TSG-RAN Meeting #25 **RP-040304**

Palm Springs, USA, 07 - 09 September 2004

Presentation of Specification to TSG or WG

Presentation to:	**TSG RAN Meeting #25**
Documents for presentation:	**TS 25.460: UTRAN Iuant Interface: General Aspects and Principles**
	Version 1.0.0
Presented for:	**Approval**

Abstract of document:

At TSG-RAN#19 the "Work Item Description for Remote Control of Electrical Tilting Antennas" (RP-030193) was approved. The new Technical Specification 25.460 describes the priciple of the Iuant interface. The logical Iuant interface is a Node B internal interface between the implementation specific O&M function and the RET Antenna Control unit function of the Node B. The Iuant interface for the Control of RET Antennas is a logical part of the Node B. No new UTRAN element for the RET Antenna and no new UTRAN element manager is needed. The existing implementation specific O&M transport is used for the connection between the RET Antenna Control unit and the Node B Element Manager.

Changes since last presentation to TSG RAN Meeting #24:

- The open issues in the draft versions of the specifications were solved in RAN3.
- The Technical Specification 25.460 for Iuant was prepared for approval at TSG-RAN#25

Outstanding Issues:

Some minor open issues were identified which can be handled via CRs during the next WG meetings:

- Change Requests for the TSs can be expected in the next RAN3 meetings to solve editorial mistakes.
- The WI level of completion is 95%.

Contentious Issues:

No contentious issues are open.

3GPP TS 25.460 V1.0.0 (2004-09)

Technical Specification

3rd Generation Partnership Project; Technical Specification Group Radio Access Network; UTRAN Iuant Interface: General Aspects and Principles (Release 6)

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document is an introduction to the TSG RAN TS 25.46x series of UMTS Technical Specifications that define the Iuant Interface. The logical Iuant interface is a Node B internal interface between the implementation specific O&M function and the RET Antenna Control unit function of the Node B.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 25.401: "UTRAN Overall Description".

[2] 3GPP TS 25.461: "UTRAN Iuant Interface: Layer 1".

[3] 3GPP TS 25.462: "UTRAN Iuant Interface: Signalling Transport".

[4] 3GPP TS 25.463: "UTRAN Iuant Interface: Remote Electrical Tilting (RET) Antennas Application Part (RETAP) Signalling".

[5] ISO/IEC 13239 (2nd Edition, March 2000): Information Technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures

[6] 3GPP TS 25.442: " UTRAN implementation-specific O&M transport ".

3 Abbreviations

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

HDLC	High-Level Data Link Control
OSI	Open Systems Interconnection
RET	Remote Electrical Tilting

4 General Aspects

4.1 Introduction

The Iuant interface for the Control of RET Antennas is a logical part of the Node B as shown in figure 9 of [1]. Therefore, no new UTRAN element for the RET Antenna and no new UTRAN element manager is needed. The existing Implementation Specific O&M transport is used for the connection between the RET Antenna Control unit and the Node B Element Manager.

The Node B internal interface Iuant between the Implementation Specific O&M function and the RET Antenna Control unit function is specified in detail in the specifications for layer 1, signalling transport and RET application part [2,3,4].

4.2 Iuant Interface General Principles

For the control of RET antennas a standard data interface between the Node B Implementation Specific O&M function and the Node B RET Antenna Control function according to [1] is defined by means of which functional parameters of the device can be remotely controlled. The Iuant interface for the RET antenna control is based on a three-layer protocol model. The three-layer model is a compact form of the OSI seven-layer reference model and includes only layers 1, 2 and 7:

- The Physical Layer (Layer 1) defines the signalling levels and basic data characteristics including the data rates.
- The Data Link Layer (Layer 2) for the Signalling Transport uses a specific class of the HDLC standard as defined in [5].
- The Application Layer (Layer 7) defines the data payload format and the required command set. This layer is called the "RET Control Application Part" (RETAP).

This compact model for the control interface provides an efficient protocol stack suitable for implementation on a single embedded micro-controller.

4.3 Iuant Interface Specification Objectives

The Iuant interface specifications shall facilitate the following:

- controling the tilting of RET antennas remotely from the O&M Network and locally from the Node B;
- interfacing a mix of RET antennas and Node Bs from different vendors;
- providing RET functionality in the UTRAN accompanied by an appropriate set of signalling commands and control parameters
- support of error and alarm handling.

4.4 Iuant Interface Characteristics

The Iuant interface has a protocol structure as shown below in figure 4.1 for both Implementation Specific O&M Transport options.

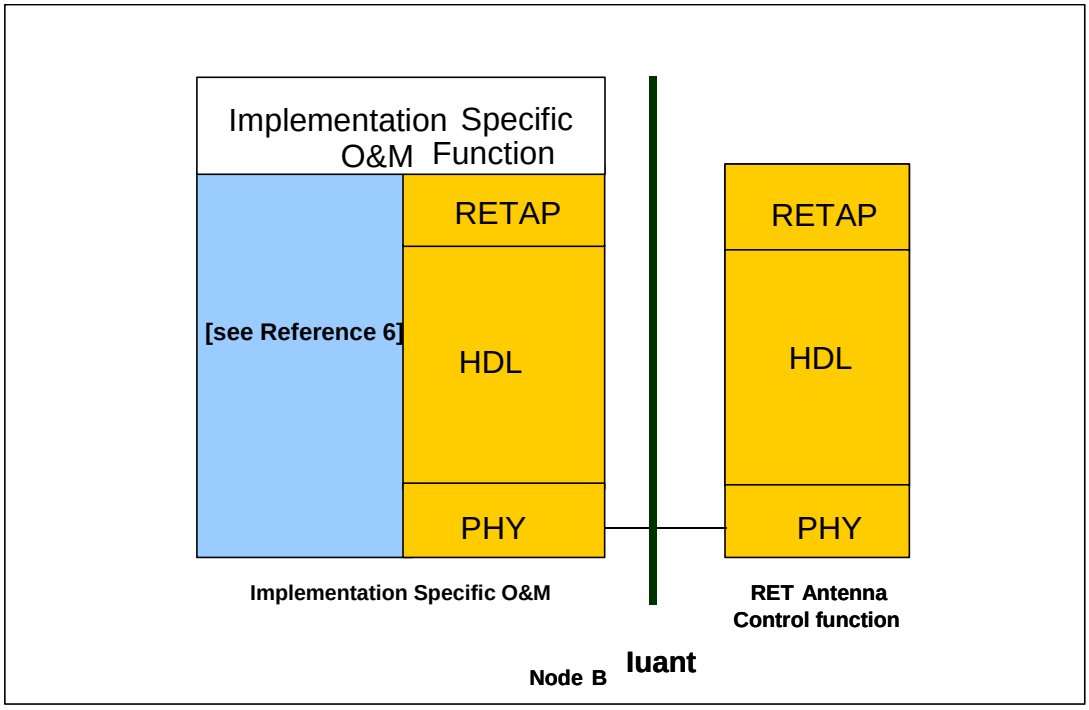

Figure 4.1: Protocol Structure for Iuant interface

As the Iuant and the Implementation Specific O&M are different interfaces with e.g. different addressing schemes a mediation function is needed. This mediation function uses on one side a protocol that uses the implementation specific O&M bearer (e.g. IP) and on the other side the Iuant protocol.

5 Functions of the Iuant Interface Protocols

5.1 Physical Layer Functions

The physical layer provides a multi drop broadcast link between the primary device (Node B) and all secondary devices (RET antennas). Any message transmitted will be received by all other devices. If two devices transmit at the same time, their messages will be garbled.

The connection requires a half duplex communication, which requires an appropriate addressing scheme for the timing and access control of the connection.

5.2 Data Link Layer Functions

The Data Link layer provides:

- A data packet communication format;
- An addressing scheme;
- A master/slave relationship whereby the primary device controls the half duplex timing;
- A message checksum scheme to protect from transmission errors;
- A message sequence numbering scheme which protects layer 7 from

  - Duplicated messages;
  - Deleted messages;
  - Receiving messages in the wrong order.
- A flow control mechanism protecting each node from being overrun by messages.

These functions provide layer 7 with a safe full-duplex connection between the primary device and any secondary device.This full duplex link allows both the primary and secondary device to transmit layer 7 messages to the opposite device of the connection, whenever they need to. Actual delivery time on layer 2 will depend on the layer 2 polling frequency, which is chosen by the primary device.

5.3 Application Layer Functions

The list of functions on the Iuant interface is the following:

- Control of RET;
- Software Download;
- Alarm Reporting.

5.4 Control of RET

A RET device provides means to adjust the electrical tilt of one or multiple antennas. This set of procedures provides a means of remotely controlling the electrical tilt of one or more RET devices.

5.5 Software Download

The interface provides means for downloading new software to a secondary device. The support of Software Download to a secondary device is optional. If a secondary device supports software download, it may do so using the memory for two full software versions in parallel or it may enter a boot mode during the download of the software. In either case, the secondary device shall reset itself and start running the new software automatically after the completed download. If boot mode is used, a limited set of commands and return codes in the application layer is allowed during that mode. The physical layer and the transport layer must maintain full functionality also in boot mode.

5.6 Alarm Reporting

The secondary device reports every change in error status after subscription for alarm reporting by transmitting an alarm message to the primary device. Alarm information can also be interrogated in the application layer.

6 Other Iuant Interface Specifications

6.1 UTRAN Iuant Interface: Layer 1 (TSG RAN 25.461)

TS 25.461 [2] specifies the standards allowed for implementation of Layer 1 (physical layer) on the Iuant interface.

6.2 UTRAN Iuant Interface: Signalling Transport (TSG RAN 25.462)

TS 25.462 [3] specifies the signalling transport related to RETAP signalling to be used across the Iuant interface.

6.3 RETAP Specification (TSG RAN 25.463)

TS 25.463 [4] specifies the standards for RETAP specification to be used over the Iuant interface.

6.4 Summary of UTRAN Iuant Interface Technical Specifications

The relationship between the technical specifications that define the UTRAN Iuant interface is shown in figure 6.1.

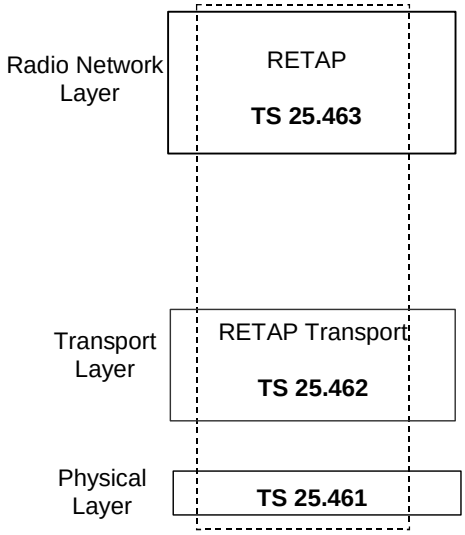

Figure 6.1: Iuant Interface Technical Specifications

Annex A (informative): OSI Model Overview

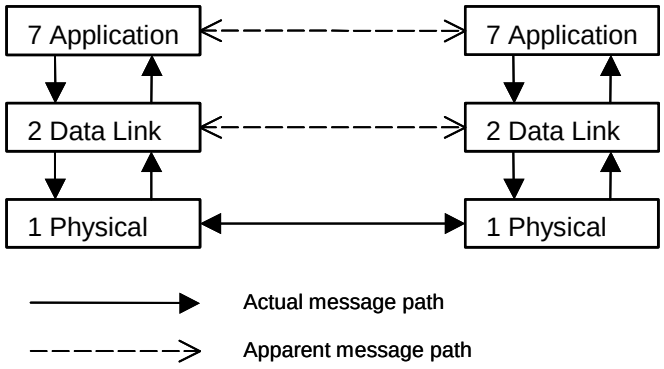

Figure A.1: Relevant OSI Model Layers

Figure A.1 shows the relevant OSI Model layers and the communication paths between the primary and secondary device.

The two important aspects of the OSI Model are:

- It defines a layered structure for the communication software
- It provides each layer with an apparent direct link to the same layer at the other device.

However, in real life, the only actual message path between the two devices is through the physical connection between the two layer 1 entities.

The layer 2 entities appear to communicate directly. In actual fact, a message passed from the first device to the second device takes the following path:

- Layer 2 at the first device passes the message down to Layer 1
- Layer 1 transmits it across the physical connection (for instance a wire) to layer 1 at the second device.
- Layer 1 at the second device passes the message up to Layer 2 at the second device.

Likewise, layer 7 entities appear to communicate directly. In actual fact, a message passed from the first device to the second device takes the following path:

- Layer 7 at the first device passes the message down to Layer 2
- Layer 2 at the first device passes the message down to Layer 1
- Layer 1 transmits it across the physical connection (for instance a wire) to layer 1 at the second device.
- Layer 1 at the second device passes the message up to Layer 2 at the second device.
- Layer 2 at the second device passes the message up to Layer 7 at the second device.

Annex B (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
September 2004	TSG-RAN#25	RP-040304	_	_	presentation to TSG-RAN for information	_	1.0.0