

# ETSI TS 125 463 V6.2.0 (2005-03)

---

*Technical Specification*

**Universal Mobile Telecommunications System (UMTS);  
UTRAN Iu-MS interface: Remote Electrical Tilting (RET)  
antennas Application Part (RETAP) signalling  
(3GPP TS 25.463 version 6.2.0 Release 6)**

---



---

Reference

RTS/TSGR-0325463v620

---

Keywords

UMTS

**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**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the 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](http://portal.etsi.org/chaicor/ETSI_support.asp)

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2005.  
All rights reserved.

DECT™, PLUGTESTS™ and UMTS™ are Trade Marks of ETSI registered for the benefit of its Members.  
TIPHON™ and the TIPHON logo are Trade Marks currently being registered by ETSI for the benefit of its Members.  
3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

---

## 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://webapp.etsi.org/IPR/home.asp>).

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 Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

# Contents

Intellectual Property Rights .....	2
Foreword.....	2
Foreword.....	5
1 Scope .....	6
2 References .....	6
3 Definitions and abbreviations.....	6
3.1 Definitions .....	6
3.2 Abbreviations .....	8
4 General .....	8
4.1 Procedure specification principles.....	8
4.2 Forwards and backwards compatibility.....	8
4.3 Multi-antenna units.....	8
4.4 Integer representation .....	8
5 Services expected from signalling transport.....	8
5.1 Elementary procedure format .....	9
5.1.1 Initiating message .....	9
5.1.2 Response message .....	9
6 Control elementary procedures .....	10
6.1 State model.....	10
6.2 General procedure handling .....	10
6.2.1 Alarms .....	10
6.2.2 Procedure message interpretation .....	11
6.3 Overview of elementary procedures.....	11
6.4 Description of elementary procedures.....	12
6.5 Common elementary procedures .....	13
6.5.1 Reset Software .....	13
6.5.2 Get Alarm Status.....	14
6.5.3 Get Information .....	14
6.5.4 Clear Active Alarms .....	15
6.5.5 Alarm Subscribe .....	16
6.5.6 Self Test.....	16
6.5.7 Void.....	17
6.5.8 Void.....	17
6.5.9 Read User Data .....	17
6.5.10 Write User Data .....	18
6.5.11 Download Start .....	19
6.5.12 Download Application.....	19
6.5.13 Download End .....	20
6.6 Single-antenna elementary procedures.....	21
6.6.1 Calibrate.....	21
6.6.2 Send Configuration Data .....	22
6.6.3 Set Tilt .....	22
6.6.4 Get Tilt.....	23
6.6.5 Alarm Indication.....	24
6.6.6 Set Device Data .....	24
6.6.7 Get Device Data.....	25
6.7 Multi-antenna elementary procedures .....	26
6.7.1 Antenna Calibrate .....	26
6.7.2 Antenna Set Tilt.....	26
6.7.3 Antenna Get Tilt .....	27
6.7.4 Antenna Set Device Data.....	28
6.7.5 Antenna Get Device Data .....	29

6.7.6	Antenna Alarm Indication .....	29
6.7.7	Antenna Clear Active Alarms .....	30
6.7.8	Antenna Get Alarm Status .....	30
6.7.9	Antenna Get Number Of Antennas .....	31
6.7.10	Antenna Send Configuration Data .....	32
7	Unknown elementary procedures .....	32
<b>Annex A (normative):</b>	<b>Return codes for secondary devices .....</b>	<b>33</b>
<b>Annex B (normative):</b>	<b>Assigned fields for additional data .....</b>	<b>34</b>
<b>Annex C (normative):</b>	<b>Procedure sequence for download of software to a secondary device.....</b>	<b>35</b>
<b>Annex D (informative):</b>	<b>Overview of elementary procedures.....</b>	<b>36</b>
<b>Annex E (informative):</b>	<b>Change history .....</b>	<b>37</b>
History .....		38

---

# Foreword

This Technical Specification has been produced by the 3<sup>rd</sup> 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 specifies the *Remote Electrical Tilting Application Part (RETAP)* between the implementation specific O&M transport function and the RET Antenna Control unit function of the Node B. It defines the Iuant interface and its associated signaling procedures.

---

# 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 25.460: "UTRAN Iuant Interface: General Aspects and Principles".
- [2] ISO/IEC 13239 (2<sup>nd</sup> Edition, March 2000): "Information Technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures".
- [3] 3GPP TS 25.462: "UTRAN Iuant Interface: Signalling Transport".
- [4] 3GPP TS 25.461: 'UTRAN Iuant Interface: Layer 1'.

---

# 3 Definitions and abbreviations

## 3.1 Definitions

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

**Active alarm:** An alarm which has an alarm state that has been raised, but not cleared

**Alarm:** Persistent indication of a fault

**Alarm code:** A code that identifies a specific alarm. The alarm code set is a subset of the return code set. The alarm codes are listed in annex A of this TS

**Alarm state:** A condition or state in the existence of an alarm. Alarm states are raised and cleared

**ASCII character:** A character forming part of the International Reference Version of the 7-bit character set defined in ISO/IEC 646:1991

**Calibrate:** Exercise the antenna drive unit over its entire range of travel to ensure fault-free operation and synchronise the measured and actual beam tilt of the antenna

**Configuration data:** A stored table or function defining the relationship between the physical position of the drive and electrical beam tilt

**Data type:** A definition determining the value range and interpretation of a series of octets. The following specified data types are used in this TS:

Name:	Definition:
AlarmCode	1 octet unsigned enumerated code All AlarmCode values are listed in annex A of this TS
FieldNumber	1 octet unsigned enumerated code All field number values are listed in annex B of this TS
ProcedureCode	1 octet unsigned enumerated code
ReturnCode	1 octet unsigned enumerated code All ReturnCode values are listed in annex A of this TS
TextString	Octets with integer values in the range of 32 to 126 to be interpreted as ASCII characters

**Elementary procedure:** The RETAP protocol consists of elementary procedures (EPs). An elementary procedure is a unit of interaction between the primary device (Node B) and the secondary devices (RET devices)

An EP consists of an initiating message and possibly a response message.

Two kinds of EPs are used:

- **Class 1:** Elementary procedures with response (success or failure).
- **Class 2:** Elementary procedures without response.

For **Class 1** EPs, the types of responses can be as follows:

Successful

- A signalling message explicitly indicates that the elementary procedure has been successfully completed with the receipt of the response.

Unsuccessful

- A signalling message explicitly indicates that the EP failed.

**Class 2** EPs are considered always successful.

**Error:** Deviation of a system from normal operation

**Fault:** Lasting error condition

**Little endian:** The order of transmission in which the least-significant octets of a multi-octet representation of a number are transmitted first. Little endian only applies to binary integer representations

**MaxDataReceiveLength:** SecondaryPayloadReceiveLength minus 3 octets (see subclause 4.8.1 in [3])

**MaxDataTransmitLength:** SecondaryPayloadTransmitLength minus 3 octets (see subclause 4.8.1 in [3])

**Procedure code:** A code identifying an elementary procedure

**Reset:** A process by which the device is put in the state it reaches after a completed power-up

**Return code:** A code which defines information about the outcome of an elementary procedure execution

**Tilt (also downtilt, tilt angle, beamtilt):** The elevation angle between the direction orthogonal to the antenna element axis and the maximum of its main beam in the elevation plane. A positive electrical tilt angle means that the antenna beam is directed below the direction orthogonal to the antenna axis. An antenna has separate values for electrical and mechanical tilt. The mechanical tilt is fixed by the geometry of the installation. In this TS the tilt referred to is always the electrical tilt unless otherwise stated

**Tilt value:** A signed integer used in elementary procedures to define the electrical tilt setting of the antenna. The tilt value is 10 times the antenna electrical tilt angle in degrees.



## 3.2 Abbreviations

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

EP	Elementary Procedure
HDLC	High-Level Data Link Control
RET	Remote Electrical Tilting
RETAP	Remote Electrical Tilting Application Part

---

## 4 General

### 4.1 Procedure specification principles

The principle for specifying the procedure logic is to specify the functional behaviour of the RET antenna control unit exactly and completely. The Node B functional behaviour is left unspecified.

The following specification principles have been applied for the procedure text in clause 6:

- The procedure text discriminates between:

- 1) Functionality which "shall" be executed

The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the REQUEST message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

- 2) Functionality which "shall, if supported" be executed

The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

### 4.2 Forwards and backwards compatibility

The forwards and backwards compatibility of all versions of the protocol shall be assured by a mechanism in which all current and further messages will not be changed in the future. These parts can always be decoded regardless of the standard version.

### 4.3 Multi-antenna units

The RETAP elementary procedures are split into a single-antenna oriented part, a multi-antenna oriented part and a common part for both device types in order to support RET units controlling single- or multi-antenna devices. The RET unit responds, upon request, the number of antennas it controls. All multi-antenna oriented elementary procedures include a parameter stating which antenna the elementary procedure addresses. Antennas are numbered 1 and upwards.

### 4.4 Integer representation

Multi-octet integer values are transmitted in little endian order. Signed integers are represented as 2-complement values.

---

## 5 Services expected from signalling transport

RETAP requires an assured in-sequence delivery service from the signalling transport and notification if the assured in-sequence delivery service is no longer available.

## 5.1 Elementary procedure format

Layer 2 provides a full-duplex link for the transmission of RETAP messages.

There are two types of RETAP elementary procedures:

**Class 1:** Initiating messages are sent either from the primary to a secondary device, or from a secondary to the primary device, in order to initiate some action within the receiving device. The other device sends a response message completing the procedure.

**Class 2:** Initiating messages are sent either from the primary to a secondary device, or from a secondary to the primary device. No response message is expected.

All RETAP messages use the same basic format:

**Table 5.1.1: Basic format for all RETAP messages**

Elementary procedure	Number of data octets	Data
1 octet	2 octets	MaxDataReceiveLength or MaxDataTransmitLength.

NOTE: Response messages have the same basic format as initiating messages. The elementary procedure code shall be the same in the response message as in the associated initiating message.

### 5.1.1 Initiating message

The data part of an initiating message may contain parameters as specified in clause 6 of this TS.

### 5.1.2 Response message

Elementary procedures shall, unless otherwise specified, provide a response message within 1 second. The response time is measured from the time the message frame was received by the transport layer to the time the response message is ready for transfer by the transport layer.

If the class1 elementary procedure requested by the initiating message was successfully executed, the response message data part from a single-antenna device shall be <OK>. Additional information may follow in the data part. The response message data part from a multi-antenna device starts with the antenna number followed by <OK> and optional additional information.

If the elementary procedure requested by the initiating message was not successfully executed, the response message data part from a single-antenna device shall be <FAIL>.

The following octet shall contain a return code which describes why the execution of the requested procedure failed. The response message data part from a multi-antenna device starts with the antenna number followed by <FAIL> and a return code which describes why the execution of the requested procedure failed.

In some situations an initiating message can cause a change of operating conditions, for instance a SetTilt procedure might cause a RET device to discover that an adjuster is jammed or that a previously jammed adjuster works normally again. In these cases an alarm procedure reporting the change of operating conditions shall be used in addition to the regular <OK> or <FAIL> response message.

A complete annotated table of all return codes with their corresponding hexadecimal numbers is provided in annex A of this TS.

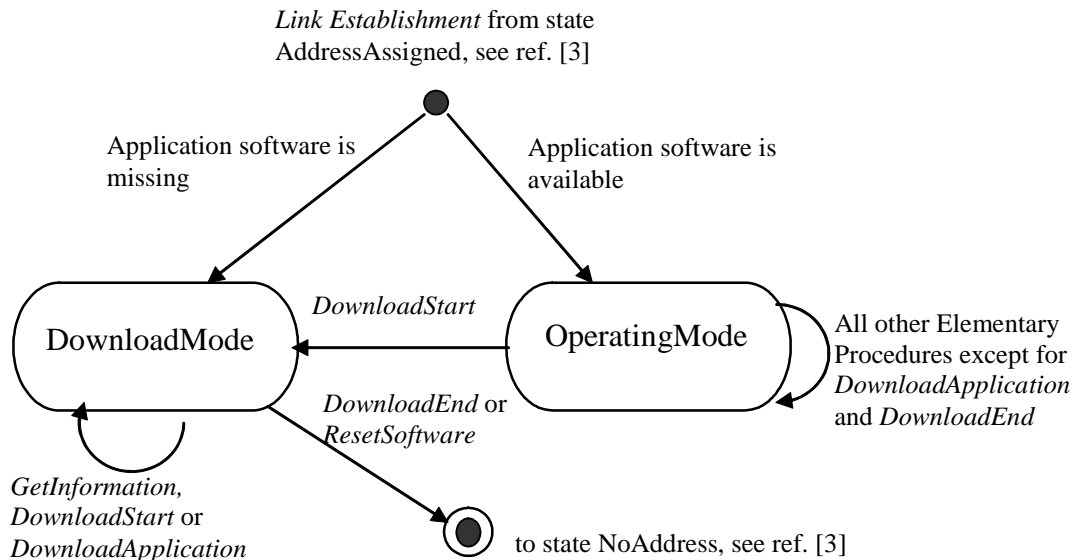
Return codes marked with an X in the Alarm column of annex A in this TS are used to report operating conditions in alarm procedures (see subclauses 6.6.5 and 6.7.6 for details).

## 6 Control elementary procedures

### 6.1 State model

The state model describing the RET device is shown in figure 6.1 with procedures written in *italic*.

The relation to the connection state model for layer 2 can be found in [3].



**Figure 6.1: State model for the RET device**

If an application software is not missing the RET device enters the state **OperatingMode**.

If an application software is missing, the RET device enters the state **DownloadMode**. In this state only software download functionality is supported in order to restore the application software.

The primary device will be notified that the RET device has entered the state **DownloadMode** when a procedure which only is supported in the state **OperatingMode** fails with the return code **WorkingSoftwareMissing**.

If no software download functionality is supported, then only the state **OperatingMode** for the RET device is supported.

## 6.2 General procedure handling

All procedures are blocking i.e. no new initiation messages will have to be executed before a response message has been delivered as result of the previously initiated procedure.

The **ResetSoftware** procedure shall always be handled in all states and never be blocked.

### 6.2.1 Alarms

When a fault is detected, the corresponding alarm state shall be changed to state *raised* by the secondary device. When the fault no longer exists, the corresponding alarm state shall be changed to state *cleared* by the secondary device. Alarm changes are reported through the **AlarmIndication** or **AntennaAlarmIndication** elementary procedures. Whenever an **AlarmIndication** or **AntennaAlarmIndication** elementary procedure message is transmitted, it shall contain all the alarm states changed that have not yet been reported as described in subclauses 6.6.5 and 6.7.6.

All alarm states shall be cleared by any type of reset.

## 6.2.2 Procedure message interpretation

The following message interpretation rules apply in the order mentioned:

- Any message shorter than 3 octets shall be disregarded;
- If a message has a length inconsistent with its 'Number of data octets' field value it shall be responded with a failure message stating 'FormatError' as the cause of failure. The response message shall be to the initiating message identified by the procedure code;
- If a secondary device in the OperatingMode state is receiving a procedure message of an optional procedure not supported or if the procedure is inapplicable to the device type, it shall respond with a failure message stating 'UnsupportedProcedure' as the cause of failure;
- If a secondary device receives a procedure message, part of the software download procedure sequence described in Annex C, without having received the previous procedure messages in that sequence it shall respond with a failure message stating 'InvalidProcedureSequence' as the cause of failure;
- If a secondary device in the DownloadMode state is receiving a procedure message not supported in that state it shall respond with a failure message stating 'WorkingSoftwareMissing' as the cause of failure;
- If a secondary device in the OperatingMode state is receiving a correct procedure message with a procedure code not known it shall respond with a failure message stating 'UnknownProcedure' as the cause of failure;
- If a message has a length inconsistent with the defined message length in the procedure definition it shall be responded with a failure message stating 'FormatError' as the cause of failure. The response message shall be to the initiating message identified by the procedure code.

## 6.3 Overview of elementary procedures

The set of elementary procedures for RET antenna control provides procedure-oriented instructions. An overview of the procedures is given in annex D. Table 6.3.1 lists all common elementary procedures described in subclause 6.5. Table 6.3.2 lists all elementary procedures specific for single-antenna device types described in subclause 6.6. Table 6.3.3 lists all elementary procedures specific for multi-antenna device types described in subclause 6.7. subclause 6.4 describes how to interpret the elementary procedure definitions in subclauses 6.5 to 6.7.

Some elementary procedures shall be performed in sequence as described in Annex C for the software download.

**Table 6.3.1: Common elementary procedure set for all device types**

Elementary procedure	Requirement	Comment
Reset Software	mandatory	
Get Alarm Status	mandatory	
Get Information	mandatory	
Clear Active Alarms	mandatory	
Alarm Subscribe	mandatory	
Read User Data	mandatory	
Write User Data	mandatory	
Self Test	mandatory	
Download Start	optional	This procedure is mandatory if the software download feature is supported
Download Application	optional	This procedure is mandatory if the software download feature is supported
Download End	optional	This procedure is mandatory if the software download feature is supported

**Table 6.3.2: Elementary procedure set for single-antenna device type**

Elementary procedure	Requirement	Comment
Calibrate	mandatory	
Send Configuration Data	mandatory	
Set Tilt	mandatory	
Get Tilt	mandatory	
Alarm Indication	mandatory	
Set Device Data	mandatory	
Get Device Data	mandatory	

**Table 6.3.3: Elementary procedure set for multi-antenna device type**

Elementary procedure	Requirement	Comment
Antenna Calibrate	mandatory	
Antenna Send Configuration Data	mandatory	
Antenna Set Tilt	mandatory	
Antenna Get Tilt	mandatory	
Antenna Set Device Data	mandatory	
Antenna Get Device Data	mandatory	
Antenna Alarm Indication	mandatory	
Antenna Clear Active Alarms	mandatory	
Antenna Get Alarm Status	mandatory	
Antenna Get Number Of Antennas	mandatory	

## 6.4 Description of elementary procedures

**Table 6.4.1: Description of elementary procedures**

<b>Name:</b> The name used to refer to the elementary procedure				
<b>Code:</b> The code is defined here. All other code references are informative	<b>Issued by:</b> Primary device or secondary device	<b>Procedure class:</b> Class 1 or Class 2	<b>DownloadMode state:</b> Defines whether the procedure shall be supported in the DownloadMode state.	<b>Power mode:</b> Defines the secondary device power consumption as described in [4] during the execution of the elementary procedure.

**Table 6.4.2: Initiating and response message parameters and format**

Number	Length	Type	Description
The enumerated order in which the parameter occurs in the data field of the message. The first number is 1.	The length of the parameter, in number of octets, if defined.	The data type used in the parameter.	Description of the parameter.

**Table 6.4.3: Response message parameters and format for common class 1 elementary procedures upon error**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code FAIL
2	1 octet	ReturnCode	Reason for failure

**Table 6.4.4: Response message parameters and format for single-antenna class 1 elementary procedures upon error**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code FAIL
2	1 octet	ReturnCode	Reason for failure

**Table 6.4.5: Response message parameters and format for multi-antenna class 1 elementary procedures upon error**

Number	Length	Type	Description
1	1 octet	Unsigned integer	Antenna number
2	1 octet	ReturnCode	Return code FAIL
3	1 octet	ReturnCode	Reason for failure

NOTE: The response message in the elementary procedure AntennaGetAntennaNumber, has the format given in table 6.4.4, although it is defined as a multi-antenna class 1 elementary procedure.

**Description:**

Describes the purpose of the elementary procedure.

**Table 6.4.6: Return codes**

OK	FAIL	Comment
All return codes applicable in a response message to a successful procedure, except 'OK', are listed here. The return codes are listed by name as defined in annex A.	All return codes applicable in a response message to a failing procedure, except 'FAIL' are listed here. The return codes are listed by name as defined in annex A.	Any comment needed for clarification.

## 6.5 Common elementary procedures

### 6.5.1 Reset Software

**Table 6.5.1.1: Elementary procedure Reset Software**

Name: <b>ResetSoftware</b>				
Code: <b>0x03</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>Yes</b>	Power mode: <b>Low</b>

**Table 6.5.1.2: Initiating message parameters and format for Reset Software**

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>

**Table 6.5.1.3: Response message parameters and format for Reset Software**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

On the receipt of the initiating message the secondary device shall reset the application. All alarm states shall be cleared.

If the initiating message is received in the OperatingMode state, the transport layer shall remain unaffected.

If the initiating message is received in the DownloadMode state, the ResetSoftware procedure shall reset the entire device without activating any new application software downloaded since entering the DownloadMode state.

The device shall not execute the reset procedure before transport layer acknowledgement through sequence number update is received for the response.

**Table 6.5.1.4: Return codes for Reset Software**

OK	FAIL	Comment
	<b>FormatError</b>	<b>In case of format error, the procedure code validity is not secured.</b>

## 6.5.2 Get Alarm Status

**Table 6.5.2.1: Elementary procedure Get Alarm Status**

Name: <b>GetAlarmStatus</b>				
Code: <b>0x04</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.5.2.2: Initiating message parameters and format for Get Alarm Status**

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>

**Table 6.5.2.3: Response message parameters and format for Get Alarm Status**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>
<b>i + 1</b>	<b>1 octet</b>	<b>AlarmCode</b>	<b>Active alarm number i</b>

**i = 1 ... N**

### Description:

On receipt of the initiating message the secondary device reports the alarm codes of the active alarms.

**Table 6.5.2.4: Return codes for Get Alarm Status**

OK	FAIL	Comment
<b>All return codes marked as used for alarms in Annex A.</b>	<b>FormatError</b> <b>Busy</b> <b>WorkingSoftwareMissing</b>	

## 6.5.3 Get Information

**Table 6.5.3.1: Elementary procedure Get Information**

Name: <b>GetInformation</b>				
Code: <b>0x05</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>Yes</b>	Power mode: <b>Low</b>

**Table 6.5.3.2: Initiating message parameters and format for Get Information**

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>

**Table 6.5.3.3: Response message parameters and format for Get Information**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>
<b>2</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Length of parameter 3 in number of octets</b>
<b>3</b>		<b>TextString</b>	<b>Product number</b>
<b>4</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Length of parameter 5 in number of octets</b>
<b>5</b>		<b>TextString</b>	<b>Serial number</b>
<b>6</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Length of parameter 7 in number of octets</b>
<b>7</b>		<b>TextString</b>	<b>Hardware Version</b>
<b>8</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Length of parameter 9 in number of octets</b>
<b>9</b>		<b>TextString</b>	<b>Software Version</b>

**Description:**

On receipt of the initiating message the secondary device shall return the product number ProdNr and the serial number SerNr of the secondary device. If known, also the hardware version and the software version may be returned. The software version should indicate the version number of the currently executed software.

The parameters HWVersion and SWVersion in the response message refer to the version designators of the hardware and installed software of the secondary device. If the application is missing or no version number is found, then an empty string shall be returned as the version number.

The response message length shall be less than or equal to the minimum SecondaryPayloadTransmitLength as given in subclause 4.8.1 in [3].

**Table 6.5.3.4: Return codes for Get Information**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b>	

**6.5.4 Clear Active Alarms****Table 6.5.4.1: Elementary procedure Clear Active Alarms**

Name: <b>ClearActiveAlarms</b>				
Code: <b>0x06</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.5.4.2: Initiating message parameters and format for Clear Active Alarms**

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>



**Table 6.5.4.3: Response message parameters and format for Clear Active Alarms**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

On receipt of the initiating message the secondary device shall first clear all stored alarm information and then return a procedure response message.

**Table 6.5.4.4: Return codes for Clear Active Alarms**

OK	FAIL	Comment
	FormatError Busy WorkingSoftwareMissing	

**6.5.5 Alarm Subscribe****Table 6.5.5.1: Elementary procedure Alarm Subscribe**

Name: <b>AlarmSubscribe</b>				
Code: <b>0x12</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.5.5.2: Initiating message parameters and format for Alarm Subscribe**

Number	Length	Type	Description
None	0 octets	None	No data carried

**Table 6.5.5.3: Response message parameters and format for Alarm Subscribe**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

On receipt of the initiating message the secondary device shall start reporting alarms to the primary device.

**Table 6.5.5.4: Return codes for Alarm Subscribe**

OK	FAIL	Comment
	FormatError Busy WorkingSoftwareMissing	

**6.5.6 Self Test****Table 6.5.6.1: Elementary procedure Self Test**

Name: <b>SelfTest</b>				
Code: <b>0x0A</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>High</b>

**Table 6.5.6.2: Initiating message parameters and format for Self Test**

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>

**Table 6.5.6.3: Response message parameters and format for Self Test**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>
<b>i + 1</b>	<b>1 octet</b>	<b>AlarmCode</b>	<b>Alarm code for alarm i detected during self test.</b>

**i = 1 ... N**

**Description:**

On receipt of the initiating message the secondary device shall execute a test procedure which may include a check of physical and processor functions. The specific tests to be performed are implementation specific, and may include the movement of the adjuster, which shall not exceed +-5% of total available tilting range starting from the current adjuster position.

The response message of the secondary device on the procedure provides information on detected faults or, if no fault is detected, with confidence that the operation of the device is normal in all respects.

During the test the operational parameters of the device shall not change beyond operationally acceptable limits and on completion all parameters shall be returned to their initial values.

In the normal response message, after the self test was executed successfully, the return codes are set to report possible detected faults during the self test. If no faults are detected, this shall be signalled by no return codes following the return code <OK>.

In the case of a failure response message, the self test could not be executed successfully and the reported return code relates to the inability of the device to perform the requested self-test operation.

**Table 6.5.6.4: Return codes for Self Test**

OK	FAIL	Comment
<b>All return codes marked as alarms in annex A.</b>	<b>FormatError Busy WorkingSoftwareMissing NotCalibrated NotScaled</b>	

6.5.7 Void

6.5.8 Void

6.5.9 Read User Data

**Table 6.5.9.1: Elementary procedure Read User Data**

Name: <b>ReadUserData</b>				
Code: <b>0x10</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.5.9.2: Initiating message parameters and format for Read User Data**

Number	Length	Type	Description
1	2 octets	Unsigned integer	Memory offset
2	1 octet	Unsigned integer	Number of octets to read

NOTE: Number of octets to read shall be less than, or equal to MaxDataTransmit Length minus 1.

**Table 6.5.9.3: Response message parameters and format for Read User Data**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK
2	Number of octets given by parameter 2 of the initiating message	User specific	User data

**Description:**

On receipt of the initiating message the secondary device shall send back user specific data stored in a user data area to the primary device.

The user data area is intended for storage of user defined data, e.g. inventory information.

**Table 6.5.9.4: Return codes for Read User Data**

OK	FAIL	Comment
	FormatError Busy WorkingSoftwareMissing OutOfRange	The return code OutOfRange is used, if the given memory address range is outside the valid address space.

**6.5.10 Write User Data****Table 6.5.10.1: Elementary procedure Write User Data**

Name: <b>WriteUserData</b>				
Code: <b>0x11</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: No	Power mode: <b>Low</b>

**Table 6.5.10.2: Initiating message parameters and format for Write User Data**

Number	Length	Type	Description
1	2 octets	Unsigned integer	Memory offset
2	1 octet	Unsigned integer	Number of octets to write
3	Message specific, given by parameter 2	User specific	Data to write

NOTE: Number of octets to write shall be less than, or equal to MaxDataReceiveLength minus 3.

**Table 6.5.10.3: Response message parameters and format for Write User Data**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

On receipt of the initiating message the secondary device shall store user data in non-volatile memory. The user data is stored in the user data area using the relative memory address offset given in the initiating message and starting with zero.

The user data area is intended for storage of user defined data, e.g. inventory information.

**Table 6.5.10.4: Return codes for Write User Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>WorkingSoftwareMissing</b> <b>HardwareError</b> <b>OutOfRange</b>	<b>The return code OutOfRange is used if the given memory address range is outside the valid address space.</b>

## 6.5.11 Download Start

**Table 6.5.11.1: Elementary procedure Download Start**

Name: <b>DownloadStart</b>				
Code: <b>0x40</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>Yes</b>	Power mode: <b>Low</b>

**Table 6.5.11.2: Initiating message parameters and format for Download Start**

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>

**Table 6.5.11.3: Response message parameters and format for Download Start**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

### Description:

On receipt of this initiating message the software download process shall be initiated. Following transition to the DownloadMode state, the secondary device sends <OK>. Previous subscription of alarms by use of the AlarmSubscribe procedure is cancelled.

**Table 6.5.11.4: Return codes for Download Start**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>UnsupportedProcedure</b>	

## 6.5.12 Download Application

**Table 6.5.12.1: Elementary procedure Download Application**

Name: <b>DownloadApplication</b>				
Code: <b>0x41</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>Yes</b>	Power mode: <b>Low</b>

**Table 6.5.12.2: Initiating message parameters and format for Download Application**

Number	Length	Type	Description
1	Less than, or equal to MaxDataReceiveLength	Vendor specific	Software data

**Table 6.5.12.3: Response message parameters and format for Download Application**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

This elementary procedure is used once or several times to transfer software data from the primary device to the secondary device.

**Table 6.5.12.4: Return codes for Download Application**

OK	FAIL	Comment
	FormatError Busy HardwareError InvalidFileContent InvalidProcedureSequence	

**6.5.13 Download End****Table 6.5.13.1: Elementary procedure Download End**

Name: <b>DownloadEnd</b>				
Code: <b>0x42</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>Yes</b>	Power mode: <b>Low</b>

**Table 6.5.13.2: Initiating message parameters and format for Download End**

Number	Length	Type	Description
None	0 octets	None	No data carried

**Table 6.5.13.3: Response message parameters and format for Download End**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

This elementary procedure signals the end of a multi-message data transfer to the secondary device. The secondary device shall respond after verifying the received data. The secondary device shall reset autonomously after completion of the layer 2 response and activate the new application software.

Table 6.5.13.4: Return codes for Download End

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>ChecksumError</b> <b>InvalidFileContent</b> <b>InvalidProcedureSequence</b>	

## 6.6 Single-antenna elementary procedures

### 6.6.1 Calibrate

Table 6.6.1.1: Elementary procedure Calibrate

Name: <b>Calibrate</b>				
Code: <b>0x31</b>	Issued by: <b>Primary Device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>High</b>

Table 6.6.1.2: Initiating message parameters and format for Calibrate

Number	Length	Type	Description
<b>None</b>	<b>0 octets</b>	<b>None</b>	<b>No data carried</b>

Table 6.6.1.3: Response message parameters and format for Calibrate

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

#### Description:

On receipt of the initiating message the secondary device shall perform a calibration of the RET antenna where the actuator is driven through its whole tilt range.

The response time to this Calibrate procedure shall be less than 4 minutes.

Table 6.6.1.4: Return codes for Calibrate

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>MotorJam</b> <b>ActuatorJam</b> <b>NotConfigured</b> <b>UnsupportedProcedure</b>	

## 6.6.2 Send Configuration Data

**Table 6.6.2.1: Elementary procedure Send Configuration Data**

Name: <b>SendConfigurationData</b>				
Code: <b>0x32</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.6.2.2: Initiating message parameters and format for Send Configuration Data**

Number	Length	Type	Description
<b>1</b>	Less than, or equal to <b>MaxDataReceiveLength</b>	<b>Vendor specific</b>	<b>Configuration data</b>

**Table 6.6.2.3: Response message parameters and format for Send Configuration Data**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

### Description:

On receipt of the initiating message the secondary device shall store the provided vendor and antenna specific configuration data for the relationship between the movement of the drive system and the beam tilt position of the antenna.

If the configuration data exceeds MaxDataReceiveLength, the data shall be split into a number of MaxDataReceiveLength segments and one final segment with whatever is left. The primary device transmits the segments in order. The layer 2 sequence numbers guarantee that no segment will be lost or received out of order.

**Table 6.6.2.4: Return codes for Send Configuration Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>ChecksumError</b> <b>InvalidFileContent</b> <b>UnsupportedProcedure</b>	

## 6.6.3 Set Tilt

**Table 6.6.3.1: Elementary procedure Set Tilt**

Name: <b>SetTilt</b>				
Code: <b>0x33</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>High</b>

**Table 6.6.3.2: Initiating message parameters and format for Set Tilt**

Number	Length	Type	Description
<b>1</b>	<b>2 octets</b>	Signed integer	<b>Tilt value</b>

**Table 6.6.3.3: Response message parameters and format for Set Tilt**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

On receipt of the initiating message the secondary device shall set the electrical tilt in increments of 0.1°. The electrical tilt value describes the elevation angle between the direction orthogonal to the antenna element axis and the maximum of its main beam in the elevation plane. A positive electrical tilt angle means that the antenna beam is directed below the direction orthogonal to the antenna axis.

The secondary device shall respond to the initiating message in less than 2 minutes.

The actual tilt angle shall not go outside of the range between the current tilt and the requested tilt value during this operation by more than 0.5°.

The value of parameter 1 is 10 times the tilt in degrees as described in subclause 3.1.

**Table 6.6.3.4: Return codes for Set Tilt**

OK	FAIL	Comment
	FormatError Busy HardwareError WorkingSoftwareMissing MotorJam ActuatorJam NotConfigured NotCalibrated OutOfRange UnsupportedProcedure	

**6.6.4 Get Tilt****Table 6.6.4.1: Elementary procedure Get Tilt**

Name: <b>GetTilt</b>				
Code: <b>0x34</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.6.4.2: Initiating message parameters and format for Get Tilt**

Number	Length	Type	Description
None	0 octets	None	No data carried

**Table 6.6.4.3: Response message parameters and format for Get Tilt**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK
2	2 octets	Signed integer	Tilt value

**Description:**

On receipt of the initiating message the secondary device shall return the current tilt value.

The returned tilt value is given in the format specified in subclause 3.1.



Table 6.6.4.4: Return codes for Get Tilt

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>NotCalibrated</b> <b>NotConfigured</b> <b>UnsupportedProcedure</b>	<b>HardwareError shall only be used, if error is detected in tilt detector.</b>

## 6.6.5 Alarm Indication

Table 6.6.5.1: Elementary procedure Alarm Indication

Name: <b>AlarmIndication</b>				
Code: <b>0x07</b>	Issued by: <b>Secondary device</b>	Procedure class: <b>2</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

Table 6.6.5.2: Initiating message parameters and format for Alarm Indication

Number	Length	Type	Description
<b>2 i – 1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	Return code i; see annex A
<b>2 i</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>State flag i</b>

**i = 1 ... N**

### Description:

The secondary device uses this procedure to report alarm state changes to the primary device. This procedure shall only be performed if the secondary has performed an AlarmSubscribe procedure since its latest reset.

For each alarm, the current alarm state and alarm code shall be reported if and only if any change in its state has occurred during the period of time since the last reported state. An AlarmIndication procedure shall be performed if at least one alarm shall be reported. The first AlarmIndication procedure after the AlarmSubscribe procedure shall report the active alarms.

Alarm state changes are considered as reported at the time the message is passed to the transport layer.

State flag = 0 represents alarm state *cleared*.

State flag = 1 represents alarm state *raised*.

## 6.6.6 Set Device Data

Table 6.6.6.1: Elementary procedure Set Device Data

Name: <b>SetDeviceData</b>				
Code: <b>0x0E</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

Table 6.6.6.2: Initiating message parameters and format for Set Device Data

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Field number, see annex B</b>
<b>2</b>	<b>See annex B</b>	<b>See annex B</b>	<b>Data to write</b>

**Table 6.6.6.3: Response message parameters and format for Set Device Data**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK

**Description:**

On receipt of the initiating message the secondary device shall write the data given in the parameters of the initiating message into the fields optionally provided for configuration data and listed in annex B of this TS. If an attempt is made to write to fields which are designated as read only, the return code *ReadOnly* is returned and the data for those fields is ignored. If an attempt is made to write to fields which are not supported by the device the return code *UnknownParameter* is returned and the data for those fields is ignored.

**Table 6.6.6.4: Return codes for Set Device Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>WorkingSoftwareMissing</b> <b>HardwareError</b> <b>ReadOnly</b> <b>UnknownParameter</b>	

**6.6.7 Get Device Data****Table 6.6.7.1: Elementary procedure Get Device Data**

Name: <b>GetDeviceData</b>				
Code: <b>0x0F</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.6.7.2: Initiating message parameters and format for Get Device Data**

Number	Length	Type	Description
1	1 octet	Unsigned integer	Field number; see annex B

**Table 6.6.7.3: Response message parameters and format for Get Device Data**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK
2	See annex B	See annex B	Field value

**Description:**

In this procedure the secondary device shall return the data stored in the field for configuration data specified by the field number in the procedure and listed in annex B of this TS.

**Table 6.6.7.4: Return codes for Get Device Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>WorkingSoftwareMissing</b> <b>UnknownParameter</b>	

## 6.7 Multi-antenna elementary procedures

### 6.7.1 Antenna Calibrate

**Table 6.7.1.1: Elementary procedure Antenna Calibrate**

Name: <b>AntennaCalibrate</b>				
Code: <b>0x80</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>High</b>

**Table 6.7.1.2: Initiating message parameters and format for Antenna Calibrate**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>

**Table 6.7.1.3: Response message parameters and format for Antenna Calibrate**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

#### Description:

On receipt of the initiating message the secondary device shall perform a calibration of the antenna addressed by the antenna number. During calibration the actuator is driven through the whole tilt range of the antenna.

The response time to this Antenna Calibrate procedure shall be less than 4 minutes.

**Table 6.7.1.4: Return codes for Antenna Calibrate**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>MotorJam</b> <b>ActuatorJam</b> <b>NotConfigured</b> <b>UnsupportedProcedure</b>	<b>If the addressed antenna is not existing, FormatError is returned.</b>

### 6.7.2 Antenna Set Tilt

**Table 6.7.2.1: Elementary procedure Antenna Set Tilt**

Name: <b>AntennaSetTilt</b>				
Code: <b>0x81</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>High</b>

**Table 6.7.2.2: Initiating message parameters and format for Antenna Set Tilt**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>2 octets</b>	<b>Signed integer</b>	<b>Tilt value</b>

**Table 6.7.2.3: Response message parameters and format for Antenna Set Tilt**

Number	Length	Type	Description
1	1 octet	Unsigned integer	Antenna number
2	1 octet	ReturnCode	Return code OK

**Description:**

On receipt of the initiating message the secondary device shall set the electrical tilt of the antenna addressed by the antenna number in increments of 0.1°. The electrical tilt value describes the elevation angle between the direction orthogonal to the antenna element axis and the maximum of its main beam in the elevation plane. A positive electrical tilt angle means that the antenna beam is directed below the direction orthogonal to the antenna axis.

The secondary device shall respond to the initiating message in less than 2 minutes.

The actual tilt angle shall not go outside of the range between the current tilt and the requested tilt value during this operation by more than 0.5°.

The format of the value of parameter 2 is given in subclause 3.1.

**Table 6.7.2.4: Return codes for Antenna Set Tilt**

OK	FAIL	Comment
	FormatError Busy HardwareError WorkingSoftwareMissing MotorJam ActuatorJam NotConfigured NotCalibrated OutOfRange UnsupportedProcedure	If the addressed antenna is not existing, FormatError is returned.

**6.7.3 Antenna Get Tilt****Table 6.7.3.1: Elementary procedure Antenna Get Tilt**

Name: <b>AntennaGetTilt</b>				
Code: <b>0x82</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.3.2: Initiating message parameters and format for Antenna Get Tilt**

Number	Length	Type	Description
1	1 octet	Unsigned interger	Antenna number

**Table 6.7.3.3: Response message parameters and format for Antenna Get Tilt**

Number	Length	Type	Description
1	1 octet	Unsigned integer	Antenna number
2	1 octet	ReturnCode	Return code OK
3	2 octets	Signed integer	Tilt value

**Description:**

On receipt of the initiating message the secondary device shall return the current tilt value of the antenna addressed by the antenna number.

The returned tilt value is in the format specified in subclause 3.1.

**Table 6.7.3.4: Return codes for Antenna Get Tilt**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>NotConfigured</b> <b>NotCalibrated</b> <b>UnsupportedProcedure</b>	<b>If the addressed antenna is not existing, FormatError is returned.</b> <b>HardwareError shall only be used, if an error is detected in tilt detector.</b>

## 6.7.4 Antenna Set Device Data

**Table 6.7.4.1: Elementary procedure Antenna Set Device Data**

Name: <b>AntennaSetDeviceData</b>				
Code: <b>0x83</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.4.2: Initiating message parameters and format for Antenna Set Device Data**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	Antenna number
<b>2</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Field number; see annex B</b>
<b>3</b>	<b>See annex B</b>	<b>See annex B</b>	<b>Data to write</b>

**Table 6.7.4.3: Response message parameters and format for Antenna Set Device Data**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

### Description:

On receipt of the initiating message the secondary device shall write the provided data for the antenna addressed by the antenna number into the fields optionally provided for configuration data and listed in annex B of this TS. If an attempt is made to write to fields which are not supported by a particular device no error is returned but the data for those fields is ignored. If an attempt is made to write to fields which are not supported for the addressed antenna the return code UnknownParameter is returned and the data for those fields is ignored.

**Table 6.7.4.4: Return codes for Antenna Set Device Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>ReadOnly</b> <b>UnknownParameter</b> <b>UnsupportedProcedure</b>	<b>If the addressed antenna is not existing, FormatError is returned.</b>

## 6.7.5 Antenna Get Device Data

**Table 6.7.5.1: Elementary procedure Antenna Get Device Data**

Name: <b>AntennaGetDeviceData</b>				
Code: <b>0x84</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.5.2: Initiating message parameters and format for Antenna Get Device Data**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>1 octet</b>	<b>Unsigned integer</b>	Field number to read; see annex B

**Table 6.7.5.3: Response message parameters and format for Antenna Get Device Data**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>
<b>3</b>	<b>See annex B</b>	<b>See annex B</b>	<b>Field value</b>

### Description:

On receipt of the initiating message the secondary device shall return the data stored for the addressed antenna in the field for configuration data specified by the field number in the initiating message and listed in annex B of this TS.

**Table 6.7.5.4: Return codes for Antenna Get Device Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>WorkingSoftwareMissing</b> <b>UnsupportedProcedure</b> <b>UnknownParameter</b>	<b>If the addressed antenna is not existing, FormatError is returned.</b>

## 6.7.6 Antenna Alarm Indication

**Table 6.7.6.1: Elementary procedure Antenna Alarm Indication**

Name: <b>AntennaAlarmIndication</b>				
Code: <b>0x85</b>	Issued by: <b>Secondary device</b>	Procedure class: <b>2</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.6.2: Initiating message parameters and format for Antenna Alarm Indication**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2 i</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Return code i; see annex A</b>
<b>2 i + 1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>State flag i</b>

$i = 1 \dots N$

### Description:

The multi-antenna secondary device uses this procedure to report antenna alarm state changes to the primary device. This procedure shall only be performed if the secondary has performed an AlarmSubscribe procedure since its latest reset. Multi-antenna devices shall use this AntennaAlarmIndication procedure only for multi-antenna specific alarms and the AlarmIndication procedure in subclause 6.6.5 for the other alarms.

For each alarm, the current alarm state and alarm code shall be reported if and only if any change in its state has occurred during the period of time since the last reported state. An AntennaAlarmIndication procedure shall be performed if at least one multi-antenna specific alarm shall be reported. The first AntennaAlarmIndication procedure after the AlarmSubscribe procedure shall report the active alarms.

Alarm state changes are considered as reported at the time the message is passed to the transport layer.

State flag = 0 represents alarm state *cleared*.

State flag = 1 represents alarm state *raised*.

## 6.7.7 Antenna Clear Active Alarms

**Table 6.7.7.1: Elementary procedure Antenna Clear Active Alarms**

Name: <b>AntennaClearActiveAlarms</b>				
Code: <b>0x86</b>	Issued by: <b>Secondary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.7.2: Initiating message parameters and format for Antenna Clear Active Alarms**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>

**Table 6.7.7.3: Response message parameters and format for Antenna Clear Active Alarms**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

### Description:

On receipt of the initiating message the secondary device shall first clear all stored alarm information for the addressed antenna and then return a procedure response message.

**Table 6.7.7.4: Return codes for Antenna Clear Active Alarms**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>WorkingSoftwareMissing</b> <b>UnsupportedProcedure</b>	<b>If the addressed antenna is not existing, FormatError is returned.</b>

## 6.7.8 Antenna Get Alarm Status

**Table 6.7.8.1: Elementary procedure Antenna Get Alarm Status**

Name: <b>AntennaGetAlarmStatus</b>				
Code: <b>0x87</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.8.2: Initiating message parameters and format for Antenna Get Alarm Status**

Number	Length	Type	Description
1	1 octet	Unsigned integer	Antenna number

**Table 6.7.8.3: Response message parameters and format for Antenna Get Alarm Status**

Number	Length	Type	Description
1	1 octet	Unsigned integer	Antenna number
2	1 octet	ReturnCode	Return code OK
i + 2	1 octet	AlarmCode	Alarm code for alarm number i

i = 1 ... N

**Description:**

On receipt of the initiating message the secondary device shall report the alarm codes of the active alarms for the addressed antenna.

**Table 6.7.8.4: Return codes for Antenna Get Alarm Status**

OK	FAIL	Comment
All return codes marked as used for alarms in Annex A	FormatError Busy WorkingSoftwareMissing UnsupportedProcedure	If the addressed antenna is not existing, FormatError is returned.

## 6.7.9 Antenna Get Number Of Antennas

**Table 6.7.9.1: Elementary procedure Antenna Get Number Of Antennas**

Name: <b>AntennaGetNumberOfAntennas</b>				
Code: <b>0x88</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.9.2: Initiating message parameters and format for Antenna Get Number Of Antennas**

Number	Length	Type	Description
None	0 octets	None	No data carried

**Table 6.7.9.3: Response message parameters and format for Antenna Get Number Of Antennas**

Number	Length	Type	Description
1	1 octet	ReturnCode	Return code OK
2	1 octet	Unsigned integer	Number of antennas

**Description:**

On receipt of the initiating message the secondary device shall return the number of antennas it controls.

**Table 6.7.9.4: Return codes for Antenna Get Number Of Antennas**

OK	FAIL	Comment
	FormatError Busy WorkingSoftwareMissing UnsupportedProcedure	



## 6.7.10 Antenna Send Configuration Data

**Table 6.7.10.1: Elementary procedure Antenna Send Configuration Data**

Name: <b>AntennaSendConfigurationData</b>				
Code: <b>0x89</b>	Issued by: <b>Primary device</b>	Procedure class: <b>1</b>	DownloadMode state: <b>No</b>	Power mode: <b>Low</b>

**Table 6.7.10.2: Initiating message parameters and format for Antenna Send Configuration Data**

Number	Length	Type	Description
<b>1</b>	1 octet	<b>Unsigned Integer</b>	<b>Antenna number</b>
<b>2</b>	Less than, or equal to MaxDataReceiveLength minus 1	<b>Vendor specific</b>	<b>Configuration data</b>

**Table 6.7.10.3: Response message parameters and format for Antenna Send Configuration Data**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>Unsigned integer</b>	<b>Antenna number</b>
<b>2</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code OK</b>

### Description:

On receipt of the initiating message the secondary device shall store the provided vendor and antenna specific configuration data for the relationship between the movement of the drive system and the beam tilt position of the addressed antenna.

If the configuration data exceeds MaxDataReceiveLength, the data shall be split into a number of MaxDataReceiveLength minus 1 segments and one final segment with whatever is left. The primary device transmits the segments in order. The layer 2 sequence numbers guarantee that no segment will be lost or received out of order.

**Table 6.7.10.4: Return codes for Antenna Send Configuration Data**

OK	FAIL	Comment
	<b>FormatError</b> <b>Busy</b> <b>HardwareError</b> <b>WorkingSoftwareMissing</b> <b>ChecksumError</b> <b>InvalidFileContent</b> <b>UnsupportedProcedure</b>	<b>If the addressed antenna is not existing, FormatError is returned.</b>

## 7 Unknown elementary procedures

If a secondary device in the OperatingMode state is receiving a correct procedure message with a procedure code not known, it shall respond with a failure message stating 'UnknownProcedure' as the cause of failure.

**Table 7.1.1: Response message parameters and format for unknown procedures**

Number	Length	Type	Description
<b>1</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code FAIL</b>
<b>2</b>	<b>1 octet</b>	<b>ReturnCode</b>	<b>Return code UnknownProcedure</b>

## Annex A (normative): Return codes for secondary devices

**Table A.1: Return Codes for Secondary Devices**

Code	Meaning		Alarm	DownloadMode state
0x00	OK	Normal response		X
0x02	Motor Jam	Motor cannot move	X	
0x03	ActuatorJam	Actuator jam has been detected. No movement of the actuator, but movement of the motor was detected	X	
0x05	Busy	The device is busy and cannot respond until an ongoing activity is completed		
0x06	ChecksumError	Checksum incorrect for otherwise valid data..		
0x0B	FAIL	Abnormal response. Indicates that a procedure has not been executed successfully		X
0x0E	NotCalibrated	The device has not completed a calibration operation, or calibration has been lost	X	
0x0F	NotConfigured	Actuator configuration data is missing	X	
0x11	HardwareError	Any hardware error which cannot be classified. May not be reported as an alarm until the fault is likely to be persistent	X	X
0x13	OutOfRange	A parameter given by an operator (e.g. tilt value or memory offset) is out of range		
0x19	UnknownProcedure	Received procedure code is not defined		X
0x1D	ReadOnly	Invalid device data parameter usage		X
0x1E	UnknownParameter	Specified parameter is not supported for the used procedure		X
0x21	WorkingSoftwareMissing	The unit is inDownloadMode state. Returned upon unsupported procedure when in DownloadMode state		X
0x22	InvalidFileContent	The data being downloaded is detected to be of wrong format or size		X
0x24	FormatError	Procedure message is inconsistent or if an addressed field or antenna is invalid or the data parameter field length is inconsistent with the corresponding field length parameter		X
0x25	UnsupportedProcedure	The procedure is optional and not supported or the procedure does not apply to this device type		
0x26	InvalidProcedureSequence	Procedure sequence as described in annex C is expected but not experienced by the secondary device		
0x27	ActuatorInterference	An actuator movement outside the control of the RET unit has been detected. Probable cause is manual interference	X	

## Annex B (normative): Assigned fields for additional data

The following standard fields have no operational impact and are used by the procedures SetDeviceData, GetDeviceData, AntennaSetDeviceData and AntennaGetDeviceData. Little endian order is used for storage of multiple-octet numbers. Where ASCII variables are shorter than the assigned field lengths the characters are right aligned and leading blanks are filled with null characters (0x00).

**Table B.1: Assigned fields for additional data**

Field No.	Length (octets)	Format	Description
0x01	15	ASCII	Antenna model number
0x02	17	ASCII	Antenna serial number
0x03	2	16-bit unsigned	Antenna frequency band(s): see below
0x04	1	1 x 8-bit unsigned	Beamwidth for each band in frequency order (deg) (example 800/900 MHz, 1800/1900 MHz, 2100 MHz)
0x05	3	3 x 8-bit unsigned	Gain for each band in frequency order (dB/10) (example 800/900 MHz, 1800/1900 MHz, 2100 MHz)
0x06	2	16-bit signed	Maximum supported tilt (degrees * 10), format as in subclause 3.1
0x07	2	16-bit signed	Minimum supported tilt (degrees * 10), format as in subclause 3.1
0x21	6	ASCII	Installation date
0x22	5	ASCII	Installer's ID
0x23	12	ASCII	Base station ID
0x24	4	ASCII	Sector ID
0x25	2	16-bit unsigned	Antenna bearing
0x26	2	16-bit signed	Installed mechanical tilt (degrees * 10), format as in subclause 3.1

**Table B.2: Coding for antenna frequency bands in field 0x03**

Bit No	Field 0x03 Frequency band (MHz)
1	800
2	900
3	1500
4	1800
5	1900
6	2100
7 to 16	Reserved

Examples of frequency bands: 0000 0000 0001 0000 = 1900 MHz

0000 0000 0011 1000 = 1800, 1900 and 2100 MHz

NOTE: Field numbers 0x01, 0x02, and 0x21 to 0x26 in Table B.1 are common for multi-antenna device antennas. These fields may be addressed through any antenna number procedure.

Annex C (normative):  
 Procedure sequence for download of software to a secondary device

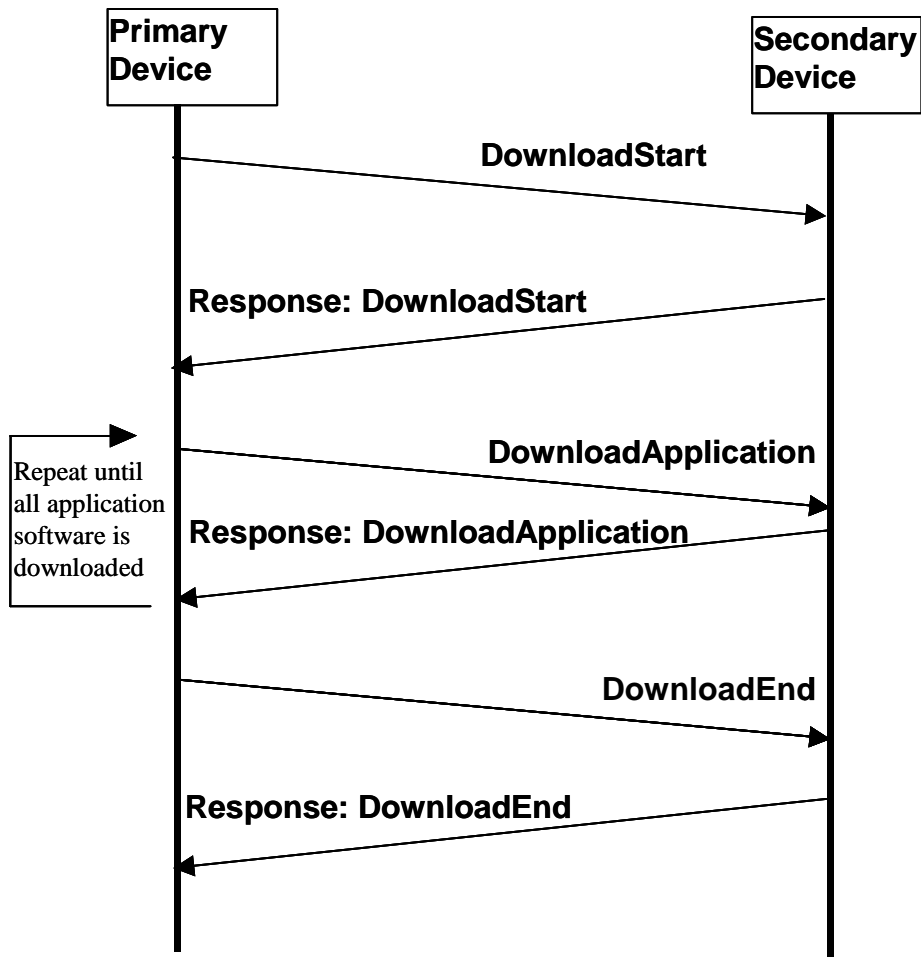


Figure C.1: Procedure sequence for Software Download

The erasure of the secondary device application software shall not be done before the reception of the Download Application message. The data content of the Download Application message is implementation specific but it is recommended to support an application software validity feature that shall minimise the risk of downloading faulty or invalid application software.

## Annex D (informative): Overview of elementary procedures

**Table D.1: Elementary Procedures and Procedure Codes**

Elementary Procedure	Procedure Code	Issued by	DownloadMode state
<u>Common Procedure Set</u>			
(Reserved)	0x01		
Reset Software	0x03	primary device	yes
Get Alarm Status	0x04	primary device	no
Get Information	0x05	primary device	yes
Clear Active Alarms	0x06	primary device	no
Read User Data	0x10	primary device	no
Write User Data	0x11	primary device	no
Alarm Subscribe	0x12	primary device	no
Self Test	0x0A	primary device	no
Download Start	0x40	primary device	yes
Download Application	0x41	primary device	yes
Download End	0x42	primary device	yes
<u>Single-Antenna Procedure Set</u>			
Set Device Data	0x0E	primary device	no
Get Device Data	0x0F	primary device	no
Calibrate	0x31	primary device	no
Send Configuration Data	0x32	primary device	no
Set Tilt	0x33	primary device	no
Get Tilt	0x34	primary device	no
Alarm Indication	0x07	secondary device	no
<u>Multi-Antenna Procedure Set</u>			
Antenna Calibrate	0x80	primary device	no
Antenna Send Configuration Data	0x89	primary device	no
Antenna Set Tilt	0x81	primary device	no
Antenna Get Tilt	0x82	primary device	no
Antenna Set Device Data	0x83	primary device	no
Antenna Get Device Data	0x84	primary device	no
Antenna Alarm Indication	0x85	secondary device	no
Antenna Clear Active Alarms	0x86	primary device	no
Antenna Get Alarm Status	0x87	primary device	no
Antenna Get Number of Antennas	0x88	primary device	no

NOTE: The notion "yes" in the DownloadMode state column indicates that the listed procedures are mandatory if the DownloadMode state can be entered by the secondary device.

## Annex E (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
September 2004	TSG-RAN#25	RP-040346	-	-	presentation to TSG-RAN for information	-	1.0.0
September 2004	TSG-RAN#25	RP-040346	-	-	approved at TSG-RAN#25 and placed under change control	1.0.0	6.0.0
12/2004	26	RP-040445	1	2	Reduction of risk of accidental erasure of Ret application SW	6.0.0	6.1.0
12/2004	26	RP-040445	2	-	Clarification of allowed tilt operation during self test	6.0.0	6.1.0
12/2004	26	RP-040445	3	-	State Model for RET device	6.0.0	6.1.0
12/2004	26	RP-040445	4	-	Corrections and editorial changes to 25.463 according to RAN3#44	6.0.0	6.1.0
12/2004	26	RP-040445	5	1	Antenna Send Configuration Data procedure missing	6.0.0	6.1.0
12/2004	26	RP-040445	7	1	Introduction of Software Download State model	6.0.0	6.1.0
12/2004	26	RP-040445	8	3	Alarm handling clarification	6.0.0	6.1.0
12/2004	26	RP-040445	9	2	RET DC power consumption clarification	6.0.0	6.1.0
12/2004	26	RP-040445	10	2	Response message format clarification	6.0.0	6.1.0
12/2004	26	RP-040445	12	2	Return code clean-up and clarification	6.0.0	6.1.0
12/2004	26	RP-040445	15	2	Clarification on the intention of the elementary procedures ReadUserData and WriteUserData	6.0.0	6.1.0
12/2004	26	RP-040445	16	2	Maximum data payload size in elementary procedures	6.0.0	6.1.0
12/2004	26	RP-040445	17	-	Definition of response time in the application layer	6.0.0	6.1.0
12/2004	26	RP-040445	18	2	Redefinition of the Elementary Procedures GetDeviceData and SetDeviceData	6.0.0	6.1.0
03/2005	27	RP-050061	20		Wrong numbering in table 6.7.6.2	6.1.0	6.2.0
03/2005	27	RP-050061	23	1	Editorial Corrections to 25.463 after RAN3#45	6.1.0	6.2.0
03/2005	27	RP-050061	24		Minor Corrections to 25.463 after RAN3#45	6.1.0	6.2.0
03/2005	27	RP-050061	25	2	Clarification on antenna movement during Set Tilt	6.1.0	6.2.0
03/2005	27	RP-050061	26	1	Redefinition of the Software Reset procedure	6.1.0	6.2.0

---

## History

<b>Document history</b>		
V6.0.0	September 2004	Publication
V6.1.0	December 2004	Publication
V6.2.0	March 2005	Publication