**SA WG2 Meeting #139-e S2-2000xxx**

**June, 1-12 2020, Elbonia (revision of)**

**Source: Vodafone**

**Title: Solution 1 Update: Align EPS Paging Cause with EPS Paging Policy Differentiation**

**Document for: Approval**

**Agenda Item:**

**Work Item / Release: FS\_MUSIM**

*Abstract of the contribution: xxx*

# Discussion

As described in section 4.9 of TS 23.401, in EPS, the Serving Gateway “dumbly” copies the IP header information into the DDN; the DDN is sent to the MME; and the MME checks the HPLMN/APN/QCI to determine whether the IP header information can be reliably used for paging policy. Extending this MME functionality to determine the Paging Cause seems more pragmatic than getting new SGW functionality that also has to consider HPLMN/APN/QCI. Also, placing this logic in the MME makes it easier to determine any paging cause for SMS or MT Signalling.

Extract from TS 23.401 v16.6.0:

## *4.9 Paging Policy Differentiation*

*Paging policy differentiation is an optional feature that allows the MME, based on operator configuration, to apply different paging strategies as defined in clause 5.3.4.3 for different traffic or service types provided within the same PDN connection.*

*When it supports Paging Policy Differentiation feature, the Serving GW provides a Paging Policy Indication in the Downlink Data Notification. The Paging Policy Indication is based on information received with the downlink packet that triggers the Downlink Data Notification. For example, as defined in TS 23.228 [52], the P-CSCF may support Paging Policy Differentiation by marking packet(s) to be sent towards the UE that relate to specific IMS services (e.g. conversational voice as defined in IMS multimedia telephony service).*

*The PDN GW shall not modify the received downlink IP packet e.g. the DSCP (IPv4) / TC (IPv6). Unconditionally, for each bearer and for each packet of PDN type IPv4, IPv6 or IPv4v6 that triggers a Downlink Data Notification, the SGW shall send the DSCP in TOS (IPv4) / TC (IPv6) information received in the IP payload of the GTP-U packet from the PDN GW in the Paging Policy Indication in the Downlink Data Notification.*

*It shall be possible for the operator to configure the MME in such a way that the Paging Policy Indicator only applies to certain HPLMNs and/or APNs and/or QCIs.*

*NOTE 1: Network configuration needs to ensure that the information used as a trigger for Paging Policy Indication is not changed within the EPS.*

*NOTE 2: Network configuration needs to ensure that the specific DSCP in TOS (IPv4) / TC (IPv6) value, used as a trigger for Paging Policy Indication, is managed correctly in order to avoid the accidental use of certain paging policies.*

# Proposal

The following updates are proposed to be made to solution 1 in TR 23.761 v0.3.0.

\*\*\*\*\*\*\*\*\*\* start of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 6.1.3.3 Handling of MT service with Paging Cause in EPS

Figure 6.1.3.3-1 is handling of MT service with Paging Cause in EPS.



Figure 6.1.3.3-1: Handling of MT service with Paging Cause in EPS

(\* the uneditable picture above needs message 1 to have “paging cause” changed to “Paging Policy Indication” \*)

1. If the Serving GW supports the Paging Policy Differentiation feature, then the Serving GW unconditionally, for each bearer and for each packet of PDN type IPv4, IPv6 or IPv4v6 that triggers a Downlink Data Notification, sends the DSCP in TOS (IPv4) / TC (IPv6) information received in the IP payload of the GTP-U packet from the PDN GW in the Paging Policy Indication in the Downlink Data Notification.

2. Dependent upon the configuration for that HPLMN and/or APN and/or QCI, the MME determines the Paging Cause.

 For mobile terminating signalling and SMS, the MME determines an appropriate Paging Cause.

3. MME sends S1 paging message including the Paging Cause information.

4. RAN sends the paging message with Paging Cause.

### 6.1.4 Impacts on services, entities and interfaces

For 5G:

AF:

**-** P-CSCFsets the DSCP value in the IP header to indicate the traffic type.

SMF:

- determines Paging Cause based on DSCP value from IP header.

- includes the Paging Cause to AMF in N11 signalling.

AMF:

- sends the N2 paging signalling with Paging Cause.

NG-RAN:

- sends the paging message with Paging Cause.

- in RRC\_Inactive mode, NG-RAN determines the Paging Cause based on the DSCP value in the IP header.

UE:

- receives paging message with the Paging Cause information.

For EPS:

SGW

- implement existing, optional, Paging Policy Differentiation feature

MME

- determines Paging Cause based on DSCP value from IP header and HPLMN/APN/QCI configuration.

- determines Paging Cause for MT signalling and SMS

- sends the S1 paging signalling with Paging Cause.

eNB

- sends the paging message with Paging Cause.

UE

- receives paging message with the Paging Cause information.

\*\*\*\*\*\*\*\*\* end of changes \*\*\*\*\*\*\*\*\*\*\*