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IEEE Standard for Radio over Ethernet Encapsulations and Mappings

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IEEE Std 1914.3™-2018

IEEE Standard for Radio over Ethernet Encapsulations and Mappings

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Mobile Communications Networks Standards Committee
of the
IEEE Communications Society

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Abstract: The encapsulation and mapping of radio protocols for transport over Ethernet frames, using radio over Ethernet (RoE), are defined in this standard. Structure-agnostic definitions are provided for any digitized radio data. Structure-aware definitions are provided for the Common Public Radio Interface (CPRI™). Native mode definitions are provided for digitized radio in-phase and quadrature (I/Q) payload.

Keywords: IEEE 1914.3™, native RoE, radio over Ethernet, RoE, RoE de-mapper, RoE mapper, structure-agnostic, structure-aware

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Introduction

This introduction is not part of IEEE Std 1914.3-2018, IEEE Standard for Radio over Ethernet Encapsulations and Mappings.

This standard defines the encapsulation and mapping of radio protocols for transport over Ethernet frames, using radio over Ethernet (RoE). It is an integral part of the IEEE 1914™ family of standards, which facilitates the implementation of key technologies for next generation (5G) cellular services, from a transport networking perspective.

The transport networking solution for these cellular services is expected to provide, at least, the following:

— High link capacity

— High link efficiency

— Load balancing for pooled resources (Cloud-RAN)

— Latency guarantees

— Phase alignment of radio data

— Flexible mapping (e.g., different functional splits of radio data) of radio traffic for transport between radio units, aggregation points, and/or centralized baseband unit pools

Today's transport networking solutions cannot satisfy all these expectations. On the other hand, Ethernet technology has experienced steady and cost-efficient speed and capacity growth, driven by the enterprise, access, and data-center markets, and has inherent characteristics that allow it to satisfy the other expectations.

IEEE Std 1914.3 specifies details that allow Ethernet to partake in the new RoE transport networking solution for 5G cellular services.

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1. Overview

1.1 Scope

This standard defines the encapsulation and mapping of radio protocols for transport over Ethernet frames, using radio over Ethernet (RoE). Structure-agnostic definitions are provided for any digitized radio data. Structure-aware definitions are provided for the Common Public Radio Interface (CPRI™). Native mode definitions are provided for digitized radio in-phase and quadrature (I/Q) payload and control data channels.

1.2 Purpose

This standard enables the transfer of I/Q user-plane data, vendor-specific data, and control and management (C&M) information channels across an Ethernet-based packet-switched network. The standard fosters interoperability among implementations by defining the framing, the encapsulation of the information, and a common Ethernet Type for RoE purposes.

2. Normative references

The following referenced documents are indispensable for the application of this standard (i.e., they must be understood and used; therefore, each referenced document is cited in text, and its relationship to this standard is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

3GPP Specification TS 36.211, Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation.[1]

Common Public Radio Interface (CPRI™) Specification, v7.0.[2,3]

IEEE Std 754™-2008, IEEE Standard for Binary Floating-Point Arithmetic.[4,5]

[1]The 3GPP specification is available from the 3GPP Website, http://www.3gpp.org/specifications/releases.
[2]The CPRI specification is available from the CPRI Website, http://www.cpri.info/.
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