

Title: **Proposal for New Work Item “Remote Control of Electrical Tilting Antennas”**

Agenda Item: **9.10**

Source: **Vodafone Group**

Document for: **Discussion and Approval**

1 Introduction

In the TSG RAN#14 meeting (Kyoto, Japan, 11 – 14 December 2001) a Work Item for an "Interface to control electrical tilting of antennas" was proposed. According to the outcome of the discussion TSG RAN decided to instruct TSG RAN WG 3 to draft a clearer WI for TSG RAN#15 meeting on the topic of the postponed WI presented at TSG RAN#14 meeting [1] including an assessment on what should be done in TSG RAN, as OAM issues are normally treated by TSG SA WG5.

At that time an international forum called the Antenna Interface Standards Group (AISG, see <http://www.aisg.org.uk>, [2] and [3]) started writing a standard (AISG1) to define such an interface including signalling protocol between a logical Remote Electrical Tilting (RET) antenna and the logical Node B. Therefore, it was proposed by Vodafone Group at TSG RAN3#29 meeting (Gyeongju, South Korea, 13 – 17 May 2002) not to carry out any work on this topic within TSG RAN at that time and wait for the AISG specification [4].

At TSG RAN#18 meeting (New Orleans, Louisiana, USA, 3 – 6 December 2002) the status of the AISG work was presented by Vodafone Group [5]. It was clarified that the technical work has been finished in AISG. A first public version of the draft AISG standard [6] was published in November 2002 and is available at <http://www.aisg.org.uk>.

During the discussion at RAN#18 it was requested by TSG RAN to present the public draft AISG specification in TSG RAN WG3 and WG4 for examination of the new interface and its impact on the RF conditions at the antenna port

Therefore, contributions about the current status of AISG work and the first public draft AISG specification were presented at RAN3#34 and RAN4#26 [3,7]. Furthermore, a new Work Item proposal for consideration on "Remote Control of Electrical Tilting Antennas" to integrate the interface specified by AISG into the current UTRAN architecture was presented at RAN3#34, too [8].

In order to take into account the comments raised at TSG RAN#14 meeting during the discussion of the postponed work item proposal the proponents provide some more detailed information on the motivation for the new work item in this document.

2 Concept of Electrical Tilting Antennas

Because of the interference limitation property of the CDMA based UTRAN, the *tilting* of antennas is essential for the successful operation and optimisation of the UMTS network coverage. It would be very beneficial if it were possible to remotely control the tilting of antennas in order to optimise radio coverage areas.

In the current UTRAN architecture, the electrical tilting control function would be situated within the Node B. However, due to the different potential implementations of this function (if it is implemented at all), it may be difficult for the operator to control all antennas consistently across their network, both in day-to-day maintenance and the re-deployment of antennas. Therefore it would be beneficial for the operator to have the possibility to use a third party antenna controlling function at the Node B site, to enable a consistently control of antennas across their network, and to make re-deployment simpler. For this purpose a standardised open interface between the Node B and the antenna control unit is needed.

3 Remote Control of Electrical Antenna Tilt

Non-remote variable electrical tilting would lead to costly site visits and tower climbing. Therefore, it is beneficial to enable the operator to control the electrical tilting of antennas from the Network Management System.

Remote electrical tilting (RET) solutions to date are proprietary and hence interfacing a mix of antennas and Node Bs from different vendors is not possible without a standardised interface.

Therefore, in order to enable flexibility for the operator in choosing their antenna supplier(s), an interface is required between RET antenna and Node B to control the electrical tilting remotely. See figure 1.

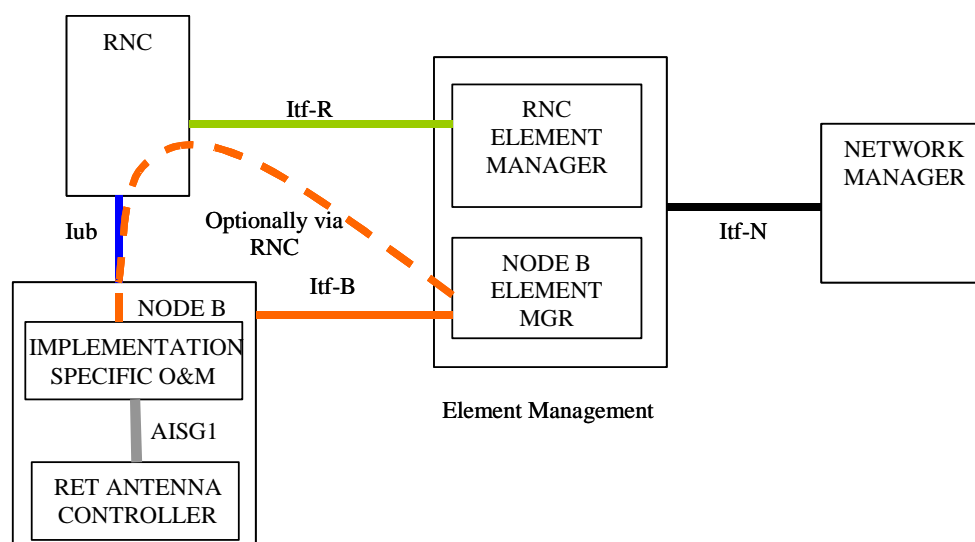


Figure 1: Radio Network Management Interfaces

Additionally, RET functionality in the UTRAN and an appropriate signalling of control parameters and commands from the Network Manager over the Ift-N interface

would allow the operator to optimise the whole network using consistent commands – even in a multi-vendor environment.

However, in enabling this RET functionality, the following items should be considered:

- There is currently a standard AISG1 for an interface to control antenna line devices specified by AISG. References to the relevant parts of this standard should be used in the relevant TSG RAN WG 3 specifications to integrate the RET control interface into the UTRAN architecture. If this is not possible due to a non-legal status of AISG, then the parts of AISG1, who are needed for the RET functionality, should be submitted to TSG RAN WG 3 as company contributions.
- There is no functionality on the Iff-N interface to enable the operator to control the antenna down-tilt remotely and consistently across their network. Therefore, some new parameters are required over the Iff-N interface to enable this.

4 Proposal

It is therefore proposed to approve the following Work Item Description on "Remote Control of Electrical Tilting Antennas".

5 References

- [1] **RP-010834** "Proposed Work Item 'Interface to control electrical tilting of antennas"; Mannesmann Mobilfunk GmbH, Omnitel-Vodafone, Deutsche Telekom MobilNet, Eplus, Vodafone Group, Telecom Italia; TSG RAN#14, Kyoto, Japan
- [2] **RP-020451** "Overview of the Antenna Interface Standards Group (AISG)"; Vodafone Group; TSG RAN#16, Marco Island, FL, USA
- [3] **R3-030082** "Information about Antenna Interface Standards Group (AISG) first public draft specification"; Vodafone Group; TSG RAN3#34, Sophia Antipolis, France
- [4] **R3-021584** "Proposed Handling for Remote Electrically Tilting (RET) Antennas Work in TSG RAN"; Vodafone Group; TSG RAN3#29, Gyeongju, South Korea
- [5] **RP-020853** "Status of Antenna Interface Standards Group (AISG) work"; Vodafone Group; TSG RAN#18, New Orleans, Louisiana, USA
- [6] **AISG Standard No. AISG1** "Control Interface for Antenna Line Devices", 1st Public Draft 8, 18th November 2002
- [7] **R4-030140** "Information about AISG draft specification"; Vodafone Group; TSG RAN4#26, Madrid, Spain
- [8] **R3-030156** "Proposal for New Work Item 'Remote Control of Electrical Tilting Antennas"; Vodafone Group; TSG RAN3#34, Sophia Antipolis, France

Work Item Description

Title: Remote Control of Electrical Tilting Antennas

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

None identified

3 Justification

Because of the interference limitation property of the CDMA based UTRAN, the tilting of antennas is essential for the successful operation and optimisation of UMTS network coverage. It would be very beneficial if it were possible to remotely control the tilting of antennas in order to optimise radio coverage areas.

The ability for the operator to control the electrical tilt of the antennas remotely from the O&M Network is currently possible via the implementation-specific interfaces between Node B Element Manager and Node B. A “remote control” mechanism would decrease the costs incurred on the operator for site visits to change the tilt of the antennas manually and simplify the redeployment of antennas in a large network.

Remote electrical tilting (RET) solutions to date are proprietary and hence interfacing a mix of antennas and Node Bs from different vendors is not possible without a standardised interface. Therefore, in order to enable flexibility for the operator in choosing their antenna supplier(s), a new interface is required between RET antenna and Node B to control the electrical tilting.

Additionally, RET functionality in the UTRAN accompanied by an appropriate set of signalling commands and control parameters from the Network Manager over the Ift-N interface would allow the operator to optimise the whole network using consistent commands – even in a multi-vendor environment.

4 Objective

The objectives of this work item are:

- Enable local RET antenna-controlling functionality situated at or near Node B site to be from a third party vendor using a standardised open interface.
- Be able to control the antenna from the Network Manager, so that the operator is able to control the RET antenna remotely and consistently across the network.

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects:	USIM	ME	AN	CN	Others
Yes			X		X
No	X	X		X	
Don't know					

a) Work for TSG RAN WG 3

- Verification of the relevant parts of the AISG specification
- Integration of the new antenna interface specified by AISG into the UTRAN architecture

b) Work for TSG SA WG 5

- Provision of the parameters / functionality across the Itf-N interface needed for a network wide controlling of RET antenna devices

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
Affected existing specifications						
Spec No.	CR	Subject		Approved at plenary#	Comments	
25.401		UTRAN architecture description; stage 2		RAN#20		

11 Work item rapporteur

Andreas Hauser, Vodafone D2 GmbH, Düsseldorf, Germany

12 Work item leadership

TSG-RAN WG 3

13 Supporting Companies

Vodafone Group, 3, Lucent Technologies, Nortel Networks, Siemens AG,
Telefonica, Telecom Italia

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

(list of Work Items identified as building blocks)

14b The WI is a Building Block: Parent Feature: RAN Improvement

14c The WI is a Work Task: parent Building Block

(one Work Item identified as a building block)