT Bombay, Prasar Bharati, Bharat Sanchar Nigam Limited (BSNL), Ligado Networks, One Media 3.0, Fraunhofer IIS, CEWiT, Tejas Networks, IIT Kanpur, IIT Madras, IIT Hyderabad, IIT Kharagpur, Reliance Jio, Lockheed Martin Corporation, IDRBT, IIT Bhilai, IIT Mandi | | | | | | | | | |
| ***Source to TSG:*** | S1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | Sat4MBS | | | | |  | ***Date:*** | | | 2022-08-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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)*  *Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | TS 22.261 highlights the need for a flexible and dynamic allocation of radio resources between unicast and multicast services within the 5GS as well as support for a stand-alone deployment of multicast/broadcast network due to “the proliferation of video services, ad-hoc multicast/broadcast streams, software delivery over wireless, group communications and broadcast multicast IoT applications.”  TS 22.261 also specifies that the 5GS shall support the delivery of multicast broadcast services (MBS) to UEs via satellite access networks. While TS 22.261 mentions the usage of a 5G satellite access network for multicast broadcast services, it does not specify if non-3GPP satellite access can interwork with 5GS multicast broadcast services .  Interworking of non-3GPP satellite access with 5GS for multicast broadcast services appears quite promising as there might be many different types of non-3GPP satellite access, both legacy and new such as, OneWeb, Telesat, Starlink, and Amazon’s Kuiper, etc. which could be used for this purpose. Therefore, it is proposed that the interworking of non-3GPP satellite access network with 5GS multicast broadcast services be supported. | | | | | | | | |
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| ***Summary of change:*** | | Stage 1 specification to be updated to specify the interworking requirement for non-3GPP satellite access network (NTN) with 5GS for multicast broadcast services. | | | | | | | | |
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| ***Consequences if not approved:*** | | It may not be possible to interwork with legacy and new non-3GPP satellite access networks to support 5G multicast/broadcast services. | | | | | | | | |
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| ***Clauses affected:*** | | 6.13.2 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | S1-220167 - submitted in meeting SA1#97e  S1-221024 - submitted in meeting SA1#98e | | | | | | | | |

### 6.13.2 Requirements

The following set of requirements complement the requirements listed in 3GPP TS 22.146 [7], TS 22.246 [8] and TS 22.101 [6], clause 32.

The 5G system shall support operation of downlink only broadcast/multicast over a specific geographic area (e.g. a cell sector, a cell or a group of cells).

The 5G system shall support operation of a downlink only broadcast/multicast system over a wide geographic area in a spectrally efficient manner for stationary and mobile UEs.

The 5G system shall enable the operator to reserve 0% to 100% of radio resources of one or more radio carriers for the delivery of broadcast/multicast content.

The 5G network shall allow the UE to receive content via a broadcast/multicast radio carrier while a concurrent data session is ongoing over another radio carrier.

The 5G system shall be able to support broadcast/multicast of UHD streaming video (e.g. 4K/8K UHD).

NOTE 1: Taking into account the bandwidth needs for different streaming video resolution.

The 5G network shall allow the operator to configure and broadcast multiple quality levels (i.e. video resolutions) of broadcast/multicast content for the same user service in a stand-alone 3GPP based broadcast/multicast system.

The 5G network shall support parallel transfer of multiple quality levels (i.e. video resolutions) of broadcast/multicast content for the same user service to the same UE taking into account e.g. UE capability, radio characteristics, application information.

The 5G system shall support parallel transfer of multiple multicast/broadcast user services to a UE.

The 5G system shall support a stand-alone multicast/broadcast network comprising of multiple cells with inter-site distances of up to 200 km.

The 5G system shall support multicast/broadcast via a 5G satellite access network, or via a combination of a 5G satellite access network and other 5G access networks.

The 5G system shall support interworking of 5G multicast/broadcast with non-3GPP satellite access and shall support interworking of 5G multicast/broadcast with non-3GPP satellite access networks. ~~or via a combination of a non-3GPP satellite access network and other 5G access networks.~~

NOTE: This requirement assumes no impact to the non-3GPP DTT standard, as the non-3GPP DTT standard is out of scope of 3GPP standardization.

The 5G system shall be able to setup or modify a broadcast/multicast service area within [1s].

NOTE 2: For MCPTT related KPIs see 3GPP TS 22.179 [30], clause 6.15.

The 5G system shall be able to apply QoS, priority and pre-emption to a broadcast/multicast service area.

The 5G system shall support downlink parallel transfer of the same content, via broadcast/multicast and/or unicast, such that all receiver group members in a given area receive the media at the same time according to user perception.

NOTE 3: In this context user perception refers to a difference in delay of typically less than 20 ms.

The 5G system shall support a mechanism to inform a media source of relevant changes in conditions in the system (e.g. capacity, failures).

The 5G system shall provide means for a media source to provide QoS requirement requests to the broadcast/multicast service.

The 5G system shall provide means for the broadcast/multicast service to inform the media source of the available QoS, including modification of available QoS characteristics and availability of the broadcast/multicast service.

The 5G system shall be able to support broadcast/multicast of voice, data and video group communication, allowing at least 800 concurrently operating groups per geographic area.

NOTE 4: In this context "concurrently operating groups" means that the associated media streams are delivered concurrently.

The 5G system shall support delivery of the same UE-originated data in a resource-efficient manner in terms of service bit rate to UEs distributed over a large geographical area.

The 5G system shall allow a UE to request a communication service to simultaneously send data to different groups of UEs at the same time.

The 5G system shall allow different QoS policy for each group the UE communicates with.