
1 Introduction

In the SP-230759, Potential WT for MED (starting point) was captured.

Table 1:

Ambient IoT	5G system to support new IoT segment for battery-less devices. Key objectives: <ol style="list-style-type: none">1. Architecture update to support Ambient IoT for all types of devices (passive, semi-passive, active)2. Ambient IoT device identification3. Registration and connection management of Ambient IoT devices4. Services for Ambient IoT (e.g small data transfer, Inventory service etc.)5. Charging6. Security
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In the SA#100 Rel-19 workshop, about 30 companies have shown interest on the Ambient IoT. The following objectives/work tasks have been categoried based on the proposals and SP-230759.

Table 2:

	Proposed objectives/work tasks	Proposed Tdocs in the SA workshop

1	Architecture update to support Ambient IoT for all types of devices (passive, semi-passive, active)	<p>SP-230759 Architecture update to support Ambient IoT for all types of devices (passive, semi-passive, active)</p> <p><i>NOTE from moderator: since passive, semi-passive, active has no clear definition, the terminology has been replaced by the Type A, Type B, Type C as defined in TR 38.848</i></p> <p>SWS-230013(Telecom Italia) It is recommended to start to study stage-2 architecture solutions to address the Ambient IoT service and system requirements identified by SA1 and RAN.</p> <p>SWS-230014 (Intel), Overall architecture and function enhancement to support new Ambient IoT service (e.g.enhancement to Rel-18 PIN).</p> <p>SWS-230015 (Futurewei), 5G System architecture enhancement to support Ambient IoT: Architecture enhancement for Ambient IoT, alignment with RAN WG on different deploy models and topologies.</p> <p>SWS-230020 (OPPO), 5G System Architecture is enhanced to support ambient power-enabled IoT devices under extremely constrained power consumption conditions.</p> <p>SWS-230021 (ETRI etc.), Study architecture requirements to support Ambient IoT service within 5GS</p> <p>SWS-230025 (MediaTek) The study should focus on carrying out a gap analysis to support Ambient IoT as a PIN.</p> <p>SWS-230030 (LGE), End-to-end architecture design to support Ambient IoT device</p> <p>SWS-230034 (ZTE) Architecture of Ambient IoT devices accessing network: w/o and with relay</p> <p>SWS-230038 (Xiaomi), Identify the architecture impacts based on the use cases provided by SA1 and RAN to support the energy efficient communication;</p> <p>SWS-230042 (CATT), Overall architecture and function enhancement to support new Ambient IoT.</p>
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2	Ambient IoT device identification	<p>SP-230759 Ambient IoT device identification</p> <p>SWS-230014 (Intel) Ambient IoT control parameter generation and provisioning</p> <p>SWS-230015(Futurewei), Ambient IoT device management:How to manage (activate/deactivate/discover) Ambient IoT Device, including group of Ambient IoT device efficiently?</p> <p>SWS-230020(OPPO), Subscription, Identification management with or without the 3rd party assistance</p> <p>SWS-230034 (ZTE), Ambient IoT ID management,</p> <p>SWS-230038 (Xiaomi), the life cycle management of the Ambient IoTdevice(s)</p> <p>SWS-230042 (CATT), ID design and management.</p> <p>SWS-230045(Huawei), Ambient IoT device identification, identification of Ambient IoT devices</p> <p>SWS-230050 (vivo) Identify the Tag.</p> <p>SWS-230058 (Lenovo), Ambient IoT device (or service) identification</p> <p>Types of devices and device capabilities (e.g. whether to support type A, B, C).</p> <p>Device (or group of devices or A-IoT service) identifier and subscription management.</p> <p>SWS-230059(Philips), E2E procedures for device identification,</p>
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3	Registration and connection management of Ambient IoT devices	<p>SP-230759 Registration and connection management of Ambient IoT devices</p> <p>SWS-230012 (Qualcomm), Support for devices not capable of autonomous transmission including reachability / mobility management, security and charging aspects</p> <p>SWS-230015 (Futurewei), Evaluate and enhance some procedures for simplification and optimization for Ambient IoT: Are current procedures simplified and efficient enough to support no-power or ultra-low power Ambient IoT device?</p> <p>SWS-230020(OPPO), Registration, Mobility, paging and connection management support for Ambient IoT devices, if applicable to specific device type(s)</p> <p>SWS-230021(ETRI etc), Study registration and connection management for Ambient IoT devices (e.g., security aspects, QoS and traffic management, etc.)</p> <p>SWS-230023(KPN), Optimised procedures. E.g. performing a complete initial registration for a device that only sends 200 bits of data before registering on a different network is not efficient.</p> <p>SWS-230038(Xiaomi) the access control and mobility management for the Ambient IoT supporting;</p> <p>SWS-230042(CATT), Access and mobility management enhancement for Ambient IoT,</p> <p>SWS-230045(Huawei), Registration and Connection Management for Ambient IoT devices</p> <p>SWS-230050(vivo) Common and simplified protocol stack between Ambient IoT device(s).</p> <p>SWS-230058 (Lenovo), Registration and connectivity management</p> <p>Whether device (or group of devices, or A IoT service) registration in the 5GS is needed.</p> <p>Authentication and authorization (also SA3 relevant).</p>
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4	Services for Ambient IoT (e.g small data transfer, Inventory service etc.)	<p>SP-230759 Services for Ambient IoT (e.g small data transfer, Inventory service etc.)</p> <p>SWS-230013 (Telecom Italia), MNO networks could collect data from these device and securely expose them to 3rd parties</p> <p>SWS-230012 (Qualcomm), Support for devices capable of autonomous transmission, for which the focus shall be on further enhancements of IoT features to enable reduced power operation</p> <p>SWS-230014 (Intel), collecting information from deployed sensors and delivering the collected information to third party AF</p> <p>SWS-230020 (OPPO), Study whether and how to perform Session Management for data transmission</p> <p>Connectivity establishment for data transmission vs. connection less communication;</p> <p>Data received or collected by the network exposed to the 3rd party for backend service;</p> <p>SWS-230034(ZTE), Service flows for MO/MT traffic transferring;</p> <p>SWS-230038 (Xiaomi), the information collection and exposure to the AF identified by SA1 an RAN;</p> <p>SWS-230042 (CATT), Session management enhancement for Ambient IoT. Network capability exposure enhancements for Ambient IoT.</p> <p>SWS-230045 (Huawei), Services for Ambient IoT (e.g small data transfer, Inventory service etc.), Ambient IoT services and data transmission</p> <p>SWS-230050 (vivo), Control and manage Ambient IoT device(s) based on 3rd party request and provide collected information from Ambient IoT device(s) to the 3rd party.</p> <p>SWS-230058 (Lenovo), Ambient IoT Communication service: Define signalling procedures and data transfer (e.g. CP vs. UP data transfer).</p> <p>Network exposure capability for third party Afs.</p>
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5	Charging	SP-230759 Charging SWS-230003(Orange), billing SWS-230012 (Qualcomm), Support for devices not capable of autonomous transmission including reachability / mobility management, security and charging aspects SWS-230038 (Xiaomi), Charging. e.g. collection of charging information based on charging policies for Ambient IoT device SWS-230045 (Huawei), Operator charging support SWS-230050 (vivo), Charging information collection for Ambient IoT services.
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6	Security	<p>SP-230759 Security SWS-230003(Orange), authentication</p> <p>SWS-230012 (Qualcomm), Support for devices not capable of autonomous transmission including reachability / mobility management, security and charging aspects</p> <p>SWS-230014 (Intel), Authorization</p> <p>SWS-230015(Futurewei), Authentication, Security and privacy support</p> <p>SWS-230020 (OPPO), Architecture requirements for authentication and authorization of the Ambient IoT devices and device privacy;</p> <p>SWS-230021(ETRI etc), security aspects</p> <p>SWS-230034 (ZTE), Authentication/Authorization</p> <p>SWS-230038 (Xiaomi), the security and privacy with light weight;</p> <p>SWS-230045(Huawei), Security aspects</p> <p>SWS-230058 (Lenovo), Authentication and authorization (also SA3relevant).</p> <p>SWS-230059(Philips), authorization</p> <p>SWS-230066 (Interdigital), Evolved system architecture, procedures and security mechanisms that require less transactions between the devices and the network</p>
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7	QoS and Policy	<p>SWS-230014 (Intel), related QoS/Policy enhancement.</p> <p>SWS-230020 (OPPO), Study QoS and Policy Enhancement to support the Ambient IoT devices;</p> <p>SWS-230038 (Xiaomi), the QoS mechanism for the Ambient IoT device (s) supporting;</p> <p>SWS-230042 (CATT), Policy and QoS control enhancement for Ambient IoT.</p> <p>SWS-230059(Philips), policy control, QoS,</p>
8	Positioning, LCS, Ranging	<p>SWS-230015 (Futurewei), LCS and ranging support for ambient IoT:How to positioning an or group of Ambient IoT device(s)</p> <p>SWS-230021(ETRI etc), Study how to perform positioning for Ambient IoT device</p> <p>SWS-230042(CATT), Positioning/location enhancements for Ambient IoT.</p> <p>SWS-230059(Philips), positioning of Ambient IoT device</p>
9	Congestion control	<p>SWS-230020 (OPPO), study access and congestion control mechanisms to support the ultra-high density deployment scenarios of Ambient IoT devices</p> <p>SWS-230066 (Interdigital) access control</p> <p><i>NOTE from moderator: since access control is mainly in RAN WGs and CTI, only congestion control has been captured in the WT#9.</i></p>
10	manage and control a UE or a RAN node	<p>SWS-230050 (vivo) Manage and control a UE or a RAN node for communication with Ambient IoT device(s) directly.</p> <p>SWS-230059(Philips), managing and controlling a UE or a RAN node for communication with Ambient IoT device(s),</p>

In the SA2#157 meeting, there are three proposed SI on the Ambient IoT in S2-2306419, S2-2306423 and S2-2307089 submitted for information.

2 Scoping

2.1 Work Tasks based on input to and outcome of the Workshop

The initial set of Work Tasks for discussion, based on the input to the workshop and SP-230759 are as follows:

WT-1: Architecture update to support Ambient IoT for all types of devices (type A, type B, Type C as defined in TR 38.848)

NOTE1: Which Connectivity topologies as defined in TR38.848 will be in the scope of this study requires coordination with RAN.

NOTE 2: Which types of the ambient IoT devices (type A, type B, Type C as defined in TR 38.848) will be in the scope of this study requires coordination with RAN.

******WT#1 is derived from SP-230759, and SWS-230013, SWS-230014, SWS-230015, SWS-230020, SWS-230021, SWS-230025, SWS-230030, SWS-230034, SWS-230038, SWS-230042, SWS-230045, SWS-230050, SWS-230058, SWS-230059, SWS-230066******

WT-2: Ambient IoT device identification

WT#2.1 Ambient IoT devices Identifiers including the identifier format and how to identify the Ambient IoT device in the 5GS

WT#2.2 Whether and how to manage subscription data

******WT#2.1 and 2.2 are derived from SP-230759, and SWS-230014, SWS-230015, SWS-230020, SWS-230034, SWS-230038, SWS-230042, SWS-230045, SWS-230050, SWS-230058, SWS-230059******

WT#3: Registration and connection management of Ambient IoT devices

WT #3.1: Study whether and how to perform registration, connection management to support ambient IoT devices.

WT#3.2: Study the impact on reachability and paging aspects considering the ambient IoT devices capability and characteristics.

******WT#3.1 and 3.2 are derived from SP-230759, and SWS-230012, SWS-230015, SWS-230020, SWS-230021, SWS-230023, SWS-230038, SWS-230042, SWS-230045, SWS-230050, SWS-230058, SWS-230059, SWS-230066 ******

WT#4: Services for Ambient IoT (e.g small data transfer, Inventory service etc.)

WT#4.1: Study the procedure to support data transmission for the ambient IoT devices.

WT#4.2: Study the exposure of network capabilities to the 3rd party to support data transmission.

*****WT#4.1 and 4.2 are derived from SP-230759, and SWS-230012, SWS-230013, SWS-230014, SWS-230020, SWS-230034, SWS-230038, SWS-230042, SWS-230045, SWS-230050, SWS-230058, SWS-230059*****

WT#5: Security aspects

Study architecture aspects to support authentication and authorization for the Ambient IoT devices (detailed authentication and authorization mechanism will be defined in SA3)

*****WT#5 is derived from SP-230759, and SWS-230003, SWS-230012, SWS-230014, SWS-230015, SWS-230020, SWS-230034, SWS-230038, SWS-230045, SWS-230058, SWS-230059, SWS-230066*****

WT#6: Charging aspects

Study what data needs to be collected for Ambient IoT services and devices for the purpose of charging

*****WT#6 is derived from SP-230759, and SWS-230003, SWS-230012, SWS-230038, SWS-230045, SWS-230050*****

WT#7: QoS and Policy aspects

Study whether and how to support QoS and Policy for Ambient IoT devices

*****WT#7 is derived from SWS-230014, SWS-230020, SWS-230038, SWS-230042, SWS-230059*****

WT#8: Positioning and/or ranging aspects

Study whether and how to support positioning and/or ranging for Ambient IoT services and devices

*****WT#8 is derived from SWS-230015, SWS-230021, SWS-230042, SWS-230059*****

WT#9: Congestion control for core network

Study whether and how to support congestion control mechanisms for the ultra-high density deployment scenarios of Ambient IoT devices

*****WT#9 is derived from SWS-230020, SWS-230066*****

WT#10: 5G network manage and control a UE or a RAN node for communication with Ambient IoT device(s).

*****WT#10 is derived from SWS-230050 and SWS-230059*****

Feedback Form 1: Which of the above Work Tasks should be in scope of Rel-19?

1 – DOCOMO Communications Lab.

WT#1, WT#2, WT#3 and WT#4 should be in the scope of Rel-19.

2 – Ericsson LM

Agree with DoCoMo that WT#1, WT#2, WT#3 and WT#4 should be in the scope of Rel-19, but as the work is dependent on RAN progress, SA2 work should be limited to aspects to be progressed by RAN e.g. the device types and connectivity topologies to be included by RAN (more on that in relevant feedback and also in some rewording proposals). Note that WT#5 would be lead by SA3 and WT#6 lead by SA5-Charging. Also, WT#8 depends on RAN i.e. may be needed or may not be needed but requires RAN input.

3 – OTECH

[OPPO]

WT#1, 2, 3, 4, 5, 6, and 9 should be in the scope of Rel-19.

OPPO would like to request further clarification regarding WT#10. Specifically, under which operation mode are the control and management aspects mentioned in this WT?

4 – ZTE Corporation

WT-1~WT-4 and WT-7 should be in the scope of Rel-19.

5 – MediaTek Inc.

This Study has full dependencies with RAN - thus must be fully coordinated with RAN during the SI drafting phase including:

- **Device Type** to be supported among A, B and C (as defined in 38.848 v0.2.0); and
 - o The **UXP data rate** for A, B, C is **fundamental** for SA2 to understand before the study can start
 - o We expect the second **fundamental distinction** for SA2 is **between {A,B}and {C}**

- **Topologies to be supported** among Topologies 1, 2, 3 and 4 (as defined in 38.848 v0.2.0)
 - o The deployment scenarios 1, 2/4, 3/5 are transparent to SA2 in our understanding

WT-1 is required

WT-2 is unclear, possibly misleading and should be rephrased (see below) - Individual Ambient IoT devices (at least A, B) may not need to be identified by the network

WT-3 is also unclear, possibly misleading and should be rephrased - the current wording assumes a solution is required to register and manage a device connection. We do not think this is necessarily the case.

WT-4 is required but should be rephrased - these devices are highly constrained - these constraints impose severe restriction on "data rate" whatever the data may contain (i.e. signaling information or user data)

WT-5: for SA3

WT-6: for SA5

WT-7: not required. We do not expect any QoS (and associated policies) support for Ambient IoT (for obvious reasons)

WT-8: not required

WT-9: not required for Devices A/B. We don't expect any specific issue for SA2 regarding Devices C - RAN can handle access control.

WT-10: required

6 – Huawei Technologies France

WT#1: Architecture update to support Ambient IoT for all types of devices (type A, type B, Type C as defined in TR 38.848)

While we expect solutions to propose updates to the architecture as required to support the different devices and topologies we should be careful as architecture change itself is not a requirement.

This should ideally be a result and not a target of the study, but we are ok to have a WT to help with overall organisation of the work and identify how different topologies may impact the architecture.

WT#2: Ambient IoT device identification

How to identify the new devices and potential new features related to it (e.g. filtering of devices) is important and should be studied as existing identifiers may well not be aligned with the new capabilities and life cycle of AIoT devices. Whether to support subscription data and how to manage it given the potential scale of AIoT is important underpinning for other WTs.

This WT is essential.

WT#3: Registration and connection management of Ambient IoT devices

Whether and how registration, connection management and session management is performed is important given the new devices and their capabilities. We also need to study whether all those aspects are applicable at all to AIoT devices and if they are to which devices that RAN may study i.e. different devices may have different capabilities and therefore different registration/connection/session management aspects. If

they are supported then it needs to include how much of the existing procedures are applicable and simplification of those procedures, including signalling. RAN device A and RAN device B passive devices maybe somewhat different to RAN device C active device, which maybe more like a traditional device in this regard, for example. Additional aspects maybe brought by AIoT like disabling devices which would be new for 3GPP.

This WT is essential.

WT#4: Services for Ambient IoT (e.g small data transfer, Inventory service etc.)

The services a network offers and how they are offered to 3rd parties, e.g. AFs, is important, along with how those services, e.g. transfer of user data, inventory operations, etc., are handled within the network is essential to study.

How the services are offered to 3rd parties should be agnostic to device A/B or C and topologies as far as possible.

The proposed sub-WTs only include data transfer, which is only one possible service. Other services must be included in the sub-WTs, for example inventory as already mentioned in the main WT title. How any new services required, in addition to inventory and data transfer, are supported also needs to be studied, for example management of AIoT devices (including e.g. disabling devices), additional information collection, etc.

This WT is essential.

WT#5: Security aspects

We expect SA#3 to be the lead group for security, although we expect there will aspects which SA2 can study, for example when within a procedure to have authentication, which NFs support the authentication and trigger it.

This WT is essential.

WT#6: Charging aspects

We expect SA#5 to be the lead group for charging, although we expect there to be some work in SA2 to handle aspects related to where and what kind of information can be captured for charging.

This WT is essential.

WT#7: QoS and Policy aspects

Given the fundamental capabilities for the RAN devices A/B and RAN device C, there is no need or possibility for QoS for their data transfer or Policy to be provided to them.

This should not be studied.

WT#8: Positioning and/or ranging aspects

It is somewhat unclear what there is for SA2 to study here and whether any/all of these aspects are needed at present. RAN needs to study, for example, positioning signals and measurements, in , and whether that is included in Rel-19 should be RAN determined. If the outcome of any RAN study imposes architecture impact, SA2 can coordinate with RAN at that time.

This is not essential in Rel-19, as SA2 can coordinate with RAN in a later time if needed according to any potential study related to positioning in RAN.

WT#9: Congestion control for core network

Needs further clarification on what is being proposed. Many aspects related to congestion/access control are not in SA2. It is also unclear given the capabilities of devices whether there can be any controls.

This should not be studied.

WT#10: 5G network manage and control a UE or a RAN node for communication with Ambient IoT device

We understand this to be related to topologies and general operation of the system for AIoT. Therefore, will be covered by solutions for other WTs, e.g. WT#1, WT#3 and WT#4 etc.

This should not be a standalone WT.

7 – Qualcomm CDMA Technologies

All WTs except WT#7 should be in scope. WT#7 (QoS and Policy aspects) should not be in scope as the need for QoS differentiation for AIoT scenarios is not clear; this is also not backed by any SA1 requirements.

8 – Nokia Korea

We agree with MediaTek that SA2 must fully coordinate with RAN for the drafting of SI.

Due to the large amount of work expected for this work and the need for tight coordination with RAN, we believe that only study should be performed in this release.

WT#1, WT#2, WT#3, WT#4, WT#8(Partially) and WT#9 can be in scope of R19 with following reasons:

- WT#5 and WT#6 are the scopes of SA3 and SA5 respectively.
- WT#7 is not needed in this release.
- In WT#8, raging part should be removed because we think it is far-fetched.
- WT#9 will apply only to type C case because the traffic should be initiated by the core in case of type A and B.
- WT#10 should be removed because the meaning of "manage and control" in this WT is unclear and we believe this is part of the rest (i.e. WT#4.1).

9 – Orange

WT # 1 to 6 and 9 should be in Release 19.

WT#10 should be covered by other WTs.

WT-vivo-1 should be in Release 19 as a subtask of WT#4.

WT-Huawei-4.3 should be covered by WT#4.2 with the rewording proposed by Orange.

Other WTs are not needed for Rel-19.

10 – Motorola Mobility Germany GmbH

[Lenovo]

WT-1 (Architecture update): **Not essential**. We agree with Huawei that the architecture can be updated depending on the conclusions of the other WTs. Alternatively, this WT can be used to document the agreed scenarios, e.g. deployment options (direct or indirect communication) or type of AIoT devices like "passive, semi-passive" devices and "active" devices; but then this can be captured in the "Architectural Assumptions" clause in the TR.

WT-2 (Ambient IoT device identification): **Required**. The identification of single AIoT device or group of AIoT devices and the corresponding subscription data management may be different from the mechanisms used for UEs.

WT-3 (Registration and connection management): **Required**. It is essential to study whether AIoT device or group of devices are registered with the 5GC, and if yes how, but also dependent on the AIoT device type. The "connection management overlaps with the WT-4.

WT-4 (Services for Ambient IoT): **Required**. However, the wording implies that SA2 needs to study specific services derived from use cases (e.g. inventory). We think that SA2 should focus on the known communication services – e.g. exposure of AIoT service(s) to AF, data collection from AIoT devices, data delivery to the AF/AS, etc. It can be clarified that the “user data” may or may not be available, and if available, it is expected to be small. This WT overlaps with WT-3 ”connection management”.

WT-5 (Charging): **No need** to explicitly have a WT for charging. It is clear that charging is needed. A NOTE in the SID can be introduced describing that alignment with SA5 for charging aspects will be done.

WT-6 (Security): **Required**. Our preference is to include the security as sub-WT in a common WT 2+3 for the procedure. The security can be handled on high-level and possibly integrated with the registration procedure, or if registration procedure is not needed, as part of the alternative procedure.

WT-7 (QoS and Policy): **No need**. Due to the simple design of the AIoT devices it is not realistic that such devices would support different type of traffic. At least from the AIoT device perspective no traffic differentiation is required.

WT-8 (Positioning, LCS, Ranging): **No need** to support such services for AIoT. At least not in Rel-19.

WT-9 (Congestion control): **Low priority** in SA2. The access control is done by RAN and once an AIoT device gets an access, it should be able to transmit the data.

WT-10 (manage and control a UE or a RAN node): **No need** for an explicit WT on this. It is a part of WT-3 and 4.

11 – TNO

KPN believes that the WT # 1, 2, 3, 4, 5, 6, 8, 9 are essential and consider it a part of the basic Ambient IoT study.

12 – Futurewei Technologies

WT #1 : This is important and should be in the scope, but the new technical features which introduced by the architecture change can have dependency on what devices type and topologies will be supported by RAN in release 19 by RAN. e.g. rather to support all devices type and topologies in release 19 can have impact what architecture enhancement SA2 will work on in release 19.

WT#2: This is important and should be in the scope. Also, we support WT-NTT DOCOMO-1 to consider identification of group of devices.

WT#3: This is important and should be in the scope.

WT#4: This is important and should be in the scope.

WT#5: We prefer to let SA3 to take lead on this, SA2 works accordingly.

WT#6: We prefer to let SA5 to take lead on this. SA2 works accordingly.

WT#7: Consider the nature of AIoT device, the Qos and Policy are not important, not need to be considered in release 19.

WT#8: Dependent on RAN WG’s decision to support or not.

WT#9: Considering the potential big quantity number of AIoT devices, this should be study. But this work needs to coordinate with RAN.

WT#10: This should be part of WT#2, #3 and other WTs.

13 – InterDigital Communications

We agree with some companies that **WT#6**, **WT#7** and **WT#10** may not be in the scope.

We also think that **WT#9** may have lower priority.

WT#8 is important in our view. AIoT device positioning is essential in many use cases and should be taken into account (e.g. for architecture design) as early as possible.

14 – CATT

In general, we understand this study has heavy RAN dependency. The Device types and connectivity topologies as defined in TR 38.848 may lead to different architecture enhancements and procedures, so SA2 should have tight cooperation with RAN to determine the Rel-19 scope.

WT#1, #2 #3 and #4 (with some rewording) are required and the basic aspects to be studied in Rel-19.

WT#5 should be led by SA3, and WT#6 should be led by SA5-CH.

WT#7 is not required considering the device capability.

WT#8 depends on RAN scope.

WT#9 is not required and access control can be done by RAN.

WT#10 is required and mainly about UE reader/gNB reader authorization.

15 – LG Electronics France

WT#1, WT#2, WT#3, WT#4, WT#9 and WT#10

WT#8: Positioning can be included while Ranging seems not needed to be scope of Rel-19 study.

Regarding WT#5, security aspects such as authentication and authorization for Ambient IoT devices need to be considered when discussing and developing solutions, and require coordination with SA3.

We agree with MediaTek that SA2 study must fully coordinate with RAN study.

We agree with Nokia that only study should be performed in Rel-19 due to the large amount of work/objective expected for this topic and the need for tight coordination with RAN.

16 – Beijing Xiaomi Mobile Software

WT-1~WT-8 should be in the scope of Rel-19.

17 – Samsung Electronics Co.

- 10 WTs are too much for having all conclusions and solutions. So, we need to study initial and essential things first.

- WT#1, WT#2, WT#3, WT#4, and WT#5

- WT#9 should be considered when studying above WTs

18 – vivo Mobile Communication Co.

Please find vivo's view:

- WT-1, WT-2, WT-3, WT-4 and WT-10 should be included in rel19. (further rewording/merging can be done, e.g. WT-4 consider WT-vivo-1 as subclause)
- WT-7, not required.
- WT-5, 6 should be included but are led by SA5
- WT-8 is important but not necessary to be included in phase1 study. Since the F2F meetings have limit online discussion time and WT-1/2/3/4/10 require to be studied firstly. Further, WT-8 relies on RAN to design positioning measurement signal firstly. If RAN include it finally. WT can be updated in the future.
- WT-9 is also important and mainly related to Type C device. but it is also not urgent to be included in phase1 study w.r.t short rel19 timeline.

19 – China Mobile Com. Corporation

China Mobile's view:

WT1, WT2, WT3, WT4, WT9, should be in scope of R19.

WT3,4,9 are suggested to be reworded as proposed by China Mobile

20 – VODAFONE Group Plc

WT#2 and WT#5 are the absolutely key things to study. We need a good understanding of whether the ID provided by the device can be trusted or not in order to evaluate the cost/benefit of architectures/systems that provide verified-ID vs those that do not provide verified IDs.

These tasks then link up to WT#3 (registration) where the key issue is probably the ability to decommission a tag in a fully secure manner.

A good understanding of these issues can then lead to an architecture (WT #1), data transfer services (WT #4) and charging (probably more like information for an SLA with an enterprise) WT#6.

For a first release can deprioritise QoS/policy (WT#7).

WT#8, Positioning (e.g. where is the item with tag ID #abcdef in a warehouse with 1 million tags in it) is probably important but could be led by RAN, and need not drive the overall SA2 work.

WT#9 Congestion control -> this is important, but SA2/CT/RAN have well developed concepts already, so this probably does not need to be in the initial study, but just go straight into any subsequent WID.

WT#10 seems to be "one architecture alternative" that could come from the RAN plenary study - not a separate task to WT#1.

21 – Apple (UK) Limited

We suggest the following WTs to consider for R19:

- **WT-2:** How to identify the new AIoT devices should be studied.
- **WT-3:** We need to generalize the wording and study whether and how existing Registration, connection management, reachability and paging procedures apply to AIoT devices, or whether we should consider something very different and develop different procedures.
- **WT-5:** it is essential to study the procedures in WT-3 considering the security aspects. We can then task SA3 to take it further, review and complete the security procedures.
- **WT-4:** We need to study what / how services are applicable to these highly constrained devices. Exposure of network capabilities is also important.

WTs we think don't need to progress in Rel-19:

- **WT-1:** We think the procedures in WT-2 will prescribe what architectural options we need to consider, so this WT can be covered in WT-2 once procedures are known.
- **WT-7:** We consider no QoS support (and associated policies) for AIoT.
- **WT-8:** Whether this is included in R19 should be decided by RAN.
- **WT-9:** We need to understand first how RAN provides access control for these devices.
- **WT-10:** This WT can be covered in other WTs.

22 – Apple (UK) Limited

We agree with Nokia and LG that R19 should only focus on the study due to the heavy RAN dependency.

23 – Deutsche Telekom AG

We also agree that R19 should only focus on the study due to the heavy RAN dependency.

Feedback Form 2: Can any of the Work Tasks above be combined/merged?

1 – Ericsson LM

Propose to merge WT#2 into WT#3 and WT#4.

2 – MediaTek Inc.

WT-2 and WT-3 should belong together

3 – MediaTek Inc.

WT-3 and WT-4 to be merged as well

4 – Huawei Technologies France

WT-10 should be covered by WT-1, WT-3 & WT-4. The remaining WTs may have dependencies between them because of new capabilities/requirements for AIoT but can remain separate.

5 – Qualcomm CDMA Technologies

WT#10 can be merged with WT#1 (the wording of WT#1 is generic enough to consider WT#10 already merged, i.e. no further changes needed).

6 – Nokia Korea

Similarly to Qualcomm, We think no merger is needed (WT#10 can be just removed as we don't expect any changes in other WTs).

7 – Orange

WT#2 and WT#3 should be merged.

WT#10 should be merged into WT#1 and WT#3.

WT-Philips-1 should be covered by WT#1 and WT#3 and since these WTs do not assume that current procedures and protocols will apply to Ambient IoT, the words "simplification" and "reduced complexity" do not make sense. Also, it is not sure that complexity will be reduced.

WT-NTT DOCOMO-2 should be merged into WT#5. Not sure that "user data" applies to all Ambient IoT scenarios.

8 – Motorola Mobility Germany GmbH

[Lenovo]

Merge WT-3, WT-4 and WT-10: the scope of such merged WT would be to study the E2E procedures to support:

- registration of AIoT devices,
- configuration of AIoT devices, RAN and CN for: (a) reachability to AIoT devices and (b) data collection from AIoT devices;
- data delivery to the AF/AS,
- exposure of AIoT service(s) to AF.

Merge WT-2 (identification) and WT-6 (Security): as the identities needs to be protected, it would make sense to consider the WT-2 and WT-6 together. A sub-WT may include to study the data integrity and/or protection.

9 – Futurewei Technologies

Because AIoT devices are very simple devices and closely associated with certain AIoT services, so the operation on the device and services can be closely tied. **WT#2, WT#3, WT#4 and WT #10** can be merged as single WT on AIoT devices and service management, while existing WT#2, WT#3, WT#4 can be sub-WT.

10 – CATT

WT#2 can be merged into WT#3 and WT#4, as we should study what and how AIoT identity is used in Mobility Management and Connection Management procedures.

11 – Samsung Electronics Co.

- WT#6 and WT#7 can be merged
- WT#4 and WT#10 can be merged
- WT#9 can be merged with all WTs

12 – VODAFONE Group Plc

Please see comments in feedback form 1 with regard to task ordering.

Agree with Qualcomm that WT #10 is in WT#1.

13 – Apple (UK) Limited

WT-10 can be merged into WT-2.

WT-2 and WT-3 can be merged.

14 – Apple (UK) Limited

WT-1 and WT-2 can be merged.

15 – Apple (UK) Limited

WT-3 and WT-4 can be merged. Support Mediatek proposal on [Merge of WT-2 and WT-3] and [Merge of WT-3 and WT-4] in *Feedback Form 3*.

Feedback Form 3: Should any of the Work Tasks above be reworded? If so, propose the required rewording.

1 – China Mobile Com. Corporation

WT#3 should be modified with adding "support mobility, power saving, and new connection mode maybe designed if needed"

WT#4 should be reworded.

WT#4: Services for Ambient IoT (e.g ~~small data transfer~~, sensor data transfer, Inventory service etc.)

WT#9 should be modified with adding "overload control", since the congestion control may only imply the user plane congestion.

WT#10 should be combined with WT#3.

2 – Ericsson LM

WT#1 proposed to be reworded as to generalize the actual WT, as the notes already implies that device types and connectivity topologies to be supported is dependent on RAN, to: WT-1: Architecture updates to support Ambient IoT.

+ note 1 and 2 kept.

WT#2 merged into WT#3 and WT#4 as follows:

Add following note to WT#3 and to WT#4:

NOTE: This includes evaluating the identifiers used and how subscription data is used.

Agree with CMCC that WT#9 should be modified, but proposes:

WT#9: Study whether and how to use and modify overload and congestion control mechanisms for the support of of Ambient IoT.

3 – OTECH

[OPPO]

It is recommend to reword WT#2 as below,

WT#2: Ambient IoT device identification

WT#2.1 study the Ambient IoT device Identification including the format in order to recognize the Ambient IoT device in the 5GS and the management with or without 3rd party assistance.

4 – ZTE Corporation

Rewording NOTE 2 under WT-1 as following:

NOTE 2: Which types of the ambient IoT devices (type A, type B, Type C as defined in TR 38.848) will be in the scope of this study and their priorities requires coordination with RAN.

Rewording WT-4.1 as following:

WT#4.1: Study the procedure to support data transmission for the ambient IoT devices, and whether and how the session management is used.

Rewording WT-6 as following:

WT#6: Charging

Study what data needs to be collected for Ambient IoT services and devices for the purpose of charging (detailed charging mechanism and procedures will be defined in SA5).

5 – MediaTek Inc.

WT-1 will need to be reworded as coordination between RAN and SA takes place. I.e. the study must be close-ended in terms of Device types and Topologies. Said otherwise, the NOTES will need to disappear before the SI is submitted for approval, and the WT-1 defined accordingly

[Merge of WT-2 and WT-3]

WT-2: Subscription, Identification, Registration and Connection management

WT-2-1: Whether, depending on the Device Type (A, B, C *), on its characteristics (esp. max data rate (see NOTE)) and on the Topology (1, 2, 3, 4 *), Subscription Management, Registration Management and/or Connection Management is necessary, and if so identify the necessary state machine(s), procedures and functionality applicable to:

- The Ambient IoT device
- The Assisting node
- The Reader UE
- The network

NOTE: the max data rates supported by the Ambient IoT Device in Uplink and in Downlink as defined by RAN i.e. "raw" data rate regardless whether data contain user data or signaling data (if applicable).

WT-2-2: Whether and how, resulting from WT-2-1, an Ambient IoT Device is individually identified in the network, assisting node and/or UE.

[As commented above, device type and topology are to be aligned in coordination with RAN]*

[Merge of WT-3 and WT-4]

WT-3: User data transfer

WT-3-1: Depending on the Device Type (A, B, C*), on its characteristics (esp. max data rate) and on the Topology (1, 2, 3, 4 *), how to support data transmission to and from an Ambient IoT device, whether the data contain user data or signaling data (if applicable)

WT-3-2: as WT#4.2 is currently proposed above

6 – Huawei Technologies France

WT#1: Architecture update to support Ambient IoT for supported all devices and topologies (i.e Device A/B and Device C as defined in TR 38.848)

NOTE: SA2 will coordinate with RAN, if needed, for which devices and topologies RAN determines to study.

WT#3: Should add a note about devices and topologies which is applicable to WT#3.1 and WT#3.2. WT#1 should be reflected here.

WT#3.1: Study whether and how to perform registration and connection management, including their states, to support ambient IoT devices.

WT#3.2: Study the impact ambient IoT devices capability and characteristics on existing reachability and paging aspects and whether and how they are supported.

WT#4.1: Study the procedure to support data transmission and inventory services for ambient IoT devices.

WT#4.2: Study the exposure of network functionality to 3rd party including support of data transfer and inventory services.

WT#4.3: Study whether any additional services (apart from data transfer and inventory) are required for AIoT and how they are exposed to a 3rd party.

WT#5: Support or security procedures

WT#6: Support of Charging, Study what data needs to be collected and by which NF for Ambient IoT services and devices for the purpose of charging.

WT#8: Support of Positioning an AIoT Device.

NOTE: SA2 will coordinate with RAN, if needed, according to any potential study related to positioning in RAN.

7 – Nokia Korea

WT#2.1: Study how to identify the Ambient IoT device in the 5GS and how to format the identifier.

WT#2.2: Study whether and how to manage subscription data.

WT#3.2: Study how to discover the Ambient IoT devices and check the reachability of them.

(Reason: The existing text appears to imply that only the existing paging methods shall be used with potential improvements.)

WT#4: Services for Ambient IoT

(Reason: Generalize the wording to data transmission but not small data transfer. The latter has been discussed in different work items. It's better to clarify differences to former releases. A better way maybe delete all service details from the WT title and provide detailed scope in sub-WTs)

WT#8: Positioning aspects

(Reason: Ranging part should be removed.)

8 – Orange

WT#1 should be reworded to "Architecture updates to support Ambient IoT." (as proposed by Ericsson), otherwise it contradicts Note 2. In addition, this WT should include defining the status of the "ambient IoT device" in the system architecture (e.g. whether it is a UE or a new entity).

WT#3.2 should be reworded as "Study whether reachability and paging apply to Ambient IoT device, and if so, what are the impacts"

WT#4 should be reworded as "Services enabled by Ambient IoT" (the Ambient IoT device is not necessarily the recipient of these services).

WT#4.1 should be reworded as "Study the procedure to support data transmission WITH the ambient IoT devices."

WT#4.2 should be reworded as "Determine what services enabled by Ambient IoT are exposed to third parties and how".

WT#5 should be updated to also include privacy aspects.

9 – Motorola Mobility Germany GmbH

[Lenovo]

New WT-2 (merged WT-2 and WT-6): Study how to identify the Ambient IoT device or group of device in the 5GS including the following aspects:

WT-2.1: format of the device (or group) identifier.

WT.2.2: security protection of the device identifier and the device signalling/data.

WT.2.3: subscription management.

New WT-3 (merged WT-3, WT-4 and WT-10): Study whether and how the following procedures can be supported:

WT-3.1: registration of AIoT devices,

WT-3.2: configuration of AIoT devices, RAN and CN for: (a) reachability to AIoT devices and (b) signalling/data transmission to/from AIoT devices;

WT-3.3: data delivery to the AF/AS;

WT-3.4: exposure of AIoT service(s) to AF.

10 – Futurewei Technologies

support Motorola suggestion on **WT#2** to add group devices identification and management.

Support Ericsson suggestion on **WT#9**, add note” SA2 will coordinate with RAN.”

11 – China Mobile Com. Corporation

WT#7 is suggested to be reworded as follows (groups of Ambient IoT device is added):

WT#7: QoS and Policy aspects

Study whether and how to support QoS and Policy for Ambient IoT devices or groups of Ambient IoT device

12 – China Mobile Com. Corporation

WT#7 is suggested to be reworded as follows (groups of Ambient IoT device is added):

WT#7: QoS and Policy aspects

Study whether and how to support QoS and Policy for Ambient IoT devices or groups of Ambient IoT device

13 – InterDigital Communications

Suggest to reword WT#1 as:

WT-1: Architecture enhancementupdate to support Ambient IoT for all types of devices (type A, type B, Type C as defined in TR-38.848)

We should not assume all device types are supported at this point of time. And it is part of the study to device which types are supported and how.

14 – CATT

The proposed rewordings are as followings:

WT-1 Architecture enhancements to support RAN concluded Ambient IoT Device types and connectivity topologies

WT-2 can be merged into WT#3

WT-3 Whether and how to perform mobility management for Ambient IoT devices

WT-4 Whether and how to perform session management and data transmission for Ambient IoT devices

WT-10 Whether and how to authorize a UE or NG-RAN node to communicate with Ambient IoT devices

15 – LG Electronics France

WT#1: We agree with Ericsson. Anyhow, maybe using "Architecture enhancements" instead of "Architecture update" is appropriate as below:

- WT#1: Architecture enhancements to support Ambient IoT

WT#8: As commented in our feedback to the 1st Q, only positioning can be considered as scope in Rel-19 with the following rewording:

- WT#8: Positioning/Location for Ambient IoT

Study whether and how to enhance the existing positioning/location mechanisms to support Ambient IoT services and devices

WT#9: We are also fine to add "overload control" aspect to WT-9 and propose to reword as below:

- WT#9: Overload control and congestion control for Ambient IoT

Study whether and how to enhance overload and congestion control mechanisms for the support of Ambient IoT.

16 – Beijing Xiaomi Mobile Software

WT-1: Architecture update to support Ambient IoT devices

NOTE1: Which Connectivity topologies as defined in TR38.848 will be in the scope of this study requires coordination with RAN.

NOTE 2: Which types of the ambient IoT devices (type A, type B, Type C as defined in TR 38.848) will be in the scope of this study requires coordination with RAN.

<p>WT#9: Study whether and how to support the congestion control and overload mechanism for the Ambient IoT.</p> <p>WT-10: merge into WT-3.</p>
<p>17 – Beijing Xiaomi Mobile Software</p> <p>WT#1, #3, #4, #7, #8, #10 has the dependency with RAN.</p> <p>WT#5 has the dependency with SA3.</p> <p>WT#6 has the dependency with SA5.</p>
<p>18 – Beijing Xiaomi Mobile Software</p> <p>For WT-4 and WT-8, whether the WT-4 is related to the data transfer/session management, and the data/event report exposure for the AF? Or also includes the related Ambient IoT service support, e.g. Positioning and/or ranging for Ambient IoT services and devices?</p> <p>Base on the clarification, the WT-8 could be merged into WT-4, and rewording as follows:</p> <p>WT#4: Services and the data transfer for Ambient IoT</p> <p>WT#4.1: Study the procedure to support data transmission for the ambient IoT devices.</p> <p>WT#4.2: Study the services for Ambient IoT (e.g small data transfer, Inventory service, relative positioning for Ambient IoT services etc.)</p> <p>WT#4.3: Study the data exposure to the 3rd party to support the ambient IoT services.</p>
<p>19 – Samsung Electronics Co.</p> <p>No</p>
<p>20 – VODAFONE Group Plc</p> <p>WT#5: Study architecture aspects to support authentication and authorization for the Ambient IoT devices (detailed authentication and authorization mechanism will be defined in SA3), <u>in particular the validation of the device’s ID and the secure decommissioning of devices.</u></p>
<p>21 – Apple (UK) Limited</p> <p>Support Mediatek proposal on [Merge of WT-2 and WT-3] and [Merge of WT-3 and WT-4].</p>

2.2 Additional Work Tasks

As well as the initial set of Work Tasks in section 2.1 companies can request to add additional Work Tasks. The naming of these additional Work Tasks should follow the format: WT-company name-# (eg WT-Samsung-1) so that other participants can reference them.

Feedback Form 4: Are there any additional Work Tasks that should be part of Rel-19?

1 – Philips International B.V.

A work task related to simplification of protocols and procedures (as mentioned in SWS-230059) seems to be missing:

WT-Philips-1 (could potentially be subtask of WT#3 or WT#1): Study whether and how to support simplified protocol stack, and reduced complexity protocols and procedures to fit Ambient IoT device capabilities and characteristics.

2 – DOCOMO Communications Lab.

WT-NTT DOCOMO-1 Study how to identify a group of ambient IoT devices and how to manage the group of devices.

WT-NTT DOCOMO-2: Study architecture aspects to confidentiality and integrity of user data and signalling for the Ambient IoT devices (detailed mechanism will be defined in SA3)

3 – vivo Mobile Communication Co.

vivo proposes the following additional WTs:

WT-vivo-1: How 5G system support 3rd party requested services for Ambient IoT (e.g. inventory, read, write, etc.).

Which can be the sub-WT of WT#4.

Because the current sub-WT 4.1 and 4.2 only focus on data transmission and lack of how to support the other AIoT services in 5G system.

vivo also support to add WT-Philips-1

- “WT-Philips-1 (could potentially be subtask of WT#3 or WT#1): Study whether and how to support simplified protocol stack, and reduced complexity protocols and procedures to fit Ambient IoT device capabilities and characteristics.”

4 – InterDigital Communications

In a lot of SA1 use cases, device triggering is an important component so InterDigital would like to propose the following additional WT. It could be a sub-task of WT#3 or WT#4. It’s also similar to ”WT-vivo-1”.

WT-InterDigital-1: Study how to enable 3rd application to trigger the ambient IoT devices for communication

5 – Ericsson LM

None identified, it seems that was is proposed by each of the previous proposals can be studied as part of the existing WTs.

6 – OTECH

[OPPO]

OPPO supports WT-NTT DOCOMO-1, and think it could be added in WT#2 as, WT2.3, study how to identify a group of ambient IoT devices and how to manage the group of devices.

OPPO thinks WT-Philips-1 is the design principle, not WT.

7 – MediaTek Inc.

We fully agree with the proposal from Philips.

As we have explained earlier, Ambient-IoT is defined by devices that are severely constrained - thus we should take this as the starting point and define the "system" around those, rather than try to make these devices adapt to the overcomplicated 5GS design we have today, which is simply not going to work (e.g. all procedures and associated signaling imposed by 5GS are a complete showstopper for Ambient IoT)

8 – Huawei Technologies France

No new overall new WTs are required, some additional subtasks should be added/clarified.

Under WT#4, add:

WT#4.3: Study whether any additional services (apart from data transfer and inventory) are required for AIoT and how they are exposed to a 3rd party.

9 – TNO

KPN believes the following should also be a part of this study, and is currently missing

- we need to study how to trigger a specific group of AIoT devices in a specific location, and define APIs for that. This includes APIs for where and when RF power needs to be provided.

10 – Futurewei Technologies

Support WT-NTT DOCOMO-1 to consider group AIoT device identification and management which can be merged into WT#2.

Support KPN's new proposal for group trigger.

11 – CATT

No totally new WT is identified, should try to update existing WTs to include new ones if required.

12 – LG Electronics France

We support WT-NTT DOCOMO-1.

13 – Samsung Electronics Co.

No, it's enough.

14 – VODAFONE Group Plc

Tend to agree with Phillips and Mediatek that we should have a radically simpler system and protocols than EPC or 5GC.

15 – Apple (UK) Limited

We support WT-NTT DOCOMO-1.

WT-vivo-1 is covered by [Merge of WT-3 and WT-4].

We agree with OPPO that WT-Philips-1 is more of a design principle rather than a WT.

WT-NTT DOCOMO-2 should be covered in WT-5.

Feedback Form 5: If there are any additional Work Tasks required, describe them

1 – Samsung Electronics Co.

No, It's enough.

3 Dependencies

These feedback forms will help define the dependencies between Work Tasks, dependencies of Work Tasks on other Working Groups (SA, RAN or CT), and dependencies on other potential SA2 Rel-19 SIDs and WIDs. The Work Tasks can be from the list in section 2.1, or any additional Work Tasks identified in the feedback in section 2.2.

Feedback Form 6: Describe the dependencies that any of the Work Tasks have on other 3GPP Working Groups

1 – DOCOMO Communications Lab.

At least WT#1 has a RAN dependency. The scope will need to be coordinated with RAN to determine which types of Ambient IoT devices (A, B, C as defined in TR 38.848) will be included.

WT#5 and WT-NTT DOCOMO-2 have SA3 dependency. WT#6 has an SA5 dependency.

2 – Ericsson LM

RAN dependencies to WT#1-4, 5, 7, 8, 10, SA3 dependencies to mainly WT#5 but SA3 may need to consider also WT#1, #2, #3, #4. SA5 dependencies to WT#6, WT#10.

3 – OTECH

[OPPO]

WT#1 has dependencies on RAN. Agree that which topologies and device types will be in the scope of this study requires coordination with RAN.

WT#5 and WT#6 have dependencies on SA3 and SA5 respectively.

4 – MediaTek Inc.

We agree with OPPO.

5 – Huawei Technologies France

WT#1: The RAN topologies may have an impact on the architecture, however many aspects may remain common, so later alignment is possible.

WT#3: for which devices (i.e. passive RAN Device A and Device B or active Device C) and topologies will depend on RAN, however many aspects may remain common finally, so later alignment is possible.

WT#4: The RAN topologies may have an impact on how some services are handled within 5GS, so there maybe some small later alignment with RAN required, however their exposure to 3rd parties should not depend upon RAN topologies.

WT#5: The exact details of the security procedures will depend on SA3, however many aspects and be studied.

WT#6: The exact details on what needs to be collected will depend upon SA5, however SA2 can study what information can be collected and by who.

WT#8: Fully depends on whether RAN support positioning.

6 – Qualcomm CDMA Technologies

WT#1 requires coordination with RAN WGs as the device types and topologies to be supported impact what the architecture needs to support.

WT#8 (positioning/ranging) requires coordination with RAN WGs.

WT#5 depends on SA#3.

7 – Nokia Korea

WT#1 has RAN dependency.

WT#5 and WT-NTT DOCOMO-2 has SA3 dependency.

WT#6 has SA5 dependency.

8 – Futurewei Technologies

WT#1, #3, #4, #5, WT#8 and WT#9 can have RAN dependence.

WT#5 has SA3 dependence and prefer SA3 to take lead.

WT#6 has SA5 dependence and prefer SA5 to take lead.

9 – CATT

WT#1 has RAN dependency on Device types and connectivity topologies.

WT#5 has SA3 dependency.

WT#6 has SA5 dependency.

WT#8 has RAN dependency.

10 – LG Electronics France

WT#1 has obviously RAN dependencies, therefore which connectivity topologies and device types will be in the scope of this study requires coordination with RAN.

WT#3, WT#4, WT#8, WT#9 and WT#10 may have RAN dependencies.

WT#5 has SA3 dependencies.

WT#6 has SA5 dependencies.

11 – Beijing Xiaomi Mobile Software

WT#1, #3, #4, #7, #8, #10 has the dependency with RAN.

WT#5 has the dependency with SA3.

WT#6 has the dependency with SA5.

12 – Samsung Electronics Co.

- WT#1, WT#3, and WT#10 have dependencies with RAN. RAN should decide which type of devices and topologies are supported in Rel-19
- WT#5 has dependency with SA3

Feedback Form 7: Describe dependencies between the Work Tasks

1 – Ericsson LM

WT#1 is dependent on 2, 3 and 4 as architecture may be dependent on the procedures (may be dependent on 5 as dependent on how security is enabled), and one can also argue that procedures are dependent on the architecture i.e. WT#3 and WT#4 dependent on WT#1. WT#2 dependent on WT#3 and WT#4 i.e. suggests to merge 2 into 3 and 4.

2 – OTECH

OPPO]

WT#2-10 have dependencies on WT#1.

WT#2 and WT#3 have dependencies on WT#5.

3 – MediaTek Inc.

See above - WT have been rearranged (WT2/3 and WT3/4)

4 – Huawei Technologies France

All WTs will have some small dependency on WT#2 for device identification.

5 – Qualcomm CDMA Technologies

WT#2-#10 depend on the overall architecture (WT#1).

6 – Nokia Korea

WT#1 has dependencies with all the other WTs.

7 – CATT

WT#1 and the other WTs have inter-dependency.

WT#2 and the other WTs have inter-dependency.

8 – LG Electronics France

WT#1 including NOTE 1 and NOTE 2 has dependencies with all the other WTs.

9 – Beijing Xiaomi Mobile Software

WT#2 has the dependency with WT-1, WT-3 WT-4 and WT-5.

WT#3 has the dependency with WT#1 and WT#2.

WT#4 has the dependency with WT#1 and WT#2.

WT#7 has the dependency with WT#1, WT#3, WT#4.

WT#10 has the dependency with WT#1 and WT#3.

10 – Samsung Electronics Co.

WT#4 and WT#10 have dependency.

11 – VODAFONE Group Plc

See my response on feedback form 1, please.

Feedback Form 8: Describe any dependencies on potential work/study items that might be created as a result of the other Q3 moderated discussions.

1 – Samsung Electronics Co. No
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4 Partitioning

These questions will help determine whether there is one, or more than one, Study Item, Work Item or TEI-19 item to be created from these Work Tasks.

Feedback Form 9: Should there be more than one SID, WID or TEI-19 item created based on the Work Tasks?

1 – DOCOMO Communications Lab. No. One SID should be created.
2 – Ericsson LM No, one SID is ok
3 – MediaTek Inc. No - a single SID is ok.
4 – Huawei Technologies France ONE SID
5 – Nokia Korea No, one SID is enough.
6 – Orange One Study Item.
7 – Futurewei Technologies One study item is enough.

8 – China Mobile Com. Corporation One SID is enough.
9 – InterDigital Communications One SID should be enough.
10 – CATT One Study Item.
11 – LG Electronics France No, one SID is sufficient. In particular, only study should be performed in Rel-19 due to the large amount of work/objective expected for this topic and the need for tight coordination with RAN.
12 – Samsung Electronics Co. One WID

Feedback Form 10: If the answer to the above question is yes, describe how the Work Tasks should be partitioned into different items.

1 – Samsung Electronics Co. <ul style="list-style-type: none">- It may affect other WI, such as UPEAS, ProSe and so on- UPF needs to differently handle data from Ambient IoT<ul style="list-style-type: none">+ Data from Ambient IoT has its own characteristics comparing any other traffic from other devices- In Ambient IoT, communications over multiple hops are necessary

5 Summary

5.1 Summary from section 2.1

Summary of the Feedback 1 Which of the above Work Tasks should be in scope of Rel-19?

22 companies (NTT Docomo, Ericsson, OPPO, ZTE, Mediatek, Huawei, Qualcomm, Nokia, Orange, Lenovo, KPN, Futurewei, InterDigital, CATT, LGE, Xiaomi, Samsung, vivo, China Mobile, Vodafone,

Apple, Deutsche Telekom) have provided the feedback.

Summary per on WTs (Notes from moderator: if the company A have only provided WT#X should not be in the scope/ required, moderators counts other WTs as “should be in the scope-implicitly”; if the company A have only provided WT#X should be in the scope/ required, moderators counts other WTs as “should not be in the scope-implicitly”);

- WT#1
 - Support to be in the scope(19/21): NTT Docomo, Ericsson, OPPO, ZTE, Mediatek, Huawei, Qualcomm, Nokia, Orange, KPN, Futurewei, InterDigital(Implicitly), CATT, LGE, Xiaomi, Samsung, vivo, China Mobile, Vodafone;
 - Other Views (2/21): Not essential (Lenovo, Apple)

- WT#2
 - Support to be in the scope(20/21): NTT Docomo, Ericsson, OPPO, ZTE, Huawei, Qualcomm, Nokia, Orange, Lenovo, KPN, Futurewei, InterDigital(Implicitly), CATT, LGE, Xiaomi, Samsung, vivo, China Mobile, Vodafone, Apple
 - Other Views (1/21): Unclear (MediaTek)

- WT#3
 - Support to be in the scope(20/21):NTT Docomo, Ericsson, OPPO, ZTE, Huawei, Qualcomm, Nokia, Orange, Lenovo, KPN, Futurewei, InterDigital(Implicitly), CATT, LGE, Xiaomi, Samsung, vivo, China Mobile, Vodafone, Apple
 - Other Views (1/21): Unclear (MediaTek)

- WT#4
 - Support to be in the scope(21/21):NTT Docomo, Ericsson, OPPO, ZTE, Mediatek, Huawei, Qualcomm, Nokia, Orange, Lenovo, KPN, Futurewei, InterDigital(Implicitly), CATT, LGE, Xiaomi, Samsung, vivo, China Mobile, Vodafone, Apple
 - Other Views :

- WT#5
 - Support to be in the scope(12/21): OPPO, Huawei, Qualcomm, Orange, Lenovo, KPN, InterDigital(Implicitly), Xiaomi, Samsung, vivo, Vodafone, Apple
 - Other Views (6/21):
 - WT#5 should be lead by SA3 (Ericsson, MediaTek, Nokia, Futurewei, CATT, vivo)

- WT#6
 - Support to be in the scope(7/21): OPPO, Huawei, Qualcomm, Orange, KPN, Xiaomi, Vodafone

- Other Views (8/21): WT#6 should be lead by SA5 (Ericsson, MediaTek, Nokia, Lenovo, Futurewei, CATT, vivo), Not in the scope (InterDigital)
- WT#7
 - Support to be in the scope(2/21): ZTE, Xiaomi
 - Other Views (12/21): not needed explicitly indicated (Mediatek, Huawei, Orange, Qualcomm, Nokia, Lenovo, Futurewei, InterDigital, CATT, vivo, Vodafone, Apple)
- WT#8
 - Support to be in the scope(5/21): Qualcomm, Nokia (positioning), KPN, Xiaomi, LGE(positioning can be included)
 - Other Views (10/21): not needed explicitly indicated (Mediatek, Huawei, Orange, Lenovo, InterDigital), Dependent on RAN WG's decision to support or not (Futurewei, CATT, vivo, Vodafone, Apple:).
- WT#9
 - Support to be in the scope(9/21): OPPO, Qualcomm, Nokia (type C only), Orange, KPN, Futurewei, LGE, Samsung (should be considered when considering above WTs) , China Mobile
 - Other Views (8/21): not needed explicitly indicated (MediaTek, Huawei, CATT, vivo, Vodafone, Apple), Low priority(Lenovo,InterDigital)
- WT#10
 - Support to be in the scope(5/21): MediaTek, Qualcomm, CATT, LGE, vivo
 - Other Views (10/21): not needed explicitly indicated (Orange, InterDigital); Covered by other WTs (Ericsson, Huawei, Qualcomm, Nokia, Lenovo, Futurewei, Vodafone, Apple)

Summary of the Feedback 2-Can any of the Work Tasks above be combined/merged? & Feedback 3: Should any of the Work Tasks above be reworded? If so, propose the required rewording.

12 companies (Ericsson, MediaTek, Huawei, Qualcomm, Nokia, Orange, Lenovo, Futurewei, CATT, Samsung, Vodafone, Apple) have provided answers to the feedback 2.

17 companies (China Mobile, Ericsson, OPPO, ZTE, MediaTek, Huawei, Nokia, Orange, Lenovo, Futurewei, InterDigital, CATT, LGE, Xiaomi, Samsung, Vodafone, Apple) have provided answers to the feedback 3.

Summary per on WTs (Notes from moderators: since feedback 2 and feedback 3 are linked, they are summarized together)

WT#1

- Ericsson: WT-1: Architecture updates to support Ambient IoT. + note 1 and 2 kept.

- ZTE: NOTE 2 rewording;
- MediaTek: WT-1 will need to be reworded as coordination between RAN and SA takes place.
- Huawei: WT#1: Architecture update to support Ambient IoT for supported all devices and topologies (i.e Device A/B and Device C as defined in TR 38.848) + note reworded
- Orange: WT#1 should be reworded to "Architecture updates to support Ambient IoT." (as proposed by Ericsson). In addition, this WT should include defining the status of the "ambient IoT device" in the system architecture (e.g. whether it is a UE or a new entity).
- InterDigital: WT-1: Architecture enhancement to support Ambient IoT
- CATT: WT-1 Architecture enhancements to support RAN concluded Ambient IoT Device types and connectivity topologies
- LGE: WT#1: We agree with Ericsson. Anyhow, maybe using "Architecture enhancements" instead of "Architecture update" is appropriate as below:
WT#1: Architecture enhancements to support Ambient IoT
- Xiaomi: WT-1: Architecture update to support Ambient IoT devices. + note 1 and 2
- Apple: WT-1 and WT-2 can be merged.

WT#2

- Ericsson: Propose to merge WT#2 into WT#3 and WT#4. Add following note (NOTE: This includes evaluating the identifiers used and how subscription data is used.) to WT#3 and to WT#4:
- MediaTek □ WT-2 and WT-3 should belong together
- OPPO: Reworder proposal on WT#2.1.
- Nokia: Reworder proposal on WT#2.1 and WT#2.2
- Orange: WT#2 and WT#3 should be merged.
- Lenovo: Merge WT-2 (identification) and WT-6 (Security): as the identities needs to be protected, it would make sense to consider the WT-2 and WT-6 together. A sub-WT may include to study the data integrity and/or protection.
- Futurewei: WT#2, WT#3, WT#4 and WT #10 can be merged as single WT on AIoT devices and service management, while existing WT#2, WT#3, WT#4 can be sub-WT.
support Motorola suggestion on WT#2 to add group devices identification and management.
- CATT: WT#2 can be merged into WT#3 and WT#4,
- Apple: WT-2 and WT-3 can be merged. WT-1 and WT-2 can be merged. Support Mediatek proposal on [Merge of WT-2 and WT-3] and [Merge of WT-3 and WT-4].

WT#3

- China Mobile: WT#3 should be modified with adding "support mobility, power saving, and new connection mode maybe designed if needed"
- Ericsson: Propose to merge WT#2 into WT#3 and WT#4 Add following note (NOTE: This includes evaluating the identifiers used and how subscription data is used.) to WT#3 and to WT#4:
- MediaTek □ Merge of WT-2 and WT-3 and detailed wording is provided
- Huawei: **WT#3:** Should add a note about devices and topologies which is applicable to WT#3.1 and WT#3.2. WT#1 should be reflected here. Detailed wording on WT#3.1 and WT#3.2 is provided.
- Nokia: WT#3.2: Study how to discover the Ambient IoT devices and check the reachability of them.
- Orange: WT#3.2 should be reworded as "Study whether reachability and paging apply to Ambient IoT device, and if so, what are the impacts"
- Lenovo:
Merge WT-3, WT-4 and WT-10, detailed wording is provided
- Futurewei: WT#2, WT#3, WT#4 and WT #10 can be merged as single WT on AIoT devices and service management, while existing WT#2, WT#3, WT#4 can be sub-WT.
- CATT: WT-3 Whether and how to perform mobility management for Ambient IoT devices;
- Apple: WT-2 and WT-3 can be merged. WT-3 and WT-4 can be merged. Support Mediatek proposal on [Merge of WT-2 and WT-3] and [Merge of WT-3 and WT-4] in Feedback Form 3.

WT#4

- China Mobile: WT#4 should be reworded.

WT#4: Services for Ambient IoT (e.g sensor data transfer, Inventory service etc.)

- Ericsson: Propose to merge WT#2 into WT#3 and WT#4 Add one note to WT#3 and to WT#4
- ZTE: Rewording WT-4.1
- MediaTek: [Merge of WT-3 and WT-4] and detailed wording is provided.
- Huawei: Detailed wording on WT#4.1, 4.2, 4.3 is provided.
- Nokia: WT#4: Services for Ambient IoT
- Orange
WT#4 Services enabled by Ambient IoT
Detailed wording on WT#4.1 and 4.2 is also provided.
- Lenovo:
Merge WT-3, WT-4 and WT-10, detailed wording is provided
- Futurewei: WT#2, WT#3, WT#4 and WT #10 can be merged as single WT on AIoT devices and service management, while existing WT#2, WT#3, WT#4 can be sub-WT.

- CATT: WT-4 Whether and how to perform session management and data transmission for Ambient IoT devices
- Xiaomi: the WT-8 could be merged into WT-4, and rewording is provided
- Samsung: WT#4 and WT#10 can be merged

WT#5

- Huawei: WT#5: Support or security procedures
- Orange: WT#5 should be updated to also include privacy aspects.
- Lenovo: Merge WT-2 (identification) and WT-6 (Security): and detailed wording is provided.
- Vodafone:
Reworded WT#5 and one sentence “in particular the validation of the device’s ID and the secure decommissioning of devices” is added.

WT#6

- ZTE

WT#6: Charging

Study what data needs to be collected for Ambient IoT services and devices for the purpose of charging (detailed charging mechanism and procedures will be defined in SA5).

- Huawei: WT#6: Support of Charging, Study what data needs to be collected and by which NF for Ambient IoT services and devices for the purpose of charging.
- Samsung: WT#6 and WT#7 can be merged

WT#7

- China Mobile
WT#7: QoS and Policy aspects
Study whether and how to support QoS and Policy for Ambient IoT devices or groups of Ambient IoT device
- Samsung: WT#6 and WT#7 can be merged

WT#8

- Nokia:
WT#8: Positioning aspects
- Huawei:
WT#8: Support of Positioning an AIoT Device. And one note is added
- LGE:
WT#8: Positioning/Location for Ambient IoT
Study whether and how to enhance the existing positioning/location mechanisms to support Ambient IoT services and devices
- Xiaomi: WT#8 can be merged into WT#4.

WT#9

- Ericsson: Agree with CMCC that WT#9 should be modified, , but proposes:
WT#9: Study whether and how to use and modify overload and congestion control mechanisms for the support of of Ambient IoT.
- Futurewei: Support Ericsson suggestion on WT#9, add note "SA2 will coordinate with RAN."
- LGE: proposes the wording
WT#9: Overload control and congestion control for Ambient IoT
Study whether and how to enhance overload and congestion control mechanisms for the support of Ambient IoT..
- Xiaomi:
WT#9: Study whether and how to support the congestion control and overload mechanism for the Ambient IoT.
- Samsung: WT#9 can be merged with all WTs

WT#10

- China Mobile: WT#10 should be combined with WT#3.
- Huawei: WT-10 should be covered by WT-1, WT-3 & WT-4.

- Qualcomm, Nokia, Vodafone: WT#10 can be merged with WT#1 (the wording of WT#1 is generic enough to consider WT#10 already merged, i.e. no further changes needed).
- Orange: WT#10 should be merged into WT#1 and WT#3.
- Lenovo:
Merge WT-3, WT-4 and WT-10: and detailed wording is provided
- Futurewei: WT#2, WT#3, WT#4 and WT #10 can be merged as single WT on AIoT devices and service management, while existing WT#2, WT#3, WT#4 can be sub-WT.
- CATT: WT-10 Whether and how to authorize a UE or NG-RAN node to communicate with Ambient IoT devices
- Xiaomi: WT-10: merge into WT-3.
- Samsung: WT#4 and WT#10 can be merged
- Apple: WT-10 can be merged into WT-2.

Moderator Proposal(s)

Moderator Proposal-WT#1 (MP#1):

The WT#1 is included and WT#1 is reworded, and the note 1 and note 2 are merged and reworded. The NOTE will be kept until coordination between RAN and SA has determined which types of the ambient IoT devices and connectivity topologies as defined in TR38.848 to be studied in Rel-19.

WT#1 is reworded as:

WT#1 Architecture enhancements to support Ambient IoT

NOTE: Coordination between RAN and SA is required to determine which types of the ambient IoT devices and which connectivity topologies as defined in TR38.848 will be in the scope of this study.

Moderator Proposal-WT#2 (MP#2):

WT#2 is merged into WT#3 and WT#3 will be reworded (considering 7 companies have indicated that the WT#2 should be merged.)

WT#2 void

Moderator Proposal-WT#3 (MP#3):

WT#3 and WT#4 are still separated. WT#3 has merged WT#2 and WT#10.

WT#3 Identification, Subscription, Registration and Connection management to support Ambient IoT

WT#3.1 Study whether subscription management, registration management and/or connection management are necessary, and if so identify the necessary state machine(s), procedures and functionality considering the ambient IoT devices capability and characteristics:

WT#3.2 Study whether reachability and paging apply to Ambient IoT device considering the ambient IoT devices capability and characteristics, and if so, what are the impacts?

WT#3.3 Study how to identify Ambient IoT device or group of devices and how to format the identifier .

NOTE: Which types of Ambient IoT device and which connectivity topologies considered in this WT will be aligned with WT#1.

Moderator Proposal-WT#4 (MP#4):

WT#4 is included as a separated WT with WT#4 is rephrased.

WT#4 Ambient IoT Services

WT#4.1 Study how to support data transmission to and from the Ambient IoT devices.

WT#4.2 Determine what Ambient IoT services to be exposed to a 3rd party and how.

NOTE1: Which types of Ambient IoT device and which connectivity topologies considered in this WT will be aligned with WT#1.

NOTE2: This WT also includes evaluating the identifiers used and how subscription data is used.

Moderator Proposal-WT#5(MP#5):

WT#5 is included temporarily and WT#5 is reworded

WT#5 Support of Security aspects

Study architecture aspects to support authentication and authorization and privacy for the Ambient IoT devices (detailed authentication mechanism will be defined in SA3), in particular the validation of the device's ID and the secure decommissioning of devices.

NOTE: This WT is led by SA3.

Moderator Proposal-WT#6(MP#6):

This WT is removed temporarily. A NOTE " Charging aspects for Ambient IoT will be studied by SA5" is captured in the objective part and a general wording is captured in the SI clause 8 "SA5 for Charging aspects".

Moderator's proposal-WT#7(MP#7):

Since there are not many supporters of this WT, this WT is removed.

Moderator's proposal-WT#8(MP#8):

This WT is removed at present (there are not many supporters of this WT) and can be added later if RAN WGs determine to work on positioning for Ambient IoT.

Moderator's proposal-WT#9(MP#9):

Since there are not many supporters of this WT, this WT is removed.

Moderator's proposal-WT#10(MP#10):

This standalone WT is removed. The content will be merged into WT#3 and WT#1.

5.2 Summary from section 2.2

Summary of the Feedback 4- Are there any additional Work Tasks that should be part of Rel-19? & Feedback 5: If there are any additional Work Tasks required, describe them.

6 additional Work Tasks are proposed.

- WT-Philips-1 (could potentially be subtask of WT#3 or WT#1): Study whether and how to support simplified protocol stack, and reduced complexity protocols and procedures to fit Ambient IoT device capabilities and characteristics.

Comments in NWM:

- Ericsson: None identified, it seems that was is proposed by each of the previous proposals can be studied as part of the existing WTs.
- OPPO thinks WT-Philips-1 is the design principle, not WT.
- MediaTek: We fully agree with the proposal from Philips.

As we have explained earlier, Ambient-IoT is defined by devices that are severely constrained - thus we should take this as the starting point and define the "system" around those, rather than try to make these devices adapt to the overcomplicated 5GS design we have today, which is simply not going to work (e.g. all procedures and associated signaling imposed by 5GS are a complete showstopper for Ambient IoT)

- Orange: WT-Philips-1 should be covered by WT#1 and WT#3 and since these WTs do not assume that current procedures and protocols will apply to Ambient IoT, the words "simplification" and "reduced complexity" do not make sense. Also, it is not sure that complexity will be reduced.
- Vodafone: Tend to agree with Phillips and Mediatek that we should have a radically simpler system and protocols than EPC or 5GC.
- Apple: We agree with OPPO that WT-Philips-1 is more of a design principle rather than a WT.

Moderator's proposal -WT-Philips-1(MP#11):

Moderator considers this sub-WT has been covered in the WT#3.1 (new wording in MP#3). So no additional change is required.

- WT-NTT DOCOMO-1 Study how to identify a group of ambient IoT devices and how to manage the group of devices.

Comments in NWM:

- Ericsson: None identified, it seems that what is proposed by each of the previous proposals can be studied as part of the existing WTs.
- OPPO supports WT-NTT DOCOMO-1, and think it could be added in WT#2 as, WT2.3, study how to identify a group of ambient IoT devices and how to manage the group of devices.
- Notes from Moderator: Lenovo has also indicate the support of group proposal in the feedback form 3.
- Futurewei: Support WT-NTT DOCOMO-1 to consider group AIoT device identification and management which can be merged into WT#2.
- LGE: Support WT-NTT DOCOMO-1
- Apple: Support WT-NTT DOCOMO-1

Moderator's proposal-WT-NTT DOCOMO-1(MP#12):

This sub-WT is to be covered in the WT#3.1 and WT#3.3 (i.e. the new wording in moderator's proposal-WT#3 has covered WT-NTT-DOCOMO-1).

- WT-NTT DOCOMO-2: Study architecture aspects to confidentiality and integrity of user data and signalling for the Ambient IoT devices (detailed mechanism will be defined in SA3)

- Comments in NWM:
 - Ericsson: None identified, it seems that was is proposed by each of the previous proposals can be studied as part of the existing WTs.
 - Orange (Notes from Moderator: the comment is received in Feedback form 2): WT-NTT DOCOMO-2 should be merged into WT#5. Not sure that "user data" applies to all Ambient IoT scenarios.
 - Lenovo (Notes from Moderator: the comment is received in Feedback form 2): A sub-WT may include to study the data integrity and/or protection.
 - Apple: WT-NTT DOCOMO-2 should be covered in WT-5.

Moderator's proposal-WT-NTT DOCOMO-2(MP#13):

Since no major support has been received for this sub-WT, Moderator suggests that this WT requires further discussion before adding this into the objective (Moderator also suggests to check whether this subWT has been covered by the new wording WT#5).

- WT-vivo-1: How 5G system support 3rd party requested services for Ambient IoT (e.g. inventory, read, write, etc.). Which can be the sub-WT of WT#4.
- Comments in NWM:
 - Ericsson: None identified, it seems that was is proposed by each of the previous proposals can be studied as part of the existing WTs.
 - Orange: WT-vivo-1 should be in Release 19 as a subtask of WT#4.
 - Apple: WT-vivo-1 is covered by [Merge of WT-3 and WT-4].
- WT-InterDigital-1: Study how to enable 3rd application to trigger the ambient IoT devices for communication It could be a sub-task of WT#3 or WT#4. It's also similar to "WT-vivo-1".
- Comments in NWM:
 - Ericsson: None identified, it seems that was is proposed by each of the previous proposals can be studied as part of the existing WTs.
- WT-KPN-1 (numbered by Moderator): study how to trigger a specific group of AIoT devices in a specific location, and define APIs for that. This includes APIs for where and when RF power needs to be provided.
- Comments in NWM:
 - Futurewei: Support KPN's new proposal for group trigger.

Moderator’s proposal on WT-vivo-1, WT-InterDigital-1 and WT-KPN-1 (MP#14):

Merge these three proposed sub-WTs into one sub-WT. Moderator suggests the following wording “WT#4.3 Study how to support 3rd party requested services for Ambient IoT (e.g. inventory) and 3rd party triggering the ambient IoT devices for communication ”. However whether this WT#4.3 is in the scope requires further discussion (Moderator also suggests to check whether this subWT has been covered by the exposure to the 3rd party in the WT#4.2).

5.3 Summary from section 3

Summary of the Feedback6 Describe the dependencies that any of the Work Tasks have on other 3GPP Working Groups?

12 companies (NTT DOCOMO, Ericsson, OPPO, MediaTek, Huawei, Qualcomm, Nokia, Futurewei, CATT, LGE, Xiaomi, Samsung) have provided the feedback.

Summary of the feedback 7: Describe dependencies between the Work Tasks

11 companies (Ericsson, OPPO, MediaTek, Huawei, Qualcomm, Nokia, CATT, LGE, Xiaomi, Samsung, Vodafone) have provided the feedback.

The feedback can be summarized in the following table.

Table 3:

WT#1	<ul style="list-style-type: none">• RAN dependency: NTT Docomo, Ericsson, OPPO, MediaTek, Huawei, Qualcomm, Nokia, Futurewei, CATT, LGE, Xiaomi, Samsung• Work task dependency: Ericsson (WT#2, 3, 4), Huawei (WT#2); Nokia, CATT, LGE (dependency with the other WTs); Vodafone (WT#2, 3, 5)• SA3 dependency: Ericsson (may need to consider)
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WT#2	<ul style="list-style-type: none"> • RAN dependency: Ericsson, • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm, Xiaomi), depending on WT#3 and WT#4 (Ericsson, Xiaomi), Depending on WT#5 (Ericsson, OPPO, Xiaomi), CATT(WT#2 and the other WTs have inter-dependency.) • SA3 dependency: Ericsson (may need to consider)
WT#3	<ul style="list-style-type: none"> • RAN dependency: Ericsson, Huawei, Futurewei, LGE, Xiaomi, Samsung • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm, Xiaomi), Depending on WT#5 (Ericsson, OPPO, Vodafone), WT#2 (Xiaomi, Vodafone) • SA3 dependency: Ericsson (may need to consider)
WT#4	<ul style="list-style-type: none"> • RAN dependency: Ericsson, Huawei, Futurewei, LGE, Xiaomi • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm, Xiaomi), Depending on WT#5 (Ericsson, Vodafone), WT#2 (Xiaomi, Vodafone) • SA3 dependency: Ericsson (may need to consider)
WT#5	<ul style="list-style-type: none"> • RAN dependency: Futurewei • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm) • SA3 dependency: NTT Docomo, Ericsson, OPPO, MediaTek, Huawei, Qualcomm, Nokia, Futurewei, CATT, LGE, Xiaomi, Samsung

WT#6	<ul style="list-style-type: none"> • RAN dependency: None • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm) • SA5 dependency: NTT Docomo, Ericsson, OPPO, MediaTek, Huawei, Nokia, Futurewei, CATT, LGE, Xiaomi
WT#7	<ul style="list-style-type: none"> • RAN dependency: Xiaomi • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm, Xiaomi), WT#3 (Xiaomi), WT# 4 (Xiaomi)
WT#8	<ul style="list-style-type: none"> • RAN dependency: Ericsson, Huawei, Qualcomm, Futurewei,CATT, LGE, Xiaomi • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm)
WT#9	<ul style="list-style-type: none"> • RAN dependency: Futurewei, LGE • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm)
WT#10	<ul style="list-style-type: none"> • RAN dependency: LGE, Xiaomi, Samsung • Work task dependency: depending on WT#1 (Ericsson, OPPO, Qualcomm, Xiaomi), WT#3 (Xiaomi), WT#4 (Samsung) • SA5 dependency: Ericsson
WT-NTT DOCOMO-2	<ul style="list-style-type: none"> • SA3 dependency: NTT DOCOMO

Moderator proposals on Dependency (MP#15)

WT#1, WT#8 have RAN dependency; WT#3, WT#4, WT#10 may have RAN dependency; Other WTs considers no RAN dependency; (Those will be reflected in the table in objectives part)

SA3, SA5 dependency will be reflected in the clause 8 in the draft SI.

5.4 Summary from section 4

Summary of feedback 9 Should there be more than one SID, WID or TEI-19 item created based on the Work Tasks?

12 companies (NTT DOCOMO, Ericsson, MediaTek, Huawei, Nokia, Orange, Futurewei, China Mobile, InterDigital, CATT, LGE, Samsung) have provided the feedback and indicated that one study item is enough.

Summary of feedback 10: If the answer to the above question is yes, describe how the Work Tasks should be partitioned into different items.

1 company (Samsung) has provided the feedback.

(Notes from Moderator: Nokia, LGE, Apple and Deutsche Telekom indicated that R19 should only focus the study in the feedback 1. Moderator's view is that this requires further discussion.)

Moderator proposals (MP#16): It is proposed to create a SID for Ambient IoT.

