INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2025-2028

SG20-TD1499-R1

STUDY GROUP 20

Original: English

Question(s): 4/20 Geneva, 12-21 May 2026

TD

Source: Rapporteur Q4/20

Title: A.1 justification for proposed draft new Recommendation ITU-T Y.DPM-Ambient-IoT "Functional requirements and architecture of data processing and management to support ambient power-enabled Internet of Things", Q4/20 meeting (Geneva, 12-21 May 2026)

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Abstract: This document contains the A.1 justification for proposed draft new Recommendation ITU-T Y.DPM-Ambient-IoT "Functional requirements and architecture of data processing and management to support ambient power-enabled Internet of Things", based upon SG20-C418, resulting form the discussion and agreement of Q4/20 meeting (Geneva, 12-21 May 2026).

A.1 justification for proposed draft new Recommendation ITU-T Y.DPM-Ambient-IoT "Functional requirements and architecture of data processing and management to support ambient power-enabled Internet of Things"

Question:	Q4/20	**Proposed new ITU-T Recommendation**	Geneva, 12-21 May 2026	
Reference and title:	ITU-T Y.DPM-Ambient-IoT "Functional requirements and architecture of data processing and management to support ambient power-enabled Internet of Things"			
Base text:	TD1500-R1		**Timing:**	Q3 2028
Editor(s):	Dongliang Wang, China Unicom, wangdl1075@chinaunicom.cn; Tianyi Wang, China Unicom, wangty65@chinaunicom.cn; Yuhui Han, China Unicom, hanyh91@chinaunicom.cn; Chen Cheng, ICT CAS, UCAS, chengchen242@mails.ucas.ac.cn; Xinzhou Cheng, BUPT, cheng_227@163.com;		**Approval process:**	AAP

Scope:

This Recommendation specifies the functional requirements and architecture of data processing and management (DPM) to support the ambient power-enabled Internet of Things (IoT). In particular, this DPM architecture is designed to enable energy-aware data acquisition and processing, and to address data fragmentation and quality degradation inherent to ambient IoT devices.

The scope of the draft Recommendation includes:

- an overview of DPM to support ambient power-enabled Internet of Things;

- functional requirements of DPM to support ambient power-enabled Internet of Things;

- functional architecture of DPM to support ambient power-enabled Internet of Things.

Summary:

An ambient power-enabled Internet of Things (IoT) device is an IoT device powered by energy harvesting, being either battery-less or equipped with limited energy storage capability [3GPP TR 22.840].

By relying on energy harvested from ambient sources, the ambient power-enabled IoT enables the development of lower-cost, smaller, and maintenance-free devices. This allows IoT deployments to become highly scalable and environmentally sustainable [Y.Ambient-IoT].

However, the unique characteristics of the ambient power-enabled IoT reveal the limitations of conventional data processing and management (DPM) approaches. Specifically, they are challenged by:

1) Severe energy limitations that restrict continuous operation and complex on-device processing;

2) Unpredictable data intermittency caused by frequent power-off and recharge cycles;

3) Strict energy-data dependency, where the timing, volume, and quality of data acquisition are directly dictated by the real-time availability of harvested energy.

Based on the foundational DPM framework [ITU-T Y.4602], this Recommendation specifies an enhanced DPM functional architecture tailored for the ambient power-enabled IoT. It extends conventional DPM capabilities to support energy-aware data acquisition and edge-assisted data reconstruction, effectively addressing the challenges of unpredictable energy harvesting status and inherent data quality degradation.

Relations to ITU-T Recommendations or to other standards (approved or under development):

ITU-T Y.4602, YSTR.Ambient IoT, Y.Ambient-IoT

Liaisons with other study groups or with other standards bodies:

3GPP RAN, 3GPP SA, ISO/IEC JTC1/SC31, GS1 EPCglobal, IEEE 802.11

Supporting members that are committing to contributing actively to the work item:

China Unicom, Institute of Computing Technology Chinese Academy of Sciences (ICT CAS), University of Chinese Academy of Sciences (UCAS), Beijing University of Posts and Telecommunications (BUPT), China Mobile, China Telecom