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Title: Use Case on supplementary downlink data via a second 3GPP network

Agenda Item: 7.9 FS\_DualSteer

Source: Thales, Lockheed Martin, SES, Avanti, Intelsat, CeWIT, Airbus, Hispasat, Inmarsat, Gilat, TNO, ESA, Qualcomm, Novamint, Lenovo, Ericsson, IRT Saint Exupery, JSAT, Ligado, Sateliot, Omnispace, Gatehouse, EchoStar, Viasat, Cobham Satcom, SA catapult, Eutelsat, Leonardo, OneWeb, Forsway, China Telecom, ETRI, ST Engineering iDirect, Xiaomi

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*Abstract: this document introduces a use case addressing NTN based dual NG-RAN access connectivity, to be captured in TR 22.841 v.0.0.0.*

\* \* \* First Change \* \* \* \*

## 5.19      Use Case on supplementary downlink data via a second 3GPP access network

### 5.19.1    Description

Wireless access in rural areas to users in poor terrestrial access network coverage or radio conditions (e.g. Mountain valley) may not provide the required service performance.

Adding supplementary downlink data capacity (e.g. provided by NTN) would be beneficial to improve the service performance and QoE, for example to support the traffic asymmetry associated to video consumption. Hence, using the downlink capacity of a NTN network (GSO Satellites or HAPS) in addition to the available downlink capacity of a base station would enhance the overall downlink performance, especially from a throughput perspective.

Ideally this supplementary downlink data capacity would be provided by a GSO satellite (possibly already in orbit) which would support receive only capability in the terminal.

The figure below depicts the proposed concept.



**Fig. 5.19.1 example of a supplementary downlink data via a second 3GPP radio access network**

Note : In this example, illustrated above, two separate Network Operators are considered. This does not preclude other options/scenarios, as described in later clauses of the document (e.g. same CN).

### 5.19.2    Pre-conditions

Overlapping radio coverage area of the TN and NTN networks.

5G UE with dual radios but a single subscription used to access two different PLMNs (one offering NTN and one TN access).

UE and 5GC support dual 3GPP access functionality via TN access and NTN access.

Relationship of the TN and NTN networks: Scenario 1 - managed by same Network Operator - or Scenario 2 - Multiple Network Operators with mutual agreement. A service level agreement may also be in place.

Agreed multi-path data traffic routing policy allows to route different data flows of the same service over one 3GPP access connection (via TN or NTN) and a supplementary downlink data via the other 3GPP access connection (via NTN), for example large content or video streaming could be transmitted over the additional downlink connection.

### 5.19.3    Service Flows

1) Alice lives in a remote area where she has a home broadband service (possibly with limited performance), including TV and VoD services, from operator A that is provided through 5G fixed wireless access (FWA) network.

2) When Alice wants to watch VoD service she could experience bad quality connectivity due to the FWA congestion.

3) Operator A is able to provide Alice the VoD service via an supplementary NTN downlink only connectivity.

4) When activating the VoD, the command and control are steered via the TN access while the video stream is steered to the NTN access.

### 5.19.4    Post-conditions

UE will be able to receive high quality video content via the downlink NTN connectivity without impacting the scarce radio resources he may be offered via the TN access network due to its poor radio condition.

### 5.19.5    Existing 3GPP features partly or fully covering the use case functionality

None. ATSSS covers only scenarios of dual connectivity over 3GPP and non 3GPP access.

### 5.19.6    Potential New Requirements needed to support the use case

[PR 5.19.6-001] Based on PLMN operator policies, the 5G system shall be able to support mechanisms to configure and control the steering of UE’s service data flows (of the same service session) across two 3GPP access networks (e.g. via NR based TN and/or NTN), one of which is used for transferring downlink data only. The two 3GPP access networks can belong to one or two different PLMNs, one of which is the UE’s HPLMN, and UE is assumed to use single subscription.

Note: This can also include support for UE specific user data characteristics measurements (e.g., RTT, Packet loss rate) reporting to UE’s HPLMN.

\* \* \* End of Changes \* \* \* \*