



Group Specification

**Open Radio equipment Interface (ORI);
ORI Interface Specification;
Part 2: Control and Management
(Release 1)**

Disclaimer

This document has been produced and approved by the Open Radio equipment Interface (ORI) ETSI Industry Specification Group (ISG) and represents the views of those members who participated in this ISG.
It does not necessarily represent the views of the entire ETSI membership.

Reference

RGS/ORI-0014

Keywords

control, interface, management, radio

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2014.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

| | |
|---|----|
| Intellectual Property Rights | 7 |
| Foreword..... | 7 |
| 1 Scope | 8 |
| 2 References | 8 |
| 2.1 Normative references | 8 |
| 2.2 Informative references..... | 9 |
| 3 Definitions, symbols and abbreviations | 9 |
| 3.1 Definitions..... | 9 |
| 3.2 Symbols..... | 10 |
| 3.3 Abbreviations | 11 |
| 4 Introduction | 12 |
| 5 C&M plane description | 12 |
| 5.1 Protocol stack | 12 |
| 5.2 C&M plane protocols | 12 |
| 5.2.1 Ethernet/Fast C&M..... | 13 |
| 5.2.2 IP..... | 13 |
| 5.2.3 DHCP..... | 13 |
| 5.2.4 TCP/UDP..... | 13 |
| 5.2.5 FTP | 13 |
| 5.2.6 ORI C&M Protocol (OCP) | 13 |
| 5.2.7 AISG/3GPP Iuant interface support within ORI..... | 14 |
| 5.3 OCP message encoding and object modelling..... | 14 |
| 5.4 Vendor specific extensions..... | 15 |
| 6 RE Resource Model and its related Management Functions..... | 15 |
| 6.1 Introduction | 15 |
| 6.2 Object types..... | 17 |
| 6.3 Object lifecycle | 17 |
| 6.4 Object naming/addressing | 17 |
| 6.5 Object relations | 19 |
| 6.6 Object parameters..... | 20 |
| 6.6.1 Roles/Purposes of parameters | 20 |
| 6.6.2 Parameter characterization..... | 20 |
| 6.6.2.1 Object containment | 20 |
| 6.6.2.2 Parameter Name | 20 |
| 6.6.2.3 Parameter Type | 21 |
| 6.6.2.4 Parameter Access | 21 |
| 6.6.2.5 Default value | 21 |
| 6.6.3 Void | 22 |
| 6.6.4 Parameter access functions | 22 |
| 6.7 Object states/State handling | 22 |
| 6.7.1 State types/states..... | 22 |
| 6.7.1.1 Administrative State (AST)..... | 22 |
| 6.7.1.2 Functional state (FST)..... | 24 |
| 6.7.1.3 Relationship between Administrative and Functional states | 24 |
| 6.7.2 State management functions | 25 |
| 6.7.3 Linkage between object state changes and fault reporting..... | 25 |
| 6.8 Fault management | 25 |
| 6.8.1 Fault States..... | 26 |
| 6.8.2 Fault Severity..... | 26 |
| 6.8.3 Fault Reporting | 26 |
| 6.8.4 Fault History | 27 |
| 6.8.5 ORI Fault Types | 27 |
| 6.8.6 Handling of Fault Reports by the REC..... | 27 |

| | | |
|---------|--|----|
| 6.9 | Performance Management..... | 27 |
| 6.10 | Logging | 27 |
| 6.10.1 | Log concept | 27 |
| 6.10.2 | Log types & content..... | 28 |
| 6.10.3 | Log categories..... | 29 |
| 6.10.4 | Log configuration and control | 29 |
| 6.10.5 | Log file naming..... | 30 |
| 6.11 | Vendor specific extensions to the resource model | 30 |
| 6.11.1 | Vendor specific parameters..... | 31 |
| 6.11.2 | Vendor specific object types..... | 31 |
| 6.11.3 | Vendor specific fault types | 31 |
| 7 | OCP format and encoding structure | 32 |
| 7.1 | Roles of REC/RE | 32 |
| 7.2 | Message format and encoding | 32 |
| 7.2.1 | Message types/handling..... | 32 |
| 7.2.2 | Encoding basis | 33 |
| 7.2.3 | Data types | 33 |
| 7.2.4 | Name spaces | 36 |
| 7.2.5 | Message structure | 37 |
| 7.2.5.1 | Message Header | 37 |
| 7.2.5.2 | Message body..... | 38 |
| 7.2.5.3 | OCP message | 38 |
| 7.3 | Transport protocol embedding | 38 |
| 7.3.1 | Message framing..... | 38 |
| 7.4 | Common default result codes | 39 |
| 7.5 | Default failure response message | 40 |
| 7.5.1 | Message parameter details | 41 |
| 7.5.2 | Message encoding..... | 42 |
| 8 | OCP Elementary Functions and Messages..... | 43 |
| 8.1 | Device management | 43 |
| 8.1.1 | Health Check | 43 |
| 8.1.1.1 | Success | 43 |
| 8.1.1.2 | Failure | 43 |
| 8.1.1.3 | Message Parameter Details | 43 |
| 8.1.2 | Set Time | 45 |
| 8.1.2.1 | Success | 45 |
| 8.1.2.2 | Failure | 45 |
| 8.1.2.3 | Message parameter details | 45 |
| 8.1.2.4 | Message encoding..... | 46 |
| 8.1.3 | RE Reset | 46 |
| 8.1.3.1 | Success | 47 |
| 8.1.3.2 | Failure | 47 |
| 8.2 | Software management | 48 |
| 8.2.1 | Version Query..... | 48 |
| 8.2.1.1 | Success | 48 |
| 8.2.1.2 | Failure | 49 |
| 8.2.1.3 | Message parameter details | 49 |
| 8.2.1.4 | Message encoding | 49 |
| 8.2.2 | Software Update Preparation | 50 |
| 8.2.2.1 | Success | 51 |
| 8.2.2.2 | Failure | 51 |
| 8.2.2.3 | Message parameter details | 51 |
| 8.2.2.4 | Message encoding | 52 |
| 8.2.3 | Software Download | 52 |
| 8.2.3.1 | Success | 53 |
| 8.2.3.2 | Failure | 53 |
| 8.2.3.3 | Message parameter details | 53 |
| 8.2.3.4 | Message encoding..... | 54 |
| 8.2.4 | Software Activation | 54 |
| 8.2.4.1 | Success | 55 |

| | | |
|---------|---|----|
| 8.2.4.2 | Failure | 55 |
| 8.2.4.3 | Message parameter details | 55 |
| 8.2.4.4 | Message encoding | 55 |
| 8.3 | Configuration management | 56 |
| 8.3.1 | Object Parameter Reporting | 56 |
| 8.3.1.1 | Success | 57 |
| 8.3.1.2 | Failure | 57 |
| 8.3.1.3 | Message Parameter Details | 58 |
| 8.3.1.4 | Message encoding | 58 |
| 8.3.2 | Object Parameter Modification | 60 |
| 8.3.2.1 | Success | 61 |
| 8.3.2.2 | Failure | 61 |
| 8.3.2.3 | Message parameter details | 62 |
| 8.3.2.4 | Message encoding | 63 |
| 8.4 | Object lifecycle | 65 |
| 8.4.1 | Object Creation | 65 |
| 8.4.1.1 | Success | 66 |
| 8.4.1.2 | Failure | 66 |
| 8.4.1.3 | Message parameter details | 67 |
| 8.4.1.4 | Message encoding | 68 |
| 8.4.2 | Object Deletion | 71 |
| 8.4.2.1 | Success | 71 |
| 8.4.2.2 | Failure | 71 |
| 8.4.2.3 | Message parameter details | 72 |
| 8.4.2.4 | Message encoding | 72 |
| 8.5 | Object State management | 73 |
| 8.5.1 | Object State Reporting | 73 |
| 8.5.1.1 | Success | 73 |
| 8.5.1.2 | Failure | 74 |
| 8.5.1.3 | Event-triggered reporting of state change | 74 |
| 8.5.1.4 | Message parameters | 75 |
| 8.5.1.5 | Message encoding | 76 |
| 8.5.2 | Object State Modification | 78 |
| 8.5.2.1 | Success | 78 |
| 8.5.2.2 | Failure | 79 |
| 8.5.2.3 | Abnormal operation | 79 |
| 8.5.2.4 | Message parameter details | 79 |
| 8.5.2.5 | Message encoding | 80 |
| 8.6 | Fault management | 82 |
| 8.6.1 | Fault Reporting | 82 |
| 8.6.1.1 | Success | 82 |
| 8.6.1.2 | Failure | 83 |
| 8.6.1.3 | Event-triggered reporting | 83 |
| 8.6.1.4 | Message parameter details | 83 |
| 8.6.1.5 | Message encoding | 84 |
| 8.7 | Performance management | 86 |
| 8.8 | Logging | 87 |
| 8.8.1 | File Available Indication | 87 |
| 8.8.1.1 | Message Parameter details | 87 |
| 8.8.1.2 | Message encoding | 87 |
| 8.8.2 | File Upload | 88 |
| 8.8.2.1 | Success | 89 |
| 8.8.2.2 | Failure | 89 |
| 8.8.2.3 | File Upload Completion reporting | 90 |
| 8.8.2.4 | Message parameter details | 90 |
| 8.8.2.5 | Message encoding | 91 |
| 8.8.3 | Activate Configuration | 93 |
| 8.8.3.1 | Success | 94 |
| 8.8.3.2 | Failure | 94 |
| 8.8.3.3 | Activate Configuration completion reporting | 94 |
| 8.8.3.4 | Message Parameter details | 95 |
| 8.8.3.5 | Message encoding | 95 |

| | | |
|-------------------------------|--|------------|
| 8.9 | AISG specific procedures..... | 98 |
| 8.9.1 | Device scan..... | 98 |
| 8.9.1.1 | Success..... | 98 |
| 8.9.1.2 | Failure..... | 99 |
| 8.9.1.3 | Device Scan completion..... | 99 |
| 8.9.1.4 | Message parameter details..... | 99 |
| 8.9.1.5 | Message encoding..... | 100 |
| 8.9.2 | AISG Layer 7 message and Alarm transfer..... | 101 |
| 8.9.2.1 | AISG message transmission (between REC and RE)..... | 102 |
| 8.9.2.1.1 | Success..... | 102 |
| 8.9.2.1.2 | Failure..... | 102 |
| 8.9.2.2 | AISG ALD receive indication..... | 103 |
| 8.9.2.3 | Message parameter details..... | 103 |
| 8.9.2.4 | Message encoding..... | 103 |
| 9 | Specified object types/parameters and fault types..... | 105 |
| 9.1 | Specified object types and their associated parameters..... | 105 |
| 9.1.1 | RE Object..... | 105 |
| 9.1.2 | Physical Antenna Port Object..... | 107 |
| 9.1.3 | TxSigPath Object..... | 107 |
| 9.1.4 | RxSigPath Object..... | 114 |
| 9.1.5 | ORI Link Object..... | 121 |
| 9.1.6 | External Event Port Object..... | 124 |
| 9.1.7 | AISGPort Object..... | 125 |
| 9.1.8 | AISGALD Object..... | 126 |
| 9.1.9 | Log Object..... | 129 |
| 9.2 | Specified fault types..... | 131 |
| 10 | RE management procedures..... | 133 |
| 10.1 | RE Device management..... | 133 |
| 10.1.1 | OCP layer establishment and supervision between REC and RE..... | 133 |
| 10.1.1.1 | DHCP options..... | 137 |
| 10.1.1.2 | TCP options..... | 138 |
| 10.1.2 | REC - RE alignment procedure..... | 139 |
| 10.1.3 | Software management..... | 140 |
| 10.1.3.1 | Software operation following RE reset..... | 140 |
| 10.1.3.1.1 | Normal operation..... | 140 |
| 10.1.3.1.2 | Abnormal operation..... | 140 |
| 10.1.3.2 | Void..... | 140 |
| 10.1.3.3 | REC<->RE Software Alignment..... | 140 |
| 10.2 | RE operation..... | 141 |
| 10.2.1 | Dynamic object initial status alignment..... | 141 |
| 10.2.2 | ORI link configuration..... | 142 |
| 10.2.2.1 | General..... | 142 |
| 10.2.2.2 | Transceiver module inserted during RE operation..... | 142 |
| 10.2.3 | ORI link maintenance..... | 143 |
| 10.2.4 | Delay calibration..... | 144 |
| 10.2.5 | Signal Path control (Cell configuration)..... | 146 |
| 10.2.5.1 | Signal Path setup..... | 146 |
| 10.2.5.2 | Modify a Signal Path parameter when locking required..... | 148 |
| 10.2.5.3 | Modify a Signal Path parameter when locking not required..... | 151 |
| 10.2.5.4 | Delete a Signal Path..... | 152 |
| 10.2.5.5 | Switch a Signal Path off and on..... | 152 |
| 10.2.6 | AISG/3GPP Iuant management..... | 153 |
| 10.2.6.1 | AISG/3GPP Iuant Layer 2 establishment..... | 153 |
| 10.2.6.1.1 | Layer 2 connection establishment using Device Scan..... | 154 |
| 10.2.6.1.2 | Layer 2 connection establishment using AISGALD object creation requested by the REC..... | 155 |
| Annex A (informative): | Example for a vendor specific parameter in the RE resource model..... | 157 |
| Annex B (normative): | ORI vendor codes..... | 158 |
| History..... | | 159 |

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) Open Radio equipment Interface (ORI).

The present document is part 2 of a multi-part deliverable covering the ORI Interface Specification, as identified below:

Part 1: "Low Layers (Release 1)";

Part 2: "**Control and Management (Release 1)**".

ETSI STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/17e4aa8f-52f2-4a62-9585-dde083507ff2/etsi-gs-ori-002-2-v1.3.1-2014-03>

1 Scope

The present document aims to define Control and Management plane functions and protocols, addressing, message format and coding of the Open Radio equipment Interface (ORI) for Release 1.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] "Common Public Radio Interface (CPRI); Interface Specification" V 4.1.

NOTE: Available at <http://www.cpri.info/spec.html>.

- [2] ETSI GS ORI 001: "Open Radio equipment Interface (ORI); Requirements for Open Radio equipment Interface (ORI) (Release 1)".

- [3] ETSI GS ORI 002-1: "Open Radio equipment Interface (ORI); ORI Interface Specification; Part 1: Low Layers (Release 1)".

- [4] IEEE Std 802-2001: "IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture".

- [5] W3C Recommendation 28 October 2004: "XML Schema" (part 0 to 2).

NOTE: Part 0: Primer Second Edition <http://www.w3.org/TR/2004/REC-xmlschema-0-20041028/>
Part 1: Structures Second Edition <http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/>
Part 2: Datatypes Second Edition <http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/>

- [6] The Unicode Consortium: "The Unicode Standard V6.0.0"; edited by Julie D. Allen [et al.]. Version 6.0, February 2011, ISBN 978-1-936213-01-6.

NOTE: <http://www.unicode.org/versions/Unicode6.0.0/>.

- [7] W3C Recommendation 26 November 2008: "Extensible Markup Language (XML) 1.0" Fifth Edition.

NOTE: <http://www.w3.org/TR/2008/REC-xml-20081126/>.

- [8] IETF RFC 2045 (1996): "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

NOTE: <http://www.ietf.org/rfc/rfc2045.txt>.

- [9] ETSI TS 125 461 (V10.2.0): "Universal Mobile Telecommunications System (UMTS); UTRAN Iuant interface: Layer 1 (3GPP TS 25.461 version 10.2.0 Release 10)".

- [10] ETSI TS 125 462 (V10.1.0): "Universal Mobile Telecommunications System (UMTS); UTRAN Iuant interface: Signalling transport (3GPP TS 25.462 version 10.1.0 Release 10)".

- [11] ETSI TS 125 466 (V10.3.0): "Universal Mobile Telecommunications System (UMTS); UTRAN Iuant interface: Application part (3GPP TS 25.466 version 10.3.0 Release 10)".
- [12] Antenna Interface Standards Group, Standard No. AISG v2.0, 13th June 2006: "Control interface for antenna line devices".
- NOTE: Available at www.aisg.org.uk.
- [13] ETSI TS 125 215: "Universal Mobile Telecommunications System (UMTS); Physical layer; Measurements (FDD) (3GPP TS 25.215)".
- [14] IETF RFC 959: "File Transfer Protocol".
- [15] ISO/IEC 13239 (2002): "Information technology -- Telecommunications and information exchange between systems -- High-level data link control (HDLC) procedures".
- [16] IETF RFC 2131: "Dynamic Host Configuration Protocol".
- [17] IETF RFC 2132: "DHCP Options and BOOTP Vendor Extensions".
- [18] IETF RFC 793: "Transmission Control Protocol".
- [19] ETSI TS 125 104: "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104)".
- [20] ETSI TS 136 104: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104)".
- [21] IETF RFC 950: "Internet Standard Subnetting Procedure".
- [22] ETSI TS 136 211: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation (3GPP TS 36.211)".
- [23] IETF RFC 826: "An Ethernet Address Resolution Protocol -- or -- Converting Network Protocol Addresses to 48 bit Ethernet Address for Transmission on Ethernet Hardware".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] The Apache Software Foundation: Apache log4cxx™ for C++.

NOTE: <http://logging.apache.org/log4cxx/index.html>

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

active link: See definition in [2].

active software image: software image that is currently being executed on the RE

Antenna Line Device (ALD): See definition in [12].

Antenna-Carrier (AxC): See clause 2.1 of [1].

DHCP client: See definition in [16].

DHCP server: See definition in [16].

FTP password: See definition in [14].

FTP server IP address: See definition in [14].

FTP username: See definition in [14].

universally unique MAC address: 48 bit universally administered, globally unique identifier in compliance with MAC-48/EUI-48 format assigned to a network interface, as defined in IEEE Std 802-2001 [4]

HDLC control octet: See definition in [15].

I-frame: See definition in [15].

ORI line bit rate: See definition in [3].

ORI link: See definition in [2].

ORI port: See definition in [2].

passive link: See definition in [2].

passive software image: software image that is not currently being executed on the RE

radio standard: standardized radio access technology

EXAMPLE: UMTS, LTE, GSM.

Received Total Wideband Power (RTWP): See [13].

software image: software stored on the RE as a result of a successful software upgrade that is compatible with the RE hardware version

software upgrade package version identifier: information exchanged between the REC and the RE to identify the Software Upgrade Package

software upgrade package: unique set of (one or several) files provided by the RE vendor for the purpose of performing a software upgrade of one or more RE hardware versions provided by the same RE vendor, and associated with a maximum of one Software Image on the RE

NOTE 1: The RE vendor should provide flexibility for supporting Software Upgrade Packages containing software for multiple hardware versions and Software Upgrade Packages containing software for a single Hardware version.

NOTE 2: Even if one of the files of a set changes, a new software upgrade package is created.

TCP socket: See definition in [18].

transceiver module: module that may be used to connect the internal circuits of the RE to the Layer 1 (see GS ORI 002-1 [3]) of the ORI link

Uplink Automatic Gain Control (UL AGC): See definition in [3].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

| | |
|------------------|-----------------------------------|
| AxC | Antenna-Carrier |
| Rx | Receiver |
| T _c | UTRA FDD chip period (1/3,84 MHz) |
| T _{HCI} | Health Check Idle timer |
| T _{TLM} | TCP Link Monitoring Timer |
| T _x | Transmitter |

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

| | |
|--------|--|
| 3GPP | 3 rd Generation Partnership Project |
| AGC | Automatic Gain Control |
| AISG | Antenna Interface Standards Group |
| ALD | Antenna Line Device |
| ARP | Address Resolution Protocol |
| AST | Administrative State |
| AxC | Antenna-Carrier |
| C&M | Control & Management |
| CET | Central European Time |
| CPRI | Common Public Radio Interface |
| DHCP | Dynamic Host Control Protocol |
| DL | DownLink |
| EARFCN | E-UTRA Absolute Radio Frequency Channel Number |
| EBNF | Extended Backus-Naur Form |
| E-UTRA | Evolved-UMTS Terrestrial Radio Access |
| FCS | Frame Check Sequence |
| FDD | Frequency Division Duplex |
| FST | Functional State |
| FTP | File Transfer Protocol |
| HDLC | High Level Data Link Control |
| ID | Identifier |
| IE | Information Element |
| IETF | Internet Engineering Task Force |
| IP | Internet Protocol |
| IQ | In-phase data and Quadrature data |
| KPI | Key Performance Indicator |
| LAN | Local Area Network |
| LED | Light Emitting Diode |
| LOF | Loss Of Frame |
| LOS | Loss Of Signal |
| MAC | Media Access Control |
| MIMO | Multiple-Input Multiple-Output |
| MTU | Maximum Transmission Unit |
| O&M | Operations & Maintenance |
| OCP | ORI C&M Protocol |
| ORI | Open Radio Interface |
| OS | Operating System |
| PA | Power Amplifier |
| RAI | Remote Alarm Indication |
| RE | Radio Equipment |
| REC | Radio Equipment Controller |
| RF | Radio Frequency |
| RMS | Root Mean Square |
| RO | Read-Only |
| RTWP | Received Total Wideband Power |
| RW | Read Write |
| SAP | Service Access Point |
| SDI | SAP Defect Indication |
| SSH | Secure SHell |
| TCP | Transmission Connection Protocol |
| TMA | Tower-Mounted Amplifier |
| UARFCN | UTRA Absolute Radio Frequency Channel Number |
| UDP | User Datagram Protocol |
| UID | Unique IDentifier |
| UL AGC | UpLink Automatic Gain Control |
| UL | UpLink |
| UTC | Coordinated Universal Time |

| | |
|------|-------------------------------|
| UTF | Unicode Transformation Format |
| UTRA | UMTS Terrestrial Radio Access |
| VSWR | Voltage Standing Wave Ratio |
| XID | eXchange Identification |

NOTE: As defined in [15].

| | |
|-----|----------------------------|
| XML | eXtensible Markup Language |
| XSD | XML Schema Definition |

4 Introduction

The present document is a subset of the ORI Release 1 specifications.

5 C&M plane description

5.1 Protocol stack

The C&M plane protocol stack that shall be supported by REC and RE within the overall ORI protocol stack, is shown in figure 5.1-1 and complies with [1], clause 4.1.

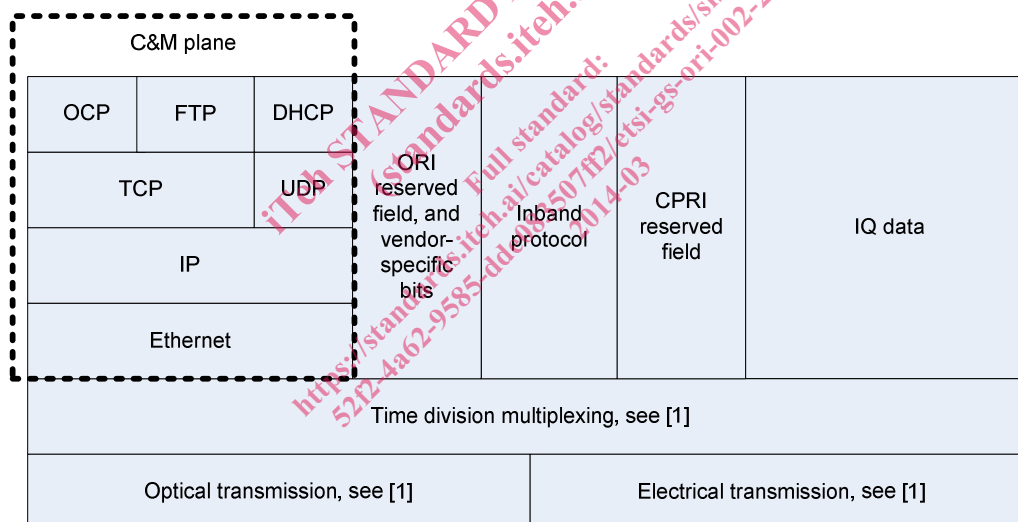


Figure 5.1-1: ORI protocol stack highlighting C&M plane

The IQ data, CPRI reserved field, Vendor-specific bits (a subset of which are used for the ORI reserved field), and Inband protocol, are as defined in [1]. The ORI reserved field itself is defined in [3].

The use of Ethernet, IP, TCP, DHCP, FTP and OCP (ORI C&M Protocol) within the C&M plane is described in clause 5.2.

Further details of OCP are defined in clauses 7, 8 and 10.

5.2 C&M plane protocols

The C&M plane consists of the following:

- OCP.
- Protocols that provide the underlying transport for the OCP layer.

- Protocols used by OCP to perform its functions. OCP functions are described in clause 5.2.6.

The OCP layer shall be transported over a TCP/IP connection established between the RE and the REC (see clause 10.1.1). This TCP/IP connection shall use the IP address provided to the RE via DHCP. The IP datagrams are transported in Ethernet frames. Ethernet is the ORI Data link layer, which is carried over the Fast C&M channel, as specified in [3].

FTP services shall be used by OCP for file transfer.

ARP (as defined in RFC 826 [23]) shall be supported for resolution of network layer addresses (i.e. IP addresses) into link layer addresses (i.e. MAC addresses).

Additional IP-based protocols (such as Telnet, SSH) may be supported to allow access from an external node to the RE via the REC.

5.2.1 Ethernet/Fast C&M

The RE shall use universally unique MAC addresses to ensure that there is no conflict of devices on the Ethernet LAN.

The MTU (the largest number of bytes that can be carried by an Ethernet frame, excluding the header and trailer) is the Ethernet default value (1 500 bytes).

NOTE: The way Ethernet frames are managed in case of daisy chained configuration is out of the scope of the present document.

5.2.2 IP

The REC communicates with the REs using IP V4 protocols. There shall be one RE IP address for the C&M plane.

5.2.3 DHCP

DHCP shall be used by the RE to acquire an IP address for OCP layer establishment. DHCP shall be supported by the REC and RE. DHCP shall be used as specified in RFC 2131 [16].

DHCP vendor specific codes and their usage within ORI are detailed in clause 10.1.1.1.

5.2.4 TCP/UDP

TCP shall provide the transport for OCP.

The REC shall be responsible for establishing the TCP connection to the RE.

The TCP port for transporting OCP shall be indicated by the RE within a Vendor Specific code in DHCP.

The establishment of the TCP/IP connection for OCP layer transport is further described in clause 10.1.1, and the TCP options that shall be used are defined in clause 10.1.1.2.

5.2.5 FTP

FTP shall be used as specified in [14]. Passive mode shall be used for all file transfers.

The RE shall provide FTP client services to allow the REC to use OCP services related to file management services.

The RE may provide a FTP server for service purposes.

5.2.6 ORI C&M Protocol (OCP)

OCP provides the following functions:

- Control & Management of the RE by the REC.
- Transport of AISG/3GPP Iuant Layer 7 messages and alarms between REC and RE.