

**Source: Huawei, HiSilicon**

**Title: Discussion on controversial topics on ID\_UAS**

**Agenda item: 17.2.17**

**Document for: Discussion and Decision**



# PCO/ePCO handling for UUAA/C2 authorization in EPS (1/2)

**Huawei principle: To mimic principle of NB-IoT for ePCO IE, the UE supporting NB-IoT can directly use ePCO IE and the EPC shall support ePCO IE to enable NB-IoT services.**

Key questions:

- Q1: Whether the MME has to support ePCO IE in order to support UAS services?
  - **Huawei answer: YES! The same as NB-IoT.**
- Q2: Whether the S-GW has to support ePCO IE in order to support UAS services?
  - **Huawei answer: YES! The same as NB-IoT.**
- Q3: Whether the P-GW has to support ePCO IE in order to support UAS services?
  - **Huawei answer: YES! The same as NB-IoT.**

Conclusions:

- C#1: Similar as NB-IoT (see NOTE 15 in TS 29.274 Table 7.2.1-1), EPC (i.e. MME, S-GW and PGW) shall support ePCO IE in order to enable UAS services; otherwise, UAS services cannot work in EPS.
- C#2: Even MME and S-GW have not been mentioned as functional entities for UAS in TS 23.256, but from stage 3 protocol implementation perspective, MME and S-GW have to be upgraded to support ePCO IE to enable UAS services in EPS.

**Proposals:**

- **P#1: Based on C#1 and C#2, similar as NB-IoT, the UE supporting UAS services can directly use ePCO IE in the first UL shot.**
- **P#2: Based on C#1 and C#2, similar as NB-IoT, EPC (i.e. MME, S-GW and PGW) shall support ePCO IE in order to enable UAS services in EPS.**
- **P#3: If C#1 and C#2 cannot be CT1 consensus, then an LS to SA2 to confirm C#1 and C#2 is needed.**

# PCO/ePCO handling for UUAA/C2 authorization in EPS (2/2)

## Compromised solution

To move forward in CT1, Huawei would be fine for following proposal as a compromised way forward:

- In the first UL shot, PCO IE is used to only carry the mandatory parameter (e.g. Service-level device ID) which is smaller than 255B.
- In all subsequent DL/UL handling, only ePCO IE is used for UAS services, regardless of the carried data size.

NOTE:

- ePCO IE was firstly introduced since R13 (i.e. v13.6.0) (see CR2415R2\_(Rel-13)\_C1-163131) and the end-to-end negotiation mechanism was firstly introduced since R13 (i.e. v13.10.0) (see CR2825R2\_(Rel-13)\_C1-171948). At that time, the negotiation mechanism was mainly to consider backward compatibility issues.
- However, for some new features, e.g. NB-IoT, non-IP, 5GS-IWK, such negotiation mechanism is not needed (see reason for change of CR2825R2\_(Rel-13)\_C1-171948).
- UAS is totally a new feature supported since R17, similar as done for new features in the past, such negotiation mechanism is not needed as well.
- For standard and protocol evolution, 3GPP should look forward to discard some unnecessary "historical baggage" (e.g. unrealistic assumption that EPC does not support ePCO IE in R17+).

# Network indication on "UAS service is not allowed" (1/3)

## USE CASE

- During PDU session/PDN connection establishment, as per user subscription, UUAA-SM/C2 authorization is required for the UE but the required mandatory information (e.g. CAA-level UAV ID or C2 aviation payload) is not provided by the UE.
- The network rejects PDU session/PDN connection establishment and needs to provide an indication to the UE, e.g. "UAS service is not allowed".
- The UUAA-SM/C2 authorization was not initiated by the network yet, i.e. such network indication was created by SMF+ PGW-C.

## Working principle between 5GS and EPS on UUAA-SM/C2 authorization

Working principle	Considerations	Facts	Huawei position
Option #1, fully decoupled	EPS and 5GS have different system architecture and NAS protocol stack and hence, the work for UUAA-SM/C2 authorization can be totally decoupled between them.	The same Service-level-AA container IE will be reused for UUAA-SM/C2 authorization between EPS and 5GS, hence fully decouple seems not possible	Not preferred
Option #2, fully aligned	The UUAA-SM/C2 authorization is required for both EPS and 5GS and hence, all required work should be fully aligned between EPS and 5GS.	There are already some differences between EPS and 5GS on UUAA-SM/C2 authorization, e.g.: <ul style="list-style-type: none"> <li>• PCO was used in EPS while not used in 5GS;</li> <li>• There are "Uplink data (not) allowed" indications in EPS while no such indications in 5GS.</li> </ul>	Not preferred
Option #3, case by case	Even the UUAA-SM/C2 authorization is required for both EPS and 5GS but due to EPS and 5GS have different system architecture and NAS protocol stack, hence, the alignment work between them is done case by case.	<ul style="list-style-type: none"> <li>• There is no any stage 2 requirements that the work has to be done fully decoupled or fully aligned between EPS and 5GS for UUAA-SM/C2 authorization.</li> <li>• SA2 has already specified some different requirements on UUAA-SM/C2 authorization between EPS and 5GS.</li> </ul>	Preferred

# Network indication on "UAS service is not allowed" (2/3)

## Current stage 2 requirements on the concerned use case

Current stage 2 requirements in 5GS	Current stage 2 requirements in EPS
<ul style="list-style-type: none"> <li>In TS 23.256 sub 5.2.5.2.3:  <i>"For a UAV with aerial subscription, if the SMF determines based on the requested DNN/S-NSSAI that the authorization procedure with the USS is required, but the UAV has not provided the CAA-Level UAV ID, <b>the SMF rejects the PDU session establishment with a cause indicating that USS authorization is required.</b>"</i> </li> <li>The above <b>yellow</b> text clearly indicates the cause is an NAS reject cause, not the parameter included in PCO.</li> </ul>	<ul style="list-style-type: none"> <li>In TS 23.256 sub 5.2.5.3.1:  <i>"For a UAV with aerial subscription, if the SMF+PGW-C determines that the S-NSSAI is subject to C2 authorization and the UAV has not provided a CAA-Level UAV ID then <b>the SMF+PGW-C rejects the PDN connectivity request and provides in PCO an indication that USS authorization is required.</b>"</i> </li> <li>The above <b>yellow</b> text clearly indicates the network indication is a parameter included in PCO.</li> </ul>
<p><b><u>SA2 has provided different stage 2 requirements between 5GS and EPS on providing such network indication to the UE. Such difference is much aligned with difference on providing UAS parameters between 5GS and EPS (i.e. PCO is used in EPS while not used in 5GS)</u></b></p>	

## Alternatives evaluation

Alternative	Pros	Cons	Huawei position
Alt #1, different network indication between EPS and 5GS (see C1-216570, C1-216571, C1-216572)	<ul style="list-style-type: none"> <li>Stage 3 implementation is aligned with stage 2 requirement.</li> <li>Single indication (i.e. 5GSM cause value) is enough in 5GS.</li> </ul>	No	Preferred
Alt #2, same network indication between EPS and 5GS	<ul style="list-style-type: none"> <li>Aligned network indication between EPS and 5GS.</li> </ul>	<ul style="list-style-type: none"> <li>Stage 3 implementation is NOT aligned with stage 2 requirement.</li> <li>Double indications (i.e. NAS 5GSM cause value + indication in Service-level-AA container) are required in 5GS which is unnecessary.</li> <li>Needs to decide which existing 5GSM cause value to be re-used.</li> <li>Indication included in Service-level-AA container has no NAS enforcement.</li> </ul>	Not preferred

# Network indication on "UAS service is not allowed" (3/3)

## New PCO parameter vs. new field in Service-level-AA container

- In EPS, SA2 just states that such network indication is included in PCO but nothing on how to include it in PCO, hence, CT1 can make the decision on this.
- In EPS, for “Uplink data (not) allowed” indications, SA2 also just states to include them in PCO but nothing on how to include them in PCO. In two agreed CRs (C1-216283, C1-216284) in CT1#132e, CT1 agreed to define two new PCO parameters rather than to define new fields in Service-level-AA container.
- Similar as “Uplink data (not) allowed” indications, such network indication for PDN connectivity rejection is locally generated by P-GW before UUAA-SM was initiated, i.e. such indication has nothing to do with UUAA-SM but just due to the mandatory parameter is missing for UAS services and hence the P-GW provides such indication to the UE.
- Similar as “Uplink data (not) allowed” indications, such network indication for PDN connectivity rejection is to enforce the UE handling at the NAS layer, not at the UAV application layer. Note that the information included in the Service-level-AA container is mainly used by the UAV application layer, not the NAS layer.
- **Question: Why for such network indication for PDN connectivity rejection, has to define a new field in Service-level-AA container? Any difference exists between such indication and “Uplink data (not) allowed” indications?**

**Huawei position: Similar as “Uplink data (not) allowed” indications, we still prefer to denote such network indication for PDN connectivity rejection as a new PCO parameter, rather than a new field in Service-level-AA container.**

# Thank you.

把数字世界带入每个人、每个家庭、  
每个组织，构建万物互联的智能世界。

Bring digital to every person, home, and  
organization for a fully connected,  
intelligent world.

**Copyright©2018 Huawei Technologies Co., Ltd.  
All Rights Reserved.**

The information in this document may contain predictive statements including, without limitation, statements regarding the future financial and operating results, future product portfolio, new technology, etc. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied in the predictive statements. Therefore, such information is provided for reference purpose only and constitutes neither an offer nor an acceptance. Huawei may change the information at any time without notice.

