



## CAT-IQ FEATURE REQUIREMENTS

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## List of Changes

VERSION	DATE	EDITOR	REMARKS
1.1	1-Jul-19	Ingolf Karls	DF CAT-iq Feature Requirements V1.1_20081024_RW-2.doc
	8 <sup>th</sup> Dec 2008	Ruth Wilson	<p>Adding CAT-iq 2.1 in Cat-iq release plan</p> <p>CAT-iq 2.0-0070 Clarification on FP capability for call on hold, 3-party conf call changed to Optional</p> <p>Change of status from Mandatory to Optional on the following features to match ETSI specifications:</p> <ul style="list-style-type: none"> <li>• CAT-iq 2.0-0080 Call Intrusion</li> <li>• CAT-iq 2.0-0090, FP &amp; PP</li> <li>• CAT-iq 2.0-0100, FP &amp; PP</li> <li>• CAT-iq 2.0-0110, PP only</li> <li>• CAT-iq 2.0-0120, PP only</li> <li>• CAT-iq 2.0-0130, FP &amp; PP</li> <li>• CAT-iq 2.0-0140 FP only</li> <li>• CAT-iq 2.0-0200 FP IP address</li> <li>• CAT-iq 2.0-230 FP only</li> </ul> <p>CAT-iq 2.0-0180 Text re-worded for clarity, no functional change</p> <p>CAT-iq 2.0-200 Encryption activation – fixed duplicate requirement number error to CAT-iq 2.0-260</p> <p>CAT-iq 2.0-0270 Added</p> <p>CAT-iq 2.1 Section added</p> <p>CAT-iq 4.0 Intelligent Network – Fixed requirement numbering</p>
	15-Dec-08	Roland Schmidt	Add Doc. Number Repair of Graphics
	19-Dec-08	Roland Schmidt	Board Approval

Commented [SD1]: Put proper date here

v1.3	13-Aug-09	Ruth Wilson	<p>Updates to reflect new definition for CAT-iq 2.0</p> <ul style="list-style-type: none"> <li>• Minor modifications to introductory section, removed empty table.</li> <li>• Clarification added on definition of CAT-iq 1.0-0050 &amp; CAT-iq 1.0-0060</li> <li>• Clarification added to CAT-iq 1.0-0020</li> <li>• Clarification added to CAT-iq 1.0-0110</li> <li>• CAT-iq 2.0-0110 PP changed to Mandatory</li> <li>• CAT-iq 2.0-0120 PP changed to Mandatory</li> <li>• CAT-iq 2.0-130 PP changed to Mandatory</li> <li>• CAT-iq 2.0-0140 FP changed to Mandatory</li> <li>• CAT-iq 2.0-0150 Added list commands support for PP</li> <li>• CAT-iq 2.0-0180 Incoming accepted calls list changed to mandatory</li> <li>• CAT-iq 2.0-0190 Added PIN code change and clarifications</li> <li>• CAT-iq 2.0-0250 Added zero mode settings, removed editorial comment</li> <li>• CAT-iq 2.0-0260 Added all voice calls encrypted</li> <li>• Added CAT-iq 2.0-0280 Multiple calls Mode setting</li> <li>• Added CAT-iq 2.0-0290 Call Forward</li> <li>• Added CAT-iq 2.0-0300 Call Forward setting</li> <li>• Added CAT-iq 2.0-0310 Security Settings</li> <li>• CAT-iq 2.1 section, updating to latest agreed feature set</li> </ul>
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03-Sept-09	Laurent Clarimon	<p>Perform a review of the document :</p> <ul style="list-style-type: none"> <li>- Very limited Editorial points in P 1 to 12</li> <li>- 1.0-0070 / P13 =&gt; replace "device that support 1.0" version by CAT-iq PPs and FPs</li> <li>- 1.0 -0180 / P15 (CNIP) =&gt; reworded to be inline with 0170 (CLIP)</li> <li>- 2.0-0010 / P16 =&gt; internal calls are also in wideband =&gt; . I replaced "MAY" by "SHOULD"</li> <li>- 2.0 -0020 / P16 =&gt; add 1 precision that CLIP external calls was already required in 1.0</li> <li>- 2.0-0050 / P16 =&gt; remove "PP and FP". There was a repetition + editorial =&gt; add a bullet</li> <li>- 2.0-0060 / P17 =&gt; precise that a "clock master" setting exist to □ontr between the 2 methods for date and time</li> <li>- 2.0-0070 / P17 =&gt; Add some clarifications and a note in "parallel" calls</li> <li>- 2.0-0080 / P18 =&gt; correct call re-injection which was incorrect</li> <li>- 2.0-0100 / P18 =&gt; add call deflection definition</li> <li>- 2.0-0110 / P18 =&gt; detail a little bit how the line id □ontrad is working</li> <li>- 2.0-0130 / P18 =&gt; detail a little bit how the multiple lines feature is working</li> <li>- 2.0-0140 / P18 =&gt; detail a little bit how the multiple calls feature is working</li> <li>- 2.0-0250 / P20 =&gt; rename zero emission mode to "no emission" mode (because this is what you did in PPT presentation already)</li> <li>- 2.0-270 / P20 =&gt; perform a full review to clarify (no □ontradiction with current text)</li> <li>- Propose 2 missing requirements in 3.0</li> </ul>
4 <sup>th</sup> Sep 2009	Ruth Wilson	<p>Added DTMF and Tones support to CAT-iq 2.0-020</p> <p>CAT-iq 1.0-070, added clarification</p> <p>Added CAT-iq 2.0-0320 Headset support</p>

	16 <sup>th</sup> Sep 2009	Ruth Wilson	Added clarification on security requirements in CAT-iq 2.0-0310 & CAT-iq 2.1-0060 Added Appendix B place holder for ETSI DECT NG Mapping
V1.5	10 <sup>th</sup> Feb 2010	Heinz Thuerauf & Laurent Clarimon	Update audio section "CAT-iq 2.0-0270 Audio quality"
	24 <sup>th</sup> Feb 2010	Ruth Wilson & Laurent Clarimon	Added note to CAT-iq 2.0-0180 Supported Lists Updated ETSI specification versions in References Update CAT-iq 2.0-0070 and with last ETSI maintenance. Detail CAT-iq 2.0-0130.
	19 <sup>th</sup> March 2010	Ruth Wilson	Aligned Profile naming to Profiles steps
	23 <sup>rd</sup> April 2010	Roland Schmidt	DF Board Approval
V1.6	25 <sup>th</sup> Aug 2010	Ruth Wilson	Adding CAT-iq 2.1 requirements CAT-iq 2.0-0050, clarification on list change PP to optional to match ETSI specification CAT-iq 2.0-0180, clarified contact list support is mandatory Update Figure 2 with new picture
	2 <sup>nd</sup> May 2011	Ruth Wilson	Updated ETSI Specification references Adding CAT-iq 2.1 profile features
	16 <sup>th</sup> January 2012	Ruth Wilson	Implementing review comments from Andreas Mueller Adding latest CAT-iq release diagram Updated to latest ETSI specification versions
	10 <sup>th</sup> February, 2012	Roland Schmidt	Board Approval

V1.7	17 <sup>th</sup> July 2013	Ruth Wilson	Adding context of cable specification Clean-up of release plan description Moved 'da' profile to historical annex Adding MANDATORY FP support of "All calls" list for CAT-iq 2.1
V1.8	29 <sup>th</sup> November 2016	Ruth Wilson	Removed Annex C Historical
	10 <sup>th</sup> January	Ruth Wilson	Cleaned up wording in Annex A, description of SUOTA Clarified Test Procedure section as Informative Only Re-names CAT-iq 4.0 to CAT-iq IoT and cleaned out the description Renamed CAT-iq 3.0 to CAT-iq Data and updated the description Cleaned text on Scope, Strategy and introductory profile definition sections Added high level profile overview section
	28 <sup>th</sup> March 2017	Ruth Wilson	Added Annex with NG specifications reference CAT-2.1-090 SMS optional
	10 <sup>th</sup> April 2017	Ruth Wilson	CAT-iq 2.1 Explicit call Intrusion optional
	26 <sup>th</sup> April 2017	Sébastien Duchamp	Changed DECT Forum Logo Inserted new profile overview graphic Updated "CAT-iq 2.1-0040 Answering machine control" requirements Added in Annex B reference to DF_CAT-iq Feature Requirements Annex_B_CAT-iq 2.1 features list overview v1.1.xlsx
	02 <sup>nd</sup> May 2017	Sébastien Duchamp	Accepted by CAT-iq WG with 1 correction: in "High Level Profile Overview", "Answering Machine Control" is optional
	January 31, 2018	Roland Schmidt	Board approved

## **Scope**

The scope of this document is to present the requirements for the CAT-iq profiles, defined by DECT Forum, and implemented by ETSI TC DECT. This is a working document which will be amended if necessary or required. The most recent document will be indicated by the version number.

The inter-working between the Base and the attached network is not in the scope of this document, but DECT Forum would like to draw attention that access and inter-working with these networks has a huge impact on simplicity, QoS and QoE for the end users.

## **Strategic objectives**

The substitution of plain telephony services by All-IP based services and the beginning of the absorption of the classical cordless base station by broadband home gateways makes it necessary to adapt the mature DECT Technology to meet the emerging market requirements.

Collaboration agreements between European Telecommunications Standardization Institute (ETSI), the DECT Forum, the Home Gateway Initiative (HGI), with its community of Telecom Operators, and further relevant industry fora such as Cablelabs, were initiated to create market relevant standards for the above-mentioned requirements.

The agreed role allocations were

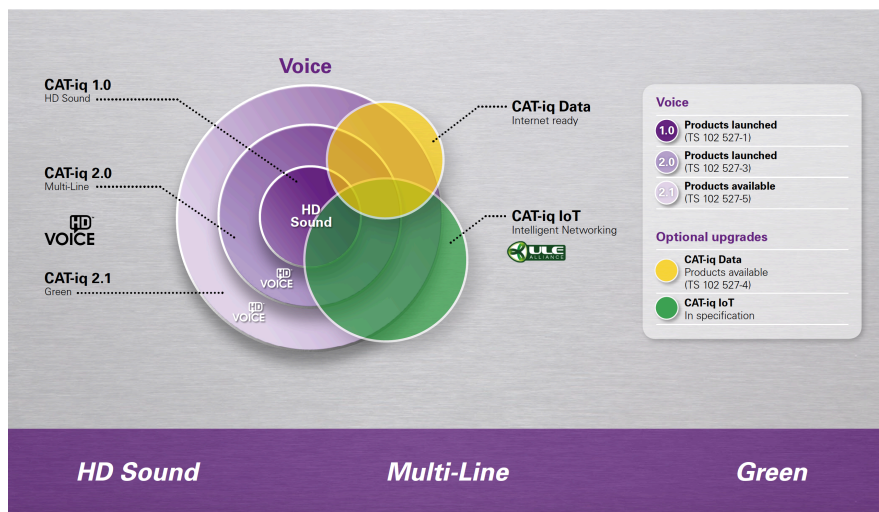
1. ETSI as standardization institute provides the technical standards which are drafted and published in the Technical Specifications ETSI TS 102 527-x, furthermore ETSI provides the needed updates for the European Norm EN 300-175-x. ETSI also performs the corresponding test specification writing.
2. The DECT Forum as the vendor association delivers to ETSI the requirement specification (this document) for market relevant requirements and agrees them within the whole value chain of the industry; it protects the market and promotes the technology using the global certification mark CAT-iq (Cordless Advanced Technology – internet and quality).
3. The HGI as the operator association which provides Gateway profiling and definition of operator requirements on the market relevant features for CAT-iq.
4. Cablelabs adopts the specification and collaborates to define HD voice service provision in the cable domain

## **Explanation of the CAT-iq Profiles**

An easy to communicate, easy to maintain, single path model for subsequent CAT-iq development steps has been requested, the continuous feature development should be expressed by a simple numbering scheme. However, this still resulted in some confusion as to the interaction between the different profiles, and the latest profile mapping diagram can be seen below.



## Profile Overview



The “voice profiles”, CAT-iq 1.0, 2.0 2.1 and subsequent future voice profile CAT-iq 2.x are considered as incremental, each including the features of the previous, maintaining back-wards compatibility, and over time replacing the previous profiles, after a grandfather period, as and when defined by the DECT Forum. However, CAT-iq 1.0 has been maintained as a profile in its own right, for use in the Enterprise domain, where high quality voice is important, but the requirements of interoperability between different vendor implementations, do not have the same constraints.

The “data profiles”, CAT-iq DATA and CAT-iq IoT can be considered to be complimentary to the voice profiles and can be used either in conjunction or isolation as required.

### Conventions

The following key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in RFC2119.

- **MUST**: This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
- **MUST NOT**: This phrase, or the phrase "SHALL NOT", mean that the definition is an absolute prohibition of the specification.
- **SHOULD**: This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- **SHOULD NOT**: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.

- MAY: This word, or the adjective „OPTIONAL“, means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

PP designates the portable part (the handset of the DECT or CAT-iq system).

FP designates the fixed part (the base station of the DECT or CAT-iq system).

"CAT-iq device" designates the system. This refers to the PP and the FP. When a requirement applies to the device, it applies to the PP and FP with the same status (MUST/SHOULD/MAY) for both parts.

## Abbreviations

AM	Answering machine
ARQ	Automatic Retransmission Request
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identity Restriction
CNIP	Calling Name Identification
FP	Fixed part, meaning the CAT-iq base station or the CAT-iq Gateway.
IP	Internet Protocol
IoT	Internet of Things
PP	Portable part, means the handset or other portable device, which is connected to a FP.
PVC	Permanent Virtual Circuit
QoE	Quality of Experience
QoS	Quality of Service
SUOTA	Software upgrade over the air
VC	Virtual Call
VoIP	Voice over IP
WG	Working Group

## High Level Profile Overview

- **CAT-iq 1.0 – “HD Sound”**
  - Wideband Audio
  - Display of Caller id, Caller Name
  
- **CAT-iq 2.0 – “Multi-line”**
  - CAT-iq 1.0 +
  - Synchronization of calls lists, family phonebook
  - Synchronization of system settings e.g. date/time
  - Multiple lines handling (optional on BS)
  - Ability to handle parallel calls such as call transfer, forward, conference
  - DTMF and Tones
  - Support for Headset
  - Easy PIN code registration
  - Easy pairing registration
  - Handset location
  - No emissions mode (optional)
  
- **CAT-iq 2.1 “Green”**
  - CAT-iq 2.0 +
  - 3-party conference call
  - Intrusion call
  - CLIR
  - Answering Machine control (optional)
  - Enhanced Security
  - ‘Green’ Power Saving Aspects
  - Diagnostics features
  - Recommended Tones (optional)
  - Handset Capability Enquiry
  - Support Personal Phonebook in HS
  - SMS (optional)



- **CAT-iq DATA**

- 'Lite' data service
- Software Upgrade 'over-the-air' (SUOTA)

- **CAT-iq IoT**

- "Intelligent Networking"

## **CAT-iq 1.0: HD Sound**

Historical Note: CAT-iq 1.0 is identical to the former interim profile name “vb”.

This paragraph contains the complete list of requirements.

### ***CAT-iq 1.0 -0010 Wideband call support***

FPs and PPs implementing the CAT-iq 1.0 MUST support incoming and outgoing wideband calls.

### ***CAT-iq 1.0 -0020 IP based wideband call support***

Wideband calls between two CAT-iq systems interconnected by an IP packet-based network (like VoIP over the Internet) MUST be supported, and in addition internal wideband voice calls SHOULD support wideband voice quality

### ***CAT-iq 1.0 -0030 Narrow- and wideband call support***

A CAT-iq 1.0 FP is REQUIRED to support narrowband calls as well as wideband calls, thus both non-CAT-iq PPs offering narrowband voice service are supported as well as CAT-iq devices offering wideband voice service.

### ***CAT-iq 1.0 -0040 More than one call support***

It is REQUIRED to support two wideband calls and one narrowband call in a system implementing CAT-iq 1.0, however this does not apply to a system comprised of one FP and one PP.

In the next paragraph the backward compatibility and interoperability requirements for voice calls are listed.

### ***CAT-iq 1.0 -0050 Backward compatibility FPs***

All CAT-iq PP devices SHALL be backward compatible with legacy DECT FP devices supporting GAP.

### ***CAT-iq 1.0 -0060 Support of legacy PPs***

CAT-iq FPs shall support legacy PPs according to GAP functionality

### ***CAT-iq 1.0 -0070 Voice call modification***

During a call, it is REQUIRED to be able to modify from wideband to narrowband supporting backward compatibility.

### ***CAT-iq 1.0 -0080 Voice codec support***

CAT-iq PPs and FPs MUST support the following codecs: ITU-T Recommendation G.726 for narrowband and ITU-T Recommendation G.722 for wideband.

CAT-iq PPs and FPs MAY support additional codecs such as G.711 in narrow band (requirement linked to CAT-iq 2.0-0270)

### ***CAT-iq 1.0 -0090 Codec switching***

CAT-iq devices SHALL support a codec selection and switching mechanism to serve interoperability needs according to ETSI TS 102 527-1 V1.2.1.

In the next paragraph the GAP requirements are listed.

### ***CAT-iq 1.0 -0100 Interoperability***

The inter-operability of CAT-iq FP and PP devices SHALL be covered by implementation of the mandatory features defined in ETSI EN 300 444 V2.2.6 Generic Access Profile (GAP).

### ***CAT-iq 1.0 -0110 Network services***

For network services MUST be implemented, for both FP and PP

- Outgoing call
- Off hook
- On hook (full release)
- Dialed digits (basic)
- Incoming call
- Alerting
- Subscription registration procedure on-air
- Link control.

### ***CAT-iq 1.0 -0120 Network services support FP***

For the FP network services, it is REQUIRED to support:

- Authentication of PP
- Authentication of user

### ***CAT-iq 1.0 -0130 On air key allocation***

On air key allocation is REQUIRED for PP and MAY be supported for FP.

### ***CAT-iq 1.0 -0140 FT authentication***

Authentication of FT MAY be implemented for FP and PP.

### ***CAT-iq 1.0 -0150 DLC services***

The following data link control services MUST be implemented:

- LAPC class A service and Lc
- CS channel fragmentation and recombination
- Broadcast Lb service
- LU1 TRUP Class 0/min\_delay
- FU1

### ***CAT-iq 1.0 -0160 MAC services***

The following Medium Access Control services SHALL be supported:

- General
- Continuous broadcast
- Paging broadcast
- Basic connections
- CS higher layer signalling
- Quality control
- Encryption activation

### ***CAT-iq 1.0 -0170 CLIP***

FPs and PPs **MUST** support Calling Line Identification Presentation (CLIP) for external calls.

### ***CAT-iq 1.0 -0180 CNIP***

FPs and PPs **SHOULD** support Calling Line Identification Presentation (CNIP) for external calls as defined in ETSI TS 102 527-1 V1.2.1 (2008-06).

In the next paragraph the test requirements for voice quality are listed.

### ***CAT-iq 1.0 -0190 Measurements passing***

Devices supporting the version 1.0 **MUST** pass measurements according to the DECT Forum “Regulation Handbook for CAT-iq Certification, Part 2: Technical Measurement Specification”.

## **CAT-iq 2.0:**

Historical Note: CAT-iq 2.0 is the successor to the former interim profile name "ve". The content of this version are the requirements for CAT-iq version 2.0, defined by DECT Forum and to be implemented by ETSI TC DECT, for alignment with and inclusion in HGI Requirement specification version 3.0.

This paragraph contains the complete list of extended inter-operability requirements.

### ***CAT-iq 2.0-0010 Extended wideband call support***

FPs and PPs **MUST** support CAT-iq 1.0 and, in addition, internal wideband voice calls between PPs. Conference calls, hands free mode as well as headsets **MAY** support wideband voice quality.

### ***CAT-iq 2.0-0020 Extended basic call services***

FPs and PPs **MUST** implement the following basic call services :

- Calling Line Identification Presentation (CLIP) for internal calls (external calls already required in 1.0)
- Calling Name Identification (CNIP) for external and internal calls
- DTMF support
- Tones support

FP and PPs **MAY** implement Calling line identity restriction (CLIR) for external outgoing calls.

### ***CAT-iq 2.0-0030 Codec Negotiation***

FPs and PPs **MUST** support the exchange of a codec list and codec negotiation during the initiation of a call.

### ***CAT-iq 2.0-0040 Sending Keypad Information***

FPs and PPs **MUST** be able to send keypad information.

### ***CAT-iq 2.0-0050 Generic event notification***

FPs and PPs **MUST** support the Generic Event notification method, using this generic event notification :

- Voice Message waiting notification, means that the FP indicates to the PPs a stored voice message.  
Voice Message waiting notification requires support of the appropriate applications like e.g. answering machines or messaging service or voice mail services in the network, in the absence of these applications the FP is not mandated to support this feature.
- List change notification, means that the FP indicates to the PPs that the content of one of the data lists supported by the FP has been amended. Note that it is mandatory for FP but optional for PP
- FPs and PPs **SHALL** support missed call notification, means that the FP indicates to the PPs that one or more incoming calls have not been accepted by the customer.

### ***CAT-iq 2.0-0060 Time and date synchronization***

FPs and PPs **MUST** support synchronization of time and date for FP and PPs, means that the PP is enabled to transmit time and date to the FP and that FP is enabled to transmit time and date to the PPs. These two modes are exclusive and managed by a "clock master" setting in the FP

**CAT-iq 2.0-0070 Parallel call services**

FP and PPs SHALL be able to handle parallel call services, means that more than one call is currently in progress. "Parallel" reflects the fact the calls involved at least one PP and the FP in several calls .

These calls may be internal or external.

The FP SHALL be able to handle at least 2 parallel calls, supporting more than one PP and the FP shall perform switchboard operations as requested by the PPs, the PPs SHALL be able to hold up to 2 parallel calls and SHALL be able to perform the following parallel call transactions, it is recommended to provide an easy and intuitive User Interface representing the appropriate call states and offering the required transactions in an intuitive way to the user.

The FP MUST be able to perform the required transactions using its call switchboard while a PP MUST be able to handle the following parallel call transactions:

- In addition to an existing call, initiating a parallel external or internal call
- Recognize a call waiting as indicated by the FP and indicate the call waiting to the user.
- Toggle between two parallel calls
- Perform call release of a parallel call and handle call release rejections.
- Handle an On-hold call release transaction.
- Accept a call waiting.
- Reject a call waiting.
- Recognize CLIP and CNIP of call waiting which is indicated by the FP and indicate it to the user.

The FP MUST be capable supporting the following parallel call transactions whereas the PP MAY support them:

- Putting a call on hold.
- Resume a call which has been put on hold

FP and PP MAY support to connect with two parallel external or internal calls to perform a 3-party conference call.

**Specificities for some Network lines ('handling of lines where second calls are signalled in-band feature'):**

A variant of the "parallel calls services" exists for systems designed to be connected on lines 'where second calls are signalled in-band'. These lines are most notably PSTN lines or VoIP lines behaving as PSTN lines for double calls.

This variant (described as a feature in the standard) consists of a limited subset of the procedures compared to the "Parallel call services", with some adjustments, due to the limitations inherent in these lines.

The PP shall support the 'Handling of lines where second calls are signalled as in-band' feature, in addition to the "parallel call services", as the delta is minor.

The FP shall support "Parallel call services" or its variant for lines 'where second calls are signalled in-band' depending on the type of lines it is designed to be connected to.

*NOTE1: Flexibility is allowed as exceptional case for headsets and devices without display and in case of certain countries not supporting these features.*

*NOTE2: This requirement is linked to CAT-iq 1.0-0040. Supporting parallel calls services implies that the PP and FP MUST support at least 2 external calls and one internal call. For example, in a double call situation with additional internal call.*

*NOTE3: It is not required that they are all active simultaneously. Only one of them may be active at a given time and the other ones on hold.*

### **CAT-iq 2.0-0080 Call transfer and Intrusion Call**

FP and PPs MUST be able to perform call transfer transactions, it is recommended to provide an easy and intuitive User Interface offering the required transactions in an intuitive way to the user.

The PP MUST be able to perform the following call transfer transactions and the FP MUST be able to support these call transfer transactions:

- Perform an announced call transfer, means the destination user is called before the call transfer is transacted.
- Perform an unannounced call transfer, means the call transfer is transacted without previously calling the destination user.
- Handle Call-Re-injection to the system, means the call can be transferred to any PP by making all of them ring. Any of the PP may then accept the transferred call.
- Indicate the remote party CLIP and CNIP to the destination PP on call transfer.

FP and PP MAY handle an explicit and an implicit call intrusion.

*NOTE: Flexibility is allowed as exceptional case for headsets and devices without display and in case of certain countries not supporting these features.*

### **CAT-iq 2.0-0090 3-Party Conference with Established External and/or Internal Calls**

FPs and PPs MAY support 3-party conference with established external and/ or internal calls. .

### **CAT-iq 2.0-0100 Call Deflection**

FPs and PPs MAY support call deflection. Call deflection is ability the ability to redirect an incoming call during the call presentation to another user.

### **CAT-iq 2.0-0110 Line Identification**

FPs MUST provide mechanisms for line identification and PPs MUST support it.

- For Outgoing calls, line identification allows a PP to select the external line on which the call shall be placed. It also allows the PP to indicate line "none" and let the FP decide the line to be used
- For incoming calls, line identification indicates to the PP the originating line of the call.

*NOTE: this feature MUST be supported even if the system implements only one line (see CAT-iq 2.0-0130 Multiple lines system).*

### **CAT-iq 2.0-0120 Call Identification**

FPs MUST provide mechanisms for call identification, whereas PPs MUST support it.

### **CAT-iq 2.0-0130 Multiple Lines**

FPs MAY provide mechanisms supporting multiple lines.

PPs MUST provide mechanisms supporting multiple lines.

The "Multiple lines" feature describes the behaviour of DECT systems connected to more than one network lines. These lines may be of different types (VoIP and PSTN for example). This feature details how calls are placed in a multiple lines context. This feature also impacts the behaviour of other services in order to insure attachment of PPs to a line, line settings and several lists properly (CAT-iq 2.0-0150/160/170/200 of List access service).

### **CAT-iq 2.0-0140 Multiple Calls**

PPs & FPs SHALL provide mechanisms supporting multiple calls.

This service enables several simultaneous active incoming or outgoing calls on different PPs. A corresponding setting exists to enable/disable it for a given line.

### **CAT-iq 2.0-0150 List access service**

The FP and the PPs MUST implement a list access service, to provide access to several system data. These System data are stored in internal Lists in the FP, the FP MUST provide access for PPs to these lists and the PPs MUST be able to perform access to the lists and to present the list content and applicable modifications to list entries in an appropriate way to the user. The following commands MUST be supported by the PP,

- edit entry
- save entry
- delete entry
- delete list
- search entries

The following list entries MUST be supported:

### **CAT-iq 2.0-0160 DECT system and line settings support**

FPs and PPs MUST support the CAT-iq system settings, means that PPs are enabled to change partly the configuration of the system consisting of FP and PPs, these system settings are handled using the list access method. Using this method, the FP and the PPs MUST support

- Synchronization of time and date for FP and PPs, that FP is enabled to transmit time and date to the PPs.
- Reset to factory settings, means that PP is enabled to reset the FP configuration to it's factory setting.
- Obtaining FP versions, means that a PP can obtain the software release of the FP

*[Editorial comment: Further alimnt with ETSI is needed, regarding the amount of settings.]*

### **CAT-iq 2.0-0170 Interactions between registration, attachment of handsets and lists**

FPs and PPs SHALL provide a means to support interactions between registration, attachment of handsets and lists.

### **CAT-iq 2.0-0180 Supported Lists**

The PP and FP MUST maintain the following lists: Missed calls list, Incoming accepted calls list Internal names list (means the list of unique identifiers of each registered PP), DECT system settings list, Line settings list and Contact List. The FP SHALL maintain call logs, means that missed calls are



stored in the FP with the called number and the date and time of this call, and an indication when the call has not been accepted (missed calls).

The FP SHALL give the PPs access to these lists using the list access mechanism and MUST provide a supported list query.

The PP and FP MAY support the following lists: Outgoing calls list, , All calls list.

*Note that the contact list should be considered as the function of family phonebook in the FP.*

### **CAT-iq 2.0-0190 DECT system settings list**

The following list entries MUST be supported:

- Clock Master Entry
- Back to factory settings entry
- Firmware version string entries (FP version & EEPROM version)
- PIN code change

The FP IP address string entries MAY be supported.

### **CAT-iq 2.0-0200 Line settings list**

The following entries of the Line setting list MUST be supported:

- Line Name
- Line Identity (Identities of PPs attached to each Line)
- Attached handsets

### **CAT-iq 2.0-0210 Calling line identity restriction**

FPs and PPs MAY support calling line identity restriction.

### **CAT-iq 2.0-0220 Identity number support**

FP and PPs MUST support an identity number assignment method for PPs in the system and the appropriate exposition to the user to enable the user to perform internal calls to specific PPs.

To perform internal calls to specific PPs, all PPs in the system need a unique identifier in the system.

### **CAT-iq 2.0-0230 Handset locator mechanism**

PPs MUST support a handset locator mechanism, means that the user is enabled to interact appropriate with the FP to page all PPs. A PP which is paged by the FP MUST signal the paging command to the user. FPs MAY support it.

### **CAT-iq 2.0-0240 Secure pairing**

PP and FP MUST provide an easy but secure pairing mechanism, which prevents the user from complicated registration procedures and which prevents the user from browsing through menu structures to start a registration procedure of newly purchased PPs.

At initial power on, the PP shall guide the user intuitively through the registration process, the PP shall recognize the environment itself and make proposals on registering the PP to the FP without entering a secure PIN Code.

### **CAT-iq 2.0-0250 No emission mode**

FP and PPs SHOULD provide a no emission mode.

With regard to the market demands for environmental protection the system should limit the transmission to a minimum level which is necessary, and the system should switch off the dummy bearer completely while in Standby Mode.

The FP and PP MUST provide a no emission mode setting.

### ***CAT-iq 2.0-0260 Encryption activation FP initiated***

FPs and PPs ARE REQUIRED to support encryption activation FP initiated. All voice calls should be encrypted

### ***CAT-iq 2.0-0270 Audio quality***

PP SHALL FULFIL audio requirements for handset, handsfree modes and headset modes. This includes narrow band and wideband communications.

FP SHOULD also FULFIL additional requirements.

These requirements are based on the use of more accurate methodology test benches (HATs: head and torso simulator) which guarantees outstanding subjective audio quality to the user during narrow band and wideband calls.

These requirements rely on ETSI EN300 175-8 and ETSI 300 176-2 specifications but precisely selected and specified in the "Test specification Audio for CAT-iq 2.0 Devices" document.

PP and FP SHALL declare the supported Audio profiles they are using.

It has to be noted that audio quality of the device in **all modes** is crucial for the rendering of the audio communication. Several speech quality parameters SHALL be guaranteed such as echo suppression and delay which might be very sensitive on VoIP (long delay) networks.

PP SHALL provide hands-free mode with a full duplex behaviour.

### ***CAT-iq 2.0-0280 Multiple calls Mode setting***

FP and PP MUST support a Mode setting for Multiple calls

### ***CAT-iq 2.0-0290 Call Forward***

FP and PP MUST support a Call Forwarding feature

### ***CAT-iq 2.0-0300 Call Forward Setting***

FP and PP MUST support a mode setting for the Call Forwarding feature

### ***CAT-iq 2.0-0310 Security Setting***

FP and PP MUST support On Air key allocation, as defined in GAP N.12.

FP and PP MUST support Authentication of PP, as defined in GAP N.9

FP and PP MUST support a closed time window for registration

FP and PP MUST support Encryption activation initiation from the FP as defined in GAP N.17

### ***CAT-iq 2.0-0320 Headset Support***

The FP MUST support headset via a simple call interception mechanism, in particular to handling incoming and outgoing calls.

## CAT-iq 2.1

This version describes additional telephony features.

All features as defined in CAT-iq 2.0 are assumed to form the basis of the CAT-iq 2.1 profile.

The following optional features of CAT-iq 2.0 are also mandated in CAT-iq 2.1.

- CAT-iq 2.0-0080 Call transfer and Implicit Intrusion Call, please note Explicit Call Intrusion remains optional for both FP & PP
- CAT-iq 2.0-0090 3-Party Conference with Established External and/or Internal Calls
- CAT-iq 2.0-0210 Calling line identity restriction

### **CAT-iq 2.1-0020 Phone book handling**

FPs MUST implement a common tool to transfer and maintain personal phone books.

PPs MAY implement support for a personal phone book.

Note existing contact list mechanism for CAT-iq 2.0 already covers this function, so there is no additional requirement for CAT-iq 2.1.

### **CAT-iq 2.1-0030 Generic command mechanism**

There MUST be a generic command mechanism by which a PP can instruct a FP to perform a specific action (or the reverse).

### **CAT-iq 2.1-0040 Answering machine control**

PP and FP MAY implement support of Answering machine control for Incoming and Welcome messages.

The Visual DTAM has an Incoming Message List, which allows to browse the message on the handset and select the one to listen / erase / etc., where Voice Oriented DTAM are based on Voice Prompts.

The PP and FP May implement either Voice oriented DTAM or Visual DTAM

The PP and FP MAY support Local DTAM (ie on base) or/and Remote DTAM (on the network).

The PP and FP MAY support Multiple DTAM, associated to lines.

When DTAM is implemented:

- DTAM Setting SHOULD be configurable from the PP.
- DTAM Welcome Message SHOULD be configurable from the PP.
- It MUST be possible to listen Incoming message recorded on the DTAM from the PP.
- The necessary actions to control an answering machine from the PP MUST be implemented:
  - read
  - delete
  - forward
  - backward
  - record Welcome message
  - etc

A Welcome Message List allowing the end user to record, listen, erase, select, ... the welcome message for the DTAM SHOULD be accessible from the PP and SHOULD allow the PP to configure the welcome message.

It SHOULD also be possible to listen to a call from the handset while it is recorded on the DTAM (Call screening, only applicable to Local DTAM).

### ***CAT-iq 2.1-0050 Handset Capability Enquiry***

There MUST be a mechanism in which the FP can enquiry of the capability of the function of the PP

### ***CAT-iq 2.1-0060 Security Enhancements***

FP & PP MUST support guaranteed encryption activation immediately after connection establishment  
FP & PP MUST support re-keying with a new derived cipher key during a call

### ***CAT-iq 2.1-0070 'Green'/ECO Mode***

PP MUST support Handset ECO mode, enabling the handset to auto adjust the transmit power during a call

FP MUST support Base ECO mode, where the base reduces transmission power when handset is on cradle in a single HS system

FP & PP must support Manual ECO mode, allowing the user to manually select the range allowing reduction in Base transmission power

### ***CAT-iq 2.1-0080 Line Diagnostics***

FP & PP must support the ability for the display of system or network information to the user on request

### ***CAT-iq 2.1-090 SMS***

PP and FP MAY implement support of SMS facility for both sending and receiving messages.

If implemented, short SMS service MUST be supported and Long SMS service MAY be supported.

Note sub-addressing support is not required.

### ***CAT-iq 2.1-0100 Supported Lists***

The FP MUST support 'All calls' list.

## **CAT-iq Data: “Internet Ready”**

This version defines the requirements for Light data services, firmware upgrade (SUOTA) and the basis for simple and extended automatic settings as well as first needs for device management.

This profile can either be used in conjunction with or in isolation from the voice profiles.

This list shows the interim release of the requirements.

### **CAT-iq 3.0-0010 Light data service support**

FP and PP MUST provide a Light data service to support SUOTA and Content download services for data rates for 50 kbps.

*Note : Only a subset of the HTTP protocol is supported in the handset. The rest of the IP stack is located on FP side.*

### **CAT-iq 3.0-0020 SUOTA**

FP and PP MUST provide for firmware upgrade (SUOTA), requirements for SUOTA are specified in more detail in Annex A.

### **CAT-iq 3.0-0030 http-based applications**

FP MUST support this feature; PP MAY support it. It consists in small "browsing" applications

### **CAT-iq 3.0-0040 light data service and voice calls simultaneity**

The FP shall always present to the PP an incoming voice call.

It is up to the PP to handle or not this incoming call by presenting it to the user depending on the capabilities of the PP and the ongoing application.

*NOTE: Full Simultaneous active voice and data services are not covered in CAT-iq 3.0*

### ***CAT-iq IoT***

This data-based profile, will be provide add-on functionality which can be used in conjunction or isolation from the voice profiles. The detailed requirements will be added once defined.

### ***Test Procedures (Informative Only)***

Following tests which could be taken into account and are currently under discussion are listed.

- TIA 920: Establishes voice performance requirements for wideband digital, wire line telephones, technical requirements are set for handset, headset and hands free (speakerphone) modes of operation. These requirements apply regardless of the technology used to couple the handset or headset to the telephone. Coupling may be by a cord, a short-range air-interface such as, but not limited to, a radio interface, an electric field interface, a magnetic field interface or an infra-red interface.
- ETSI ES 202 740 V1.1.1: Provides speech transmission performance requirements for 8 kHz wideband VoIP loud speaking and hands-free terminals; it addresses all types of IP based terminals, including wireless, soft phones and group terminals. It does not concern headset terminals
- ITU-T P.341 and P.311: Provides audio performance requirements and test methods for hands free telephones capable of transmitting an audio bandwidth extending beyond the conventional telephony bandwidth of 300 to 3400 Hz, to a bandwidth of approximately 150 to 7000 Hz. Such telephones are known as wideband audio telephones and will make use of digital encoding schemes such as in ITU-T Rec. G.722. The measurement method for delay is still under study.
- LS from ETSI TC STQ to ETSI TC DECT on speech terminal characteristics and test measurement “Inputs for updates of EN 300 175-8 and EN 300 176-2 on speech terminal characteristics and test methods”: The characteristics and test methods will cover narrowband and wideband handset, headset, hands free and loud speaking terminals. Characteristics and test methods for super-wideband will be covered in further updates of the Standards. It is proposed to consider two classes of terminals: “standard” DECT terminals with characteristics achievable by DECT devices at low/medium cost and “improved” DECT terminals with better characteristics, closer to STQ standard requirements for VoIP terminals, corresponding to devices with enhanced capabilities.



## References

3GPP TS 22.081	Line identification supplementary services Stage 1
ETSI EN 300 175-8 V2.3.1 (2010-06)	Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech coding and transmission
ETSI EN 300 176-2 V2.1.1 (2009-05)	Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 2: Speech
ETSI EN 300 444 V2.2.6 (2012-02)	Digital Enhanced Cordless Telecommunications (DECT); Generic Access Profile (GAP)
ETSI EN 301 649 V2.1.1 (2010-02)	Digital Enhanced Cordless Telecommunications (DECT); DECT Packet Radio Service (DPRS)
ETSI ES 202 737 V1.3.2 (2010-07)	Speech Processing, Transmission and Quality Aspects (STQ); Transmission requirements for narrowband VoIP terminals from a QoS perspective as perceived by the user
ETSI ES 202 739 V1.3.2 (2010-09)	Speech Processing, Transmission and Quality Aspects (STQ); Transmission requirements for wideband VoIP terminals from a QoS perspective as perceived by the user
ETSI ES 202 740 V1.3.2 (2010-09)	Speech Processing, Transmission and Quality Aspects (STQ); Transmission requirements for wideband VoIP loud speaking and hands-free terminals from a QoS perspective as perceived by the user
ETSI TBR 22	Radio Equipment and Systems (RES); Attachment requirements for terminal equipment for Digital Enhanced Cordless Telecommunications (DECT) Generic Access Profile (GAP) applications
ETSI TR 102 570 Ver. 1.1.1 (2007-03)	Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Overview and Requirements
ETSI TS 102 265 Ver. 1.2.1 (2004-10)	Digital Enhanced Cordless Telecommunications (DECT); DECT access to IP networks
ETSI TS 102 527-1 Ver. 1.2.1 (2008-06)	Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 1 Wideband speech
ETSI TS 102 527-2 Ver. 1.1.1 (2007-06)	Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 2 Support of transparent IP packet data
ETSI TS 1-2 527-3 Ver 1.4.1 (2012-01)	Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 3 Extended Wideband Speech Service
ETSI TS 1-2 527-4 Ver 1.1.1 (2009-10)	Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 4 Light Data Services
ETSI TS 1-2 527-5 Ver 0.0.1 (2010-04)	Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Part 5 Additional Feature Set NG Extended
ITU-T P.311	Transmission characteristics for wideband (150 7000 Hz) digital handset telephones
ITU-T P.341	Transmission characteristics for wideband (150 7000 Hz) digital hands-free telephony terminals DECT Forum "Regulation Handbook for CAT-iq Certification", Part 2 Technical Measurement Specification
ITU-T Recommendation G.726 (12/1990)	"40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".
ITU-T Recommendation G.722 (11/1988)	"7 kHz audio-coding within 64 kbit/s". ETSI TR 102 570 Ver. 1.1.1 Digital Enhanced Cordless Telecommunications (DECT); New Generation DECT; Overview and Requirements
RFC2119	Key words for use in RFCs to Indicate Requirement Level. S. Bradner. March 1997



TIA-920

Doc.No.: DF\_CAT-iq T\_001\_V1.8\_2018-01-31  
Telecommunications Telephone Terminal Equipment  
Transmission Requirements for Wideband Digital Wireline  
Telephones

## ANNEX A: Detailed requirements of the SUOTA feature

### Scope

New handset firmware versions will be made available in order to fix bugs but more importantly to act as an enabler for new services as they are launched. For example, if an operator launches a new service, the handset firmware will enable a relevant option to appear in the handset menu, along with all the other local handset functionality. Another option is the remote provisioning and device management of new or existing handsets.

E.g. currently the Gateway firmware uses the TR-069 mechanism for firmware update but the DECT handsets firmware upgrade is proprietary (if existing). For DECT/CAT-iq handsets to be used with next generation of gateways the firmware update mechanism is likely to be based on TR-069 and extensions and other associated documents or other options to be specified.

Cordless handsets (PPs) subscribed to a hub; gateway or base station may be different models and may be supplied by different suppliers. There is a need for the update server to store and deliver this variety of different firmware files; the necessary ACS and WAN-side CPE management is outside of scope of DECT Forum and ETSI TC DECT standardisation.

The software and hardware which is required to implement the update client in the handset (PP) is not in the scope of this document and DECT Forum/ ETSI TC DECT as well and SHALL not be standardized.

### Additional Abbreviations for this annex

ACS	Auto Configuration Server
CPE	Customer Premises Equipment
FP	Fixed part
IP	Internet Protocol
IWU	Interworking Unit
PP	Portable part
SUOTA	Software update over the air
TFTP	Trivial File Transfer Protocol

### Conventions

The same conventions as in the main text apply also to this annex.

### Use Cases

#### Actors

- Network operator (internet service provider)
- Handset user.

#### Basic path

- A table of the firmware for all handsets subscribed to the hub shall exist in the hub.
- The firmware version of the handsets shall be verified periodically over the DECT air interface, to ensure the handset firmware version information is accurate. The timing for this verification will be a function of the hub firmware, e.g. every 24 hours.
- When a new handset is subscribed to the hub the handset firmware version shall be verified at the time of subscription to ensure the information is accurate.

- The entire handset firmware upgrade process will be synchronised with an upgrade server.
- When a new firmware version is available for any of the handset models subscribed to the hub the new firmware shall be pushed to the hub and stored in hub memory.
- Device shall download new firmware BEFORE notifying user (unless firmware download prevents the device from being functional).  
=>This requirement may be in contradiction with some others.
- After the new handset firmware is stored in the hub memory the file will be transferred over the DECT air interface. Given the memory constraints it may be necessary to erase the current firmware in the handset other than a small boot.
- Care must be taken regarding the impact on calls. Ideally it should be possible to upgrade the handset firmware during a call-in background mode. If this is not possible then the upgrade should only be initiated when the handset is idle.

#### Use case event flow

Note: items 1 to 7 are terminal implementation specific. Item 10 is SUOTA server implementation specific.

1. Possible ways in which the upgrade can be accepted by the handset
  - The firmware upgrade can be forced, giving the user no option to accept or reject it.
  - To minimise inconvenience to the user, this type of upgrade could be scheduled to occur during the middle of the night.
  - Upgrade shall occur at night time when possible (12:00 to 7:00 am) but ONLY if notification message is silent and reboot is silent
  - The firmware upgrade only starts when the user accepts it
  - E.g. by pressing an "OK" soft key. This method should also enable the user to reject the upgrade, e.g. by pressing a "Reject" soft key. A confirmation may be displayed to the user following successful upgrade.
  - User is notified by pop-up screen ("an update is available for your xxx device")
2. Pop-up screen shall be silent
3. User shall be warned that device will be unavailable during firmware upgrade ("please note that your device will be unavailable during the upgrade process")
4. Estimated duration of unavailability of the device shall be communicated to user
5. User shall be offered
  - Start upgrade
  - Upgrade later >> user should be able to set a time for the upgrade
6. Upgrade shall start
  - When user validates "start upgrade"
  - At the time set by user
  - 3 minutes after user notification screen has popped up if device unavailability is shorter than 5 minutes (otherwise validation is mandatory)
7. Should the upgrade fail for any reason, e.g. batteries running flat during the upgrade process, or the handset wandering out of range
  - a re-try sequence shall be activated
  - device shall re-boot automatically to previous firmware
  - User shall be notified of upgrade failure only if he has validated to launch the upgrade (if he has not, no message is displayed)
8. Successful firmware shall be reported back to the hub over the DECT air interface to update the handset firmware version table.
9. User shall be notified that notification was successful ("your device has been upgraded automatically") if
  - new features have been added >> new features shall be described

- he has validated to launch the upgrade (if he has not, no message is displayed)

10. To optimise memory space the handset firmware can be erased from the hub after all the handsets of that model have been upgraded.

11. If there is more than one handset requiring the upgrade they will need to be upgraded sequentially and the user only needs to validate on one handset.

Note: It needs to be confirmed, if it may be configurable through a base setting parameter.

## Main requirements

There are 2 major upgrade scenarios, depending upon whether IP is support in the handset or not. In the first scenario the handset does not support IP and the gateway terminates IP packets from the network and forwards the software upgrade data over a simple protocol to the handset. In the second scenario the handset supports the processing of IP and therefore the gateway transparently forwards IP packets to the handset.

As well as the considerations for the upgrading of handsets, there are considerations for the upgrading of the FP or in the case of FP integration in a gateway, the upgrade of the gateway itself. Only the update of the handset is in scope, the upgrade of the FP or the gateway are outside the scope of these requirements

The different requirements for the non-IP and the IP-handset upgrade are listed in the following sections.

The requirements deal only with the interaction between a CAT-iq handset and a SUOTA server. The update package generation including pre-processing and identification of essential changes from an existing software version to an updated version is not part of this document. Any considerations regarding handset implementation are also out of the scope of these requirements (monolithic/partial update, update/reboot time, update version integrity, global handset's behaviour during update phase, etc.). Compression of update packages IS NOT REQUIRED.

### R1 Notification (user interaction and silent mode)

The device SHALL support two types of notification, a silent mode requiring no interaction with the user and an interaction mode where the user must acknowledge.

### R2 Start of upgrade process

If there is a request for upgrade arriving when a call was already in progress, the upgrade process SHALL not be started until the handset is available for software download.

### R3 Network handset interaction

The network IS REQUIRED to push firmware upgrade to the user's handset. A pull mode, which is triggered either by the user itself or the handset IS RECOMMENDED as an alternative.

### R4 Update process

The update over the air MUST be useable for any part of software including firmware, software as well as parameter settings.

### R5 Device "Discovery"

Following the notification phase, the handset SHALL provide the server with all required information enabling the server to download the right software version to the right handset.

**R6 Process resume and restart**

The update process MUST be handled in such a way it resumes the process if interrupted due to network loss, power failure or any other intended or unintended interrupts. A handset or FP MUST be able to restart to run a working firmware version in any of these cases.

**R7 End of transaction reporting**

At the end of the SUOTA process, the device SHALL report to the server, gateway, handset and the user the result of the transaction either successful or not.

**R8 Fault tolerance**

The software update process MUST be 100% fault tolerant end to end from server to handset according to impacts like power loss, network loss, user request/manipulation or other contingencies. It is RECOMMENDED to define a battery power level below that a software update process is prevented to start.

**R9 Download and update process**

Any suitable internal handset architecture (double memory, partial or delta upgrade with sufficient additional memory + background or intermittently working channel) COULD be used to decouple file download and update process.

**R10 Download or update acceptable time duration**

The update process SHOULD be as short as possible. The handset SHOULD not be unavailable for longer than 5 minutes for voice calls. Bandwidth SHOULD be minimum 50 kbit/s.

**R11 Availability of voice service during download.**

It SHOULD revert back to PSTN in case of emergency calls if available.

The availability of voice service on other handsets during update process SHOULD be possible. Incoming SMS MAY be supported at handsets during update process.

**R12 Customized items**

All customized items SHALL be kept in the handset as well as in the FP/ gateway.

**Requirements for non-IP handsets****R13 Storage of update data**

If the update process needs the storage of update data, the gateway SHOULD be the storage location.

**R14 Storage of firmware version number**

The FP/ gateway SHALL store a list of firmware version numbers of handsets attached to it.

**R15 Gateway handset interaction**

Handsets SHALL connect to the FP/gateway without user interaction.

**R16 Gateway update server interaction**

The gateway SHALL be informed of availability of new versions. When updating a PP or the FP, it SHOULD check cross-compatibility of the new version with the old version on the other side.

**R17 Update of multiple handsets**

The FP/ gateway SHALL control the update of multiple handsets.

**Requirements for IP handsets****R18 Storage of firmware version number**

The handset SHALL store the firmware version number.

**R19 Update server handset interaction**

Handsets SHALL connect to the update server without user interaction.<sup>1</sup>

**R20 Download and update process**

The handset SHOULD be able to decouple file download and update process.

**R21 Update of multiple handsets**

The FP/ gateway SHALL control the update of multiple handsets.

<sup>1)</sup> The handset SHALL be periodically informed by the server in order to check availability of a new version. When updating, it SHOULD check cross compatibility of its new version with the current version on the FP.

**ANNEX B: Mapping of Profile Requirements to ETSI DECT  
NG Specification Requirements.**



