P1914.3

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Type of Project: Revision to IEEE Standard 1914.3-2018
Project Request Type: Initiation / Revision
PAR Request Date: 04 May 2021
PAR Approval Date:
PAR Expiration Date:
PAR Status: Submitted
Root Project: 1914.3-2018

1.1 Project Number: P1914.3
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Project Title: Standard for Radio over Ethernet Encapsulations and Mappings
   Change to Title: ~~IEEE~~ Standard for Radio over Ethernet Encapsulations and Mappings

3.1 Working Group: Next Generation Fronthaul Interface(COM/MobiNet-SC/NGFI)
   3.1.1 Contact Information for Working Group Chair:
   Name: Jinri Huang
   Email Address: huangjinri@chinamobile.com
   3.1.2 Contact Information for Working Group Vice Chair:
   None
3.2 Society and Committee: IEEE Communications Society/Mobile Communication Networks Standards Committee(COM/MobiNet-SC)
   3.2.1 Contact Information for Standards Committee Chair:
   Name: Oliver Holland
   Email Address: oliver.holland@ieee.org
   3.2.2 Contact Information for Standards Committee Vice Chair:
   None
   3.2.3 Contact Information for Standards Representative:
   None

4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE SA for Initial Standards Committee Ballot: Apr 2022
4.3 Projected Completion Date for Submittal to RevCom: Oct 2022

5.1 Approximate number of people expected to be actively involved in the development of this project: 15
5.2 Scope of proposed standard: This standard defines the encapsulation and mapping of radio protocols transported over Ethernet frames and Internet Protocol (IP) packets and the operation of mappers and de-mappers. 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 normal and compressed digitized radio in-phase and quadrature (I/Q) payload. Specifications are provided for parameters, control messages, and mechanisms that help operate, administrate, and maintain mappers and de-mappers. A management model and a YANG data model are defined.
Change to scope of proposed standard: This standard defines the encapsulation and mapping of radio protocols ~~for transport~~ transported over Ethernet frames ~~, using~~ and ~~radio over~~ Internet ~~Ethernet~~ Protocol (~~RoE~~ IP) packets and the operation of mappers and de-mappers . Structure-agnostic definitions are provided for any digitized radio data. Structure-aware definitions are provided for the Common Public Radio Interface (CPRI ~~(TM)~~). Native mode definitions are provided for normal and compressed digitized radio in-phase and quadrature (I/Q) payload . Specifications are provided for parameters, control messages, and ~~control~~ mechanisms that help operate, administrate, and maintain mappers and de-mappers. A management model and a YANG data ~~channels~~ model are defined .

5.3 Is the completion of this standard contingent upon the completion of another standard? No
5.4 Purpose: This standard enables the transfer of radio data (e.g., user-plane data, vendor-specific data, and control and management information) across an Ethernet and/or IP-based packet network. The standard fosters interoperability among implementations by defining common information formats, information

encapsulation, operation, administration, and maintenance processes and mechanisms, and management and YANG data models.

Change to Purpose: This standard enables the transfer of ~~I/Q~~ radio data (e.g., user-plane data, vendor-specific data, and control and management ~~(C&M~~ information ~~)~~ ~~information channels~~ across an Ethernet and/or IP -based packet ~~switched~~ network. The standard fosters interoperability among implementations by defining ~~the~~ common information ~~framing~~ formats , ~~the~~ information encapsulation , ~~of~~ operation, administration, ~~the~~ and ~~information,~~ maintenance processes and ~~a~~ mechanisms, ~~common~~ and ~~Ethernet~~ management ~~Type~~ and ~~for~~ YANG ~~RoE~~ data ~~purposes~~ models .

5.5 Need for the Project: The requirements for transport networking of next generation cellular services have evolved since the time that the original IEEE 1914.3 standard was developed. These evolutions should be addressed by adding new functions to the standard and extending or elaborating on existing functions from the original standard.

Change to Need for the Project: ~~It~~ The ~~has~~ requirements for ~~been~~ transport ~~projected~~ networking ~~that~~ of next generation cellular ~~base stations will~~ services have ~~uplink speeds around 10Gbps or more,~~ ~~serving 6 or more sectors with~~ evolved ~~channel~~ since ~~bandwidths~~ the ~~beyond 200MHz. The anticipated~~ ~~cellular network architectures~~ time that ~~include a very large number (>100) of antennas per sector drive~~ the ~~strong demand for an increased uplink channel capacity.Today's~~ original ~~platforms~~ IEEE ~~cannot scale~~ ~~to meet these requirements~~ 1914 . ~~A networked solution~~ 3 ~~is~~ standard ~~required to enable:* Load~~ ~~balancing / resource~~ was ~~pooling~~ developed .
~~* Cooperative mode~~ These ~~operation~~ evolutions ~~(multiple~~ should ~~antenna~~ be ~~systems, beam-steering)*~~ ~~Dynamic power management* Flexible mapping of the Radio over Ethernet (RoE) traffic between baseband~~ ~~unit (BBU) pools and remote radio unitEthernet technology has demonstrated steady, cost efficient speed and~~ ~~capacity growth driven~~ addressed by ~~the~~ adding ~~enterprise~~ new ~~connectivity, access, and data-center~~ ~~markets. The Radio over Ethernet (RoE) project aims~~ functions to ~~take advantage of~~ ~~the Ethernet~~ ~~developments~~ standard and ~~specify~~ extending ~~a~~ or ~~scalable~~ elaborating ~~and~~ on ~~streamlined~~ existing ~~solution~~ functions ~~that complements, for example,~~ from the ~~existing~~ original ~~CPRI radio transport~~ ~~specification based on fixed time division multiplexing~~ standard .

5.6 Stakeholders for the Standard: Stakeholders include cellular operators, telecommunication carriers, cellular and telecommunication system vendors, and component vendors.

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6.1 Intellectual Property

6.1.1 Is the Standards Committee aware of any copyright permissions needed for this project?
Yes
Explanation: To maximize consistency among IEEE standards, permission has been requested and granted to adapt and reprint portions of IEEE Std 802.1Xck and IEEE Std 802.1Qcp to introduce the IEEE 1914.3 YANG data model.
Permission will be requested from the Internet Engineering Task Force (IETF) Trust to adapt and reprint the template for "YANG module security considerations".

6.1.2 Is the Standards Committee aware of possible registration activity related to this project?
Yes
Explanation: The existing base standard has already received an EtherType assignment from the IEEE-SA Registration Authority (RA).
A dedicated User Datagram Protocol (UDP) port number will be requested from the Internet Assigned Numbers Authority (IANA).
A Uniform Resource Name based on IEEE Std 802d will be registered for the YANG data model with the IEEE SA RA.
A dedicated Interface Type (ifType) will be requested from the IANA for the YANG data model per IETF Request for Comments (RFC) 8892.

7.1 Are there other standards or projects with a similar scope? Yes
Change to Are there other standards or projects with a similar scope? ~~No~~ Yes
Explanation: 1. The O-RAN Alliance Control, User and Synchronization Plane Specification standard defines several of the same functions as IEEE 1914.3 and allows the use of the IEEE 1914.3 transport header for some of its messages. However, this standard does not support the encapsulation of CPRI streams and the usage of the IEEE 1914.3 transport header is limited to O-RAN Alliance-specific OUI/CID-based subTypes.
2. The eCPRI Interface Specification standard gives a template packet format for transporting radio data. This template is subject to proprietary definitions by each member of the CPRI cooperation. While this standard offers flexible support for transporting different types of radio data, it is not specified with enough detail to enable the IEEE 1914.3 functions to be implemented without access to the proprietary definitions.
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CID-based subTypes. 2. The eCPRI Interface Specification standard gives a template packet format for transporting radio data. This template is subject to proprietary definitions by each member of the CPRI cooperation. While this standard offers flexible support for transporting different types of radio data, it is not specified with enough detail to enable the IEEE 1914.3 functions to be implemented without access to the proprietary definitions.

7.1.1 Standards Committee Organization: O-RAN Alliance
   Project/Standard Number: O-RAN.WG4.CUS.0-v05.00
   Project/Standard Date: 01 Nov 2020
   Project/Standard Title: Control, User and Synchronization Plane Specification
7.1.2 Standards Committee Organization: CPRI
   Project/Standard Number: eCPRI_v_2.0
   Project/Standard Date: 10 May 2019
   Project/Standard Title: eCPRI Interface Specification
7.2 Is it the intent to develop this document jointly with another organization? No

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8.1 Additional Explanatory Notes: This PAR is for a revision to IEEE Std 1914.3-2018 and is meant to replace the PAR for P1914.3a, which is separately requested to be withdrawn. This replacement is needed because the work that has been accomplished for P1914.3a may be too substantial for an amendment.

For 5.2:
YANG, an acronym for "Yet Another Next Generation", is a formalized data modeling language specified by IETF RFC 7950 "The YANG 1.1 Data Modeling Language".

For 6.1.1:
IEEE Std 802.1Xck-2018 "IEEE Standard for Local and metropolitan area networks—Port-Based Network Access Control Amendment 2: YANG Data Model"
IEEE Std 802.1Qcp-2018 "IEEE Standard for Local and metropolitan area networks— Bridges and Bridged Networks— Amendment 30: YANG Data Model"
The template for "YANG module security considerations" is available at https://trac.ietf.org/trac/ops/wiki/yang-security-guidelines.

For 6.1.2:
IEEE Std 802d "IEEE Standard for Local and Metropolitan Area Networks:Overview and Architecture Amendment 1: Allocation of Uniform Resource Name (URN) Values in IEEE 802(R) Standards"
IETF RFC 8892 "Guidelines and Registration Procedures for Interface Types and Tunnel Types"