**3GPP TSG-CT1 Meeting #133-eCP-213273**

**E-Meeting, 11th – 19th November 2021** was CP-213265

**3GPP TSG-CT1 Meeting #133-eC1-217214**

**E-Meeting, 11th – 19th November 2021**

**Source: CT1**

**Title: New Rel-17 WID on IoT NTN support for EPS**

**Document for: Approval**

**Agenda Item: 17.2**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: CT aspects of NB-IoT/eMTC Non-Terrestrial Networks in EPS

Acronym: IoT\_SAT\_ARCH\_EPS

Unique identifier: 940001

Potential target Release: Rel-17

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes | X | X |  | X |  |
| No |  |  | X |  |  |
| Don't know |  |  |  |  | X |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Feature |
| X | Building Block |
|  | *Work Task* |
|  | Study Item |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| IoT\_SAT\_ARCH\_EPS | SA2 | 930019 | Architecture support for NB-IoT/eMTC Non-Terrestrial Networks in EPS |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 920069 | NB-IoT/eMTC support for Non-Terrestrial Networks (LTE\_NBIOT\_eMTC\_NTN) | E-UTRAN support for IoT NTN  |
| 860005 | Integration of satellite systems in the 5G architecture (5GSAT\_ARCH) | 5GS NTN architecture to be used as baseline for IoT NTN in EPS  |
| 890005 | 5GSAT\_ARCH-CT | 5GS NTN functionality to be used as baseline for IoT NTN in EPS |

**Dependency on non-3GPP (draft) specification:** none

# 3 Justification

IoT operation is critical in remote areas with low/no cellular connectivity for many different industries, including e.g.:

- Transportation (maritime, road, rail, air) & logistics

- Solar, oil & gas harvesting

- Utilities

- Farming

- Environment monitoring

- Mining etc.

The capabilities of NB-IoT and eMTC are a good fit to the above, but will require satellite connectivity to provide coverage beyond terrestrial deployments, where IoT connectivity is required. There is an urgent need for a standardized solution allowing global IoT operation anywhere on Earth, in view of other solutions already available.

It is important that satellite NB-IoT or eMTC be defined in a complementary manner to terrestrial deployments.

3GPP TSG RAN#92e approved a Rel-17 WID (#920069) to introduce NB-IoT/eMTC support for Non-Terrestrial Networks in E-UTRAN. SA2#146E (Aug) agreed corresponding SA2 WID (S2-2106794).

This Work Item intends to make necessary changes to CT specifications defining minimum essential functionality in alignment with the SA2 WID to introduce support for NB-IoT and eMTC Non-Terrestrial Networks in EPS using 5GSAT\_ARCH solutions as baseline and adjusting them to EPS and NB-IoT/eMTC characteristics as necessary, in alignment with the RAN Work Item and SA Work Item.

# 4 Objective

This Work Item covers the following objectives to introduce CT aspects to specify minimum essential functionality in alignment with the SA2 WID, to support NB-IoT and eMTC over Non-Terrestrial Networks in EPS using 5GSAT\_ARCH solutions as baseline:

- all functionality applicable to NB-IoT and/or eMTC, except MBMS (not discussed in RAN for Rel-17 IoT NTN);

- no explicit disabling of WUS functionality.

CT1 objective:

- Provide stage 3 support for stage 2 requirements developed in the corresponding stage 2 WI including:

- Support for regulatory services with super-national satellite ground stations

- TA selection if an EPS network is broadcasting more than one TAC per PLMN

- Identification and restriction to use satellite access

- Work on extending NAS timers.

- Enhance PLMN selection taking into consideration:

- Satellite access in EPS

- Enhancement developed under 5GSAT\_ARCH-CT if applicable.

- Support for discontinuous coverage (DC) including

- Interaction with the AS layer to manage the awareness of DC at the NAS layer based on the DC awareness at the AS layer

- Impact of DC on the handling of NAS procedures at the UE

-     Impact of DC on the PLMN search and selection.

NOTE: For MME existing configurations, including configuration of mobile reachable timer and implicit detach timer, is expected to be sufficient to support DC.

CT3 objective:

- Provide stage 3 support for stage 2 requirements developed in the corresponding stage 2 WI including:

- New CN access technologies for satellite access in EPS.

CT4 objective:

- Provide stage 3 support for stage 2 requirements developed in the corresponding stage 2 WI including:

- New CN access technologies for satellite access in EPS

- Potential updates to Access Restriction Data

- Potential updates to support downlink data buffering when the UE is not reachable over satellite access.

CT6 objective:

- Updates to USIM configuration files to support PLMN selection for satellite access in EPS

- Potential updates to UICC and ME interface due to new access type.

NOTE: No additional functionality to support satellite backhaul is included as part of this work item.

NOTE: No additional functionality will be defined to support or restrict the use of Dedicated bearer.

This Work Item assumes UEs are able to determine their own location using GNSS.

# 5 Expected Output and Time scale

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| N/A | N/A | N/A | N/A | N/A | N/A |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 23.122 | Updates to PLMN selection functions to support satellite access in EPS | CT#95-e | Under CT1 responsibility |
| TS 23.008 | Potential updates to Access Restriction Data | CT#95-e | Under CT4 responsibility |
| TS 24.008 | Potential updates due to satellite access in EPS | CT#95-e | Under CT1 responsibility |
| TS 24.301 | Updates to protocols to support satellite access in EPS | CT#95-e | Under CT1 responsibility |
| TS 27.007 | Potential updates to AT-commands to support satellite access in EPS | CT#95-e | Under CT1 responsibility |
| TS 29.212 | Possibly define new CN access technologies for satellite access in EPS | CT#95-e  | Under CT3 responsibility |
| TS 29.272 | Potential impacts to S6a interface to support new CN access technologies satellite access in EPS | CT#95-e | Under CT4 responsibility |
| TS 29.274 | Potential impacts to S5/S8/S11 interfaces to support new CN access technologies for satellite access in EPS | CT#95-e | Under CT4 responsibility |
| TS 31.102 | Updates to configuration files in USIM to support PLMN selection over satellite access in EPS | CT#95-e | Under CT6 responsibility |
| TS 31.111 | Potential updates to UICC and ME interface due to new access type. | CT#95-e | Under CT6 responsibility |

# 6 Work item Rapporteur(s)

NIEMI, Marko, MediaTek Inc., marko.niemi at mediatek dot com

# 7 Work item leadership

CT1

# 8 Aspects that involve other WGs

{This information is provided as best effort assumption, at the time of submission of the WID to TSG approval. It can be later changed without a need to revise the WID.

The “aspects” can be provided by topic (e.g. “security”, “multimedia”) and/or by specifying the WG(s) e.g.: "SA2, SA3, SA5, SA6. CT6 for storage, and potentially SA4". If not applicable, indicate "None" or "None identified yet"}

CT3, CT4, CT6

# 9 Supporting Individual Members

{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval}

|  |
| --- |
| Supporting IM name |
| MediaTek Inc. |
| Thales |
| Eutelsat |
| Intelsat |
| ZTE |
| Vodafone |
| Inmarsat |
| Sateliot |
| ESA |
| Novamint |
| Gatehouse |
| Hughes/EchoStar |
| OPPO |
| Qualcomm Incorporated |
| Huawei |
| HiSilicon |