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| Version: 0.8 |
| Author: Dr. Guenter Kleindl – Date: 10 Apr 2018 |
| Last updated by: Dr. Guenter Kleindl |
| page 1 of 19 |

Terms of Reference - Specialist Task Force

STF CE (TC DECT)

Enhancements and evolution in DECT

Summary information

|  |  |
| --- | --- |
| Approval status | Approved by TC DECT 30/09/2017  To be approved by Board#116 |
| Funding | **Maximum budget: 62 000 € from ETSI FWP**  Project Management: 4 000 €, Area A (basic audio related enhancements): 9 000 €, Area B (Advanced Audio enhancements) 6 000 €, Area C (Common Interface enhancements including support of advanced chipsets) 26 000 €, Area D: (Low Latency enhancements) 15 000 €, travels 2 000 €. |
| Time scale | 22 May 2018 to 30 June 2019 |
| Work Items | Deliverables to be produced:  REN/DECT-00321 (EN 300 175-1): Part 1: Overview  REN/DECT-00322 (EN 300 175-2): Part 2: Physical Layer (PHL)  REN/DECT-00323 (EN 300 175-3): Part 3: Medium Access Control (MAC) layer  REN/DECT-00324 (EN 300 175-4): Part 4: Data Link Control (DLC) layer  REN/DECT-00325 (EN 300 175-5): Part 5: Network (NWK) layer  REN/DECT-00326 (EN 300 175-6): Part 6: Identities and addressing  REN/DECT-00327 (EN 300 175-7): Part 7: Security features  REN/DECT-00328 (EN 300 175-8): Part 8: Speech and audio coding and transmission  REN/DECT-00329 (EN 300 444): DECT Generic Access Profile (GAP)  RTS/DECT-00330 (TS 102 527-1): New Generation DECT: Part 1  RTS/DECT-00332 (TS 102 527-3): New Generation DECT: Part 3  RTS/DECT-00333 (TS 102 527-5): New Generation DECT: Part 5 |
| Board priority | [ETSI STF funding criteria](https://portal.etsi.org/STF/STFs/Funding.aspx) (ETSI/BOARD(12)88\_030r1)   * Standards enablers/facilitators (Audio) * Innovation in mature domain * Emerging domains for ETSI |

Part I – Reason for proposing the STF

# Rationale

DECT is one of the most important ETSI standards in terms of public acceptance. Approximately 100 million of DECT devices are sold each year. The standard provides a convenient solution to the needs of cordless telecommunications in the business, residential and Wireless Local Loop (WLL) scenarios.

DECT has started the design of a new radio interface (DECT-2020) intended for the Long Term Evolution of the technology. This technology should be available during the 2020 decade.

On the other hand, the public acceptance of the traditional DECT technology continues at very successful levels. Despite some saturation in the cordless voice market, other applications are taking the place and very high sales levels (in the range of >100 M of devices per year) are expected, at least, during the next 10 years. DECT ULE, itself a variation of the classic DECT interface, will even increase these figures.

Therefore, it is obvious that TC DECT has to take care of the traditional DECT radio interface, improving it with new features to improve existing products and to address new market opportunities.

The DECT industry has requested TC DECT to implement several enhancements in the traditional DECT radio interface for immediate implementation in their products. Several of these enhancements come from original ideas identified or proposed by the former STF 518 (2016-2017). This line of activity in TC DECT defines the mid-term evolution of the technology and has strong industry support. For most of the ideas described below, there are already confirmed plans to release products as soon as the enhancements are available. Therefore, we will see in the short term products implementing the result of this STF, impacting millions of users.

The enhancements have been classified in four categories:

1. Basic audio related enhancements (without MAC layer changes)
2. Advanced audio related enhancements (with MAC layer changes)
3. Common Interface enhancements including support of advanced chipsets
4. Low Latency enhancements

However, the four areas will be hard to separate and will impact the same deliverables in most cases.

The detailed content of the requested enhancements and new features is given in section 2.

Not addressing or delay the required features may jeopardize the role of DECT in the next years and will reduce market opportunities for DECT products.

# Objective

The objective of the proposed STF is implementing a significant number of technical enhancements to the DECT “classic” radio interface (based on Gaussian Frequency Shift Keying (GFSK)) that are listed below. For analysis, the topics has been classified in four “areas”, however they are closely linked and will impact in most cases the same deliverables. Therefore the term “area” is used here to avoid confusion with the “tasks” used the time-plan and the milestones.

1. Area A: basicaudio related enhancements

The goal of this area is implementing in DECT new audio codecs with enhanced efficiency and audio quality. A codec will be chosen as a candidate, with narrowband, Wideband and Superwideband variants.

The introduction and parameters of the audio codecs will impact the audio standard (EN 300 175-8), but also the MAC EN 300 175-3), DLC EN 300 175-4), and NWK EN 300 175-5), layers. The different application profiles for audio products (i.e. the GAP) will also be impacted.

By “basic audio enhancements” it means the audio transmission using GFSK and no channel protection.

Area A has impact on the following deliverables:

* EN 300 175-8 DECT Common Interface: Part 8: Speech and audio coding and transmission (major impact)
* EN 300 175-4 DECT Common Interface: Part 4: Data Link Control (DLC) layer
* EN 300 175-5 DECT Common Interface: Part 5: Network (NWK) layer
* EN 300 444 GAP: DECT; Generic Access Profile (GAP)
* TS 102 527-1: DECT New Generation Part 1: wideband speech
* TS 102 527-3: DECT New Generation: Part 3: Extended wideband speech
* TS 102 527-5: DECT New Generation: Part 5: Extended wideband speech, additional feature set 1

1. Area B: advancedaudio related enhancements

By “advanced audio enhancements” it means the implementation of the following additional audio enhancements:

* Introduction of channel protection (e.g. Turbo coding) for audio
* Introduction of High Level Modulation for audio
* Low delay audio (<10 ms)

This is a further step in audio transmission enhancements with several advantages. This “task” is implemented over about the same deliverables as task A, but with far more impact on EN 300 175 parts 3 (MAC), 4 (DLC) and 5 (NWK).

1. Area C: Common Interface enhancements including support of advanced chipsets

This area consists of implementing a significant number of enhancements in the DECT common interface standard intended for higher efficiency, higher data rate and higher reliability (link protection). A significant part of these enhancements were identified by the former STF 518. The detailed list of enhancements and new features is the following:

* Support of new advanced chipsets with (up to) 8PSK,
* Support of better channel encoding
* Enhanced support of asymmetric bearers, etc
* Correction of known limitations
* New channel protected modes
* Combination of channel protection and retransmission at MAC or DLC layers (Hybrid ARQ)
* Introduction of the concept of MCS in High Level modulation encoded modes
* MAC mechanism for fast switching between MCSs
* Better Protection of signalling (A and B field) in High Level Modulation (HLM) and encoded transmission
* Resolution of some known ambiguities in messages (e.g. MAC Attributes)
* Introduction of flexibility to use of different modulations in different bearers of a multibearer connection
* New advanced bearers and related features
* New super double simplex bearers
* Use of bits from preambles, A-field, sync in double simplex bearers
* Support of ideas from STF 518 (TR 103 422)
* Low latency modes for streaming
* Framing for Low Latency
* Low latency ULE modes Turbo coding) and/or High Level Modulation

At least one chip manufacturer has announced that it has in the roadmap chipsets implementing a significant number of these enhancements in the short term.

Area C has impact on the following deliverables:

* EN 300 175-1: DECT Common Interface: Part 1: Overview
* EN 300 175-2: DECT Common Interface: Part 2: Physical Layer (PHL)
* EN 300 175-3: DECT Common Interface: Part 3: Medium Access Control (MAC) layer (significant impact)
* EN 300 175-4: DECT Common Interface: Part 4: Data Link Control (DLC) layer (significant impact)
* EN 300 175-5: DECT Common Interface: Part 5: Network (NWK) layer (significant impact)
* EN 300 175-7: DECT Common Interface: Part 7: Security features (minor –hopefully- impact)

1. Area D: Low Latency related enhancements

This area consists on implementing, on top of task C, a series of additional new features implementing low latency transmission. Two evolution lines will be implemented: D1) for professional audio and other streaming products and D2) for ULE-like products (mostly intended for Industry M2M Automation applications). The detailed list of items is the following:

* Low latency modes for streaming
* Low latency ULE modes
* Framing for Low Latency
* Ultra-expedited setup messages (MAC) for Low Latency
* Ultra-expedited setup procedures (MAC) for Low Latency
* Improved “fast setup” procedures
* Higher flexibility for reversion of slot directions

Most of these ideas are described in TR 103 422 (STF 518).

Area D has impact on the same deliverables as area C.

It is expected that the STF outcome of the 4 areas will be implemented in the short term in a significant number of DECT products impacting millions of users.

# Relation with ETSI strategy and priorities

DECT is the most successful European Standard in the field of cordless communications. DECT ULE is the main ETSI project providing a suitable radio technology for IoT devices requiring low operating power.

The proposed work will contribute to the ETSI Long Term Strategy, addressing the trends on global level, security and privacy, and strategic objectives on being global, versatile and support EC policy objectives.

The proposed work will implement the EC policy objectives on the Digital Single Market and Internet of Things (IoT).

The proposed activities will fulfil the definitions for the categories ““Emerging domains for ETSI” since they address a new radio technology.

# Context of the proposal

## ETSI Members support

|  |  |  |
| --- | --- | --- |
| **ETSI Member** | **Supporting delegate** | **Motivation** |
| FEEI | Günter Kleindl | Do enhance DECT with new capabilities to cover new market areas. |
| Fraunhofer IIS | Manfred Lutzky | Improving the voice quality and band efficiency of the DECT communication system. |
| DSPG Edinburgh Ltd | Steven Dickinson | DSPG understands and supports the need to evolve DECT Technology, both for traditional use cases, and new use cases such as IoT and industrial scenarios. |
| Gigaset Communications GmbH | Peter Scholz | Gigaset Communications GmbH considers it important to evolve DECT technology and to participate in the benefits of the IMT 2020 family. |
| Robert Bosch GmbH | Christoph Thein | BOSCH considers the evolution of DECT as important to keep and expand DECT and the associated spectrum for future products while maintaining backward-compatibility with current DECT. |
| RTX A/S | Jens Petersen | Important evolution of DECT to support new demanding applications of low latency streaming audio and industrial data. |
| Sennheiser Electronic GmbH & Co. KG | Andreas Müller | The evolution of DECT and related URLLC activities will enable a rich-set of audio streaming equipment, e.g. wireless microphones, in-ear monitoring and conferencing systems. |
| WIRELESS PARTNERS S.L.L. | Angel Boveda | To continue the development of DECT and ULE technologies adding new features and market applications. |
| wiseSense GmbH | Andreas Wilzeck | wiseSense GmbH considers it important to evolve DECT technology towards being a local 5G RIT within the IMT-2020 family of standards. |

## Market impact

The DECT specification from ETSI is the worldwide leading standard for digital cordless telecommunications. There are more than 1000 million devices in the market and every year more than 100 million devices are sold. In the last 4 years, DECT has become the number one in the US. DECT products are also available in Japan.

Despite this great success, there is a continuing threat from other systems to take over market share from DECT and, in some countries, the cordless telephone market is saturated or already diminishing.

The DECT industry has requested TC DECT to implement several enhancements in the traditional DECT radio interface for immediate implementation in their products. Several of these enhancements come from original ideas identified or proposed by the former STF 518 (2016-2017). This line of activity in TC DECT defines the mid-term evolution of the technology and has strong industry support.

For most of the ideas that would be developed by this STF, there are already confirmed plans to release products as soon as the enhancements are available. Therefore, products implementing the result of this STF will be seen in the market in the short term, impacting millions of users.

## Tasks for which the STF support is necessary

Due to the amount of work, and despite the intense activity of TC DECT delegates, the support of an STF is essential for the timely production of the specification and the seamless continuation of the DECT and ULE success story.

There will be significant industry participation free-of-charge in this project. The effort of the STF experts will be multiplied by industry experts covered by industry R&D budgets. The STF will be only a small amount of the total cost, but absolutely critical in order to get the desired results.

STF experts role will be focused on drafting the several ETSI standards while other industry players will be focus on implementation matters.

## Related voluntary activities in the TB

Many technical contributions have been provided by the experts in TC DECT and the ULE working group. Several interoperability-testing events have been organized by the DECT Forum and performed very successfully. Further test events are planned by the ULE Alliance, the industry fora now driving for the success of this technology.

TC DECT delegates will continue to identify the activities related to the STF and will further contribute to STF objectives, in parallel to the STF.

## Previous funded activities in the same domain

The only STF that investigated the areas that will be further developed by this STF was STF 518 (STF 537 (DECT-2020) covers a completely different evolution path):

|  |  |  |
| --- | --- | --- |
| Topic | STF | **Cost in EUR (ETSI funded)** |
| **DECT evolution and security (STF 518) task B (partially)** | **STF 518** | 30 000 |
| **Total** | **Total** | 30 000 |

STF 518 has produced the Technical Report TR 103 422 “Requirements and technical analysis for the further evolution of DECT and DECT ULE”. This TR identifies and performs an initial investigation of several of the areas that will have to be implemented by the new STF

## Consequences if not agreed

Not addressing the required features for immediate evolution may jeopardize the role of DECT and ULE in the next years and will reduce market opportunities for DECT and ULE products.

Several new product lines, such as PMSE devices based on DECT are depending on the base functionality to be developed by this STF. If this is not available on time, they may potentially move their products to other technologies.

Part II - Execution of the work

# Technical Bodies and other stakeholders

## Reference TB

TC DECT, Chairman: Dr. Günter Kleindl

## Other interested ETSI Technical Bodies

TC ERM (TG17, TG41), TC smartM2M, TC CYBER.

ERM TG 17 (Standards for PMSE and broadcast equipment/services) is aware of the work to be done by this STF and TG17 participant companies are supporting this STF and participates in TC DECT meetings.

## Other stakeholders

OneM2M, AIOTI, STF 505, EC Large Scale Projects APWPT.

The APWPT (Association of Professional Wireless Production Technologies) has confirmed their interest in the DECT technology and in the STF results.

# Base documents and deliverables

## Base documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Document** | **Title** | **Current Status** | **Expected date for stable document** |
| ETSI EN 300 175-1 | DECT Common Interface (CI); part 1 v2.6.1 | published |  |
| ETSI EN 300 175-2 | DECT Common Interface (CI); part 2 v2.6.1 | published |  |
| ETSI EN 300 175-3 | DECT Common Interface (CI); part 3 v2.6.1 | published |  |
| ETSI EN 300 175-4 | DECT Common Interface (CI); part 4 v2.6.1 | published |  |
| ETSI EN 300 175-5 | DECT Common Interface (CI); part 5 v2.6.1 | published |  |
| ETSI EN 300 175-6 | DECT Common Interface (CI); part 6 v2.6.1 | published |  |
| ETSI EN 300 175-7 | DECT Common Interface (CI); part 7 v2.6.1 | published |  |
| ETSI EN 300 175-8 | DECT Common Interface (CI); part 8 v2.6.1 | published |  |
| ETSI EN 300 444 | DECT Generic Access Profile GAP) v2.4.1 | published |  |
| ETSI TS 102 527-1 | New Generation DECT: part 1 | published |  |
| ETSI TS 102 527-3 | New Generation DECT: part 3 | published |  |
| ETSI TS 102 527-5 | New Generation DECT: part 5 | published |  |
| ETSI EN 301 649 | DECT Packet Radio Service (DPRS) | published |  |
| ETSI TS 102 939-1 | DECT ULE Phase 1 v1.2.1 | published |  |
| ETSI TS 102 939-1 | DECT ULE Phase 2 v.1.1.1 | published |  |

## Deliverables

|  |  |  |
| --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** |
| D1 | REN/DECT-00321 (EN 300 175-1): | DECT Common Interface: Part 1: Overview |
| D2 | REN/DECT-00322 (EN 300 175-2): | DECT Common Interface: Part 2: Physical Layer (PHL) |
| D3 | REN/DECT-00323 (EN 300 175-3): | DECT Common Interface: Part 3: Medium Access Control (MAC) layer |
| D4 | REN/DECT-00324 (EN 300 175-4): | DECT Common Interface: Part 4: Data Link Control (DLC) layer |
| D5 | REN/DECT-00325 (EN 300 175-5): | DECT Common Interface: Part 5: Network (NWK) layer |
| D6 | REN/DECT-00326 (EN 300 175-6): | DECT Common Interface: Part 6: Identities and addressing |
| D7 | REN/DECT-00327 (EN 300 175-7): | DECT Common Interface: Part 7: Security features |
| D8 | REN/DECT-00328 (EN 300 175-8): | DECT Common Interface: Part 8: Speech and audio coding and transmission |
| D9 | REN/DECT-00329 (EN 300 444): | DECT; Generic Access Profile (GAP) |
| D10 | REN/DECT-00330 (TS 102 527-1): | DECT New Generation Part 1: wideband speech |
| D11 | REN/DECT-00331 (TS 102 527-3): | DECT New Generation: Part 3: Extended wideband speech |
| D12 | REN/DECT-00332 (TS 102 527-5): | DECT New Generation: Part 3: Extended wideband speech, additional feature set 1 |

## Deliverables schedule:

REN/DECT-00321 (EN 300 175-1): DECT Common Interface Part 1

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00322 (EN 300 175-2): DECT Common Interface Part 2

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00323 (EN 300 175-3): DECT Common Interface Part 3

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00324 (EN 300 175-4): DECT Common Interface Part 4

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00325 (EN 300 175-5): DECT Common Interface Part 5

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00326 (EN 300 175-6): DECT Common Interface Part 6

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00327 (EN 300 175-7): DECT Common Interface Part 7

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00328 (EN 300 175-8): DECT Common Interface Part 8

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

REN/DECT-00329 (EN 300 444): DECT Generic Access Profile

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Start of EN AP. 20-Oct-2019
* Publication 31-Mar-2020

DTS/DECT-00330 (TS 102 527-1): DECT New Generation: Part 1

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Publication. 31-Oct-2019

DTS/DECT-00331 (TS 102 527-3): DECT New Generation: Part 3

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Publication. 31-Oct-2019

DTS/DECT-00332 (TS 102 527-5): DECT New Generation: Part 5

* Start of work 22-May-2018
* ToC and scope 30-Jun-2018
* Early draft 30-Nov-2018
* Stable draft 15-Jun-2019
* TB approval 30-Sep-2019
* Publication. 31-Oct-2019

# Work plan, time scale and resources

## Organization of the work

The work will be steered by the TC DECT chairman and the TC DECT members. There will be five TC DECT meetings and 20 online meetings from April 2018 to June 2019.

The work will be organized based on the task and milestones described in 7.2.2.

The relation with other stakeholders (such as ERM TG 17), when needed, will be done by means of the TC DECT.

## Task and areas description

In order to properly describe the expected execution of the work, where all technical areas impact – in practice - the same deliverables, the concepts of “areas” and task” will be introduced.

### “Areas”

The “areas” are defined as follows:

**Area A: basic audio related enhancements**

The goal of this area is implementing in DECT new audio codecs with enhanced efficiency and audio quality. A codec will be chosen as candidate, with narrowband, Wideband and Super-wideband variants.

The introduction and parameters of the audio codecs impact the audio standard, but also the Mac, DLC and NWK layers. The different application profiles for audio products (i.e. the GAP) are also impacted

By “basic audio enhancements” it is mean the audio transmission using GFSK and no channel protection.

Area A has impact on the following deliverables:

* EN 300 175-8 (major impact)
* EN 300 175-4
* EN 300 175-5 (New attributes, IE and flags)
* EN 300 444 GAP
* TS 102 527-1
* TS 102 527-3
* TS 102 527-5

**Area B: advanced audio related enhancements**

By “advanced audio enhancements” it is mean the implementation of the following additional audio enhancements:

* Introduction of channel protection (typically Turbo coding) for audio
* Introduction of High Level Modulation for audio
* Low delay audio (<10 ms)

This is a further step in audio transmission enhancements with several advantages. This “task” is implemented over the same deliverables as task A, but with far more impact on part 3 (MAC), 4 (DLC) and 5 (NWK)

**Area C: Common Interface enhancements including support of advanced chipsets**

This area consists on implementing a significant number of enhancements in the DECT common interface standard intended for higher efficiency, higher data rate and higher reliability (link protection). A significant part of these enhancements were identified by former STF 518. The detailed list of enhancements and new features is the following:

* Support of new advanced chipsets with (up to) 8PSK,
* Support of better channel encoding
* Enhanced support of asymmetric bearers, etc
* Correction of known limitations
* New channel protected modes
* Combination of channel protection and retransmission at MAC or DLC layers (Hybrid ARQ)
* Introduction of the concept of MCS in High Level modulation encoded modes
* MAC mechanism for fast switching between MCSs
* Better Protection of signalling (A and B field) in HLM and encoded transmission
* Resolution of some known ambiguities in messages (e.g. MAC Attributes)
* Introduction of flexibility to use of different modulations in different bearers of a multibearer connection
* New advanced bearers and related features
* New super double simplex bearers
* Use of bits from preambles, A-field, sync in double simplex bearers
* Support of ideas from STF 518 (TR 103 422)
* Low latency modes for streaming
* Framing for Low Latency
* Low latency ULE modes Turbo coding) and/or High Level Modulation

At least one chip manufacturer has announced that it has in its roadmap chipsets implementing a significant number of these enhancements in the short term.

Area C has impact on the following deliverables:

* EN 300 175-1
* EN 300 175-2
* EN 300 175-3 (significant impact)
* EN 300 175-4 (significant impact)
* EN 300 175-5 (significant impact)
* EN 300 175-7 (minor –hopefully- impact)

**Area D: Low Latency related enhancements**

This area consists on implementing, on top of task C, a series of additional new features implementing low latency transmission. Two evolution lines will be implemented: D1) for professional audio and other streaming products and D2) for ULE-like products (mostly intended for Industry M2M Automation applications). The detailed list of items is the following:

* Low latency modes for streaming
* Low latency ULE modes
* Framing for Low Latency,
* Ultra-expedited setup messages (MAC) for Low Latency
* Ultra-expedited setup procedures (MAC) for Low Latency
* Improved “fast setup” procedures
* Higher flexibility for reversion of slot directions

These ideas are described in the TR 103 422 (STF 518).

It is expected that the STF outcome of the 4 areas will be implemented in the short term in a significant number of DECT products impacting millions of users.

### “Tasks”

Due to the interaction between “areas” and to the fact that they impact basically the same deliverables, it is impractical defining the tasks based on the areas. The tasks are instead defined based on the expected evolution of the deliverables. All deliverables are assumed to progress with similar timeframe.

To simplify wording, the term “set of deliverables” is defined as the following 12 deliverables:

The same expertise, as described in §8.1, is required for all tasks and milestones.

|  |  |  |
| --- | --- | --- |
| **Deliv.** | **Work Item code**  **Standard number** | **Working title**  **Scope** |
| D1 | REN/DECT-00321 (EN 300 175-1): | DECT Common Interface: Part 1: Overview |
| D2 | REN/DECT-00322 (EN 300 175-2): | DECT Common Interface: Part 2: Physical Layer (PHL) |
| D3 | REN/DECT-00323 (EN 300 175-3): | DECT Common Interface: Part 3: Medium Access Control (MAC) layer |
| D4 | REN/DECT-00324 (EN 300 175-4): | DECT Common Interface: Part 4: Data Link Control (DLC) layer |
| D5 | REN/DECT-00325 (EN 300 175-5): | DECT Common Interface: Part 5: Network (NWK) layer |
| D6 | REN/DECT-00326 (EN 300 175-6): | DECT Common Interface: Part 6: Identities and addressing |
| D7 | REN/DECT-00327 (EN 300 175-7): | DECT Common Interface: Part 7: Security features |
| D8 | REN/DECT-00328 (EN 300 175-8): | DECT Common Interface: Part 8: Speech and audio coding and transmission |
| D9 | REN/DECT-00329 (EN 300 444): | DECT Common Interface: DECT Generic Access Profile (GAP) |
| D10 | REN/DECT-00330 (TS 102 527-1): | DECT Common Interface: New Generation DECT: Part 1 |
| D11 | REN/DECT-00331 (TS 102 527-3): | DECT Common Interface: New Generation DECT: Part 3 |
| D12 | REN/DECT-00332 (TS 102 527-5): | DECT Common Interface: New Generation DECT: Part 5 |

The tasks defined for project planning and milestones are the following:

Task 1 – Start developing of early drafts of the “set of deliverables”

Objectives

The goal of this task is progressing some deliverables up to the level of ”early draft” implementing work from the four “areas”.

Task 2 – Continue developing early drafts of the “set of deliverables” for TC DECT review

Objectives

The goal of this task is progressing all the deliverables up to the level of ”early draft” implementing work from the four “areas”.

Task 3 – Develop stable drafts of the “set of deliverables” for TC DECT review

Objectives

The goal of this task is progressing part of the deliverables up to the level of ”stable draft” implementing work from the four “areas”.

Task 4 – Continue developing stable drafts of the “set of deliverables”

Objectives

The goal of this task is progressing all the deliverables up to the level of ”stable draft” implementing work from the four “areas”.

Task 5 – Start developing of final drafts of the “set of deliverables”

Objectives

The goal of this task is start the developing of the final drafts of the deliverables.

Task 6 – Complete developing of final drafts of the “set of deliverables” for TC DECT approval (for ENAP or for publication)

Objectives

The goal of this task is finishing all the deliverables and gets them approved by TC DECT (for ENAP or for publication)

## Milestones

Milestone 1 – Progress Report 1 approved by TC DECT

Tasks 1 completed

Preliminary drafts of some deliverables will be available for TC review

Progress Report 1 approved by TC DECT

Milestone 2 – Progress Report 2 approved by TC DECT and early draft of the “set of deliverables” for TC DECT review

Tasks 2 completed

Early drafts of the “set of deliverables” will be available for TC review

Progress Report 2 approved by TC DECT

Milestone 3 – Progress Report 3 approved by TC DECT

Tasks 3 completed

More stable drafts of the “set of deliverables” will be available for TC review

Progress Report 3 approved by TC DECT

Milestone 4 Progress Report 4 approved by TC DECT and stable drafts of the “set of deliverables” for TC DECT review

Tasks 4 and 5 completed

Stable drafts of the “set of deliverables” will be available for TC review

Progress Report 4 approved by TC DECT

Milestone 5 – Final Report and final drafts of the “set of deliverables” approved by TC DECT (for either ENAP (ENs) or publication (TSs))

Task 6 completed

Final drafts of the “set of deliverables” approved by TC DECT (for either ENAP (ENs) or publication (TSs))

Final Report approved by TC DECT

## STF time line summary

The following tables present the STF time line for the integration of the outcome of the tasks described in §7.2 in the deliverables.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Task / Milestone / Deliverable** | **Target date** | **Max Budget Allocated (in EUR)** | Area A (basic audio related enhancements) | Area B (Advanced Audio enhancements) | Area C (Common Interface enhancements including support of advanced chipsets) | Area D: (Low Latency enhancements) |
| M0 | Start of work | 22-May-2018 |  | 9000 | 6000 | 26000 | 15000 |
| T0 | Project Management and final report | from 22-May-2018-to 30-September-2019 | **4 000** |  |  |  |  |
| T1 | Start developing of early draft of the “set of deliverables” | from 22-May-2018 to 11-September-2018 | **11 200** | 1 800 | 1 200 | 5 200 | 3 000 |
| M1 | Progress Report 1 approved by TC DECT | 11-September-2018 |  |  |  |  |  |
| T2 | Continue developing of early draft of the “set of deliverables” | from 12-September-2018 to 4-December-2018 | **11 200** | 1 800 | 1 200 | 5 200 | 3 000 |
| M2 | Progress Report 2 approved by TC DECT and early draft of the “set of deliverables” for TC DECT review | 4- December -2018 |  |  |  |  |  |
| T3 | Develop stable draft of the “set of deliverables” | from 5-December-2018 to 15-March-2019 | **11 200** | 1 800 | 1 200 | 5 200 | 3 000 |
| M3 | Progress Report 3 approved by TC DECT | 15-March-2019 |  |  |  |  |  |
| T4 | Continue developing stable draft of the “set of deliverables” | from 15-March-2019 to 15-June-2019 |  |  |  |  |  |
| T5 | Start developing of final drafts of the “set of deliverables” | from 16-June-2019 to 26-June-2019 | **11 200** | 1 800 | 1 200 | 5 200 | 3 000 |
| M4 | Progress Report 4 approved by TC DECT and stable drafts of the “set of deliverables” for TC DECT review | 26- June -2019 |  |  |  |  |  |
| T6 | Complete developing of final draft of the “set of deliverables” for TC DECT approval (for ENAP or for publication) | from 27- June -2019 to 30-September-2019 | **11 200** | 1 800 | 1 200 | 5 200 | 3 000 |
| M5 | Final Report and final draft of the “set of deliverables” approved by TC DECT (for either ENAP (ENs) or publication (TSs)) | 30-September-2019 |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Task Milest.** | **Description** | **M** | **J** | **J** | **A** | **S** | **O** | **N** | **D** | **J** | **F** | **M** | **A** | **M** | **J** | **J** | **A** | **S** |
| M0 | Start of work | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T0 | Project Management and final report | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| T1 | Start developing of early draft of the “set of deliverables” | X | X | X | X | X |  |  |  |  |  |  |  |  |  |  |  |  |
| M1 | Progress Report 1 approved by TC DECT |  |  |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| T2 | Continue developing of early draft of the “set of deliverables” |  |  |  |  | X | X | X |  |  |  |  |  |  |  |  |  |  |
| M2 | Progress Report 2 approved by TC DECT and early draft of the “set of deliverables” for TC DECT review |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |  |
| T3 | Develop stable draft of the “set of deliverables” |  |  |  |  |  |  |  | X | X | X | X |  |  |  |  |  |  |
| M3 | Progress Report 3 approved by TC DECT |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |  |  |
| T4 | Continue developing stable draft of the “set of deliverables” |  |  |  |  |  |  |  |  |  |  | X | X | X | X |  |  |  |
| T5 | Start developing of final drafts of the “set of deliverables” |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |  |  |
| M4 | Progress Report 4 approved by TC DECT and stable drafts of the “set of deliverables” for TC DECT review |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |  |  |
| T6 | Complete developing of final draft of the “set of deliverables” for TC DECT approval (for ENAP or for publication) |  |  |  |  |  |  |  |  |  |  |  |  |  | X | X | X | X |
| M5 | Final Report and final draft of the “set of deliverables” approved by TC DECT (for either ENAP (ENs) or publication (TSs)) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |

## Working methods and travel cost

It is assumed that the tasks and milestones will be as shown in section 7.4. The TC may introduce changes in the timing according to the progress of the work.

The work shall be performed remotely as much as possible.

However participation in all F2F meetings of the TC and WG to present results is mandatory.

The provider may be requested to participate in non DECT meetings at choice of the TC (they will be funded by the STF).

The total travel cost is estimated in 2 KEUR and should cover participation in 4 meetings .

# Expertise required

## Team structure

This STF is intended to be executed by one or more service providers able to provide the following mix of skills:

* Authoritative competence in DECT technology with knowledge of all layers and involved in the TC DECT developments done during last years, including NG-DECT, ULE and WRS
* Perfect understanding of the DECT evolution possibilities and of the work done by previous STF 518
* University degree (M.S or Ph.D) on telecommunications plus industry experience on DECT
* Authoritative competence and active contribution to DECT ULE and to Internet of Things (IoT)

The actual number of service providers depends on the actual mix of skills in the applications received and will be decided when setting up the STF.

Part III: Financial conditions

# Maximum budget

Total action cost is 62 000 €.

## Manpower cost

The maximum manpower cost is estimated at 60 000 € distributed as follows:

* Project Management: 4 000 €
* Area A (basic audio related enhancements): 9 000 €,
* Area B (Advanced Audio enhancements) 6 000 €,
* Area C (Common Interface enhancements including support of advanced chipsets) 26 000 €,
* Area D: (Low Latency enhancements) 15 000 €,

The detailed estimate of each sub-task is shown in section 7.4

## Travel cost

Travels not included in the manpower cost:

|  |  |
| --- | --- |
| **Expected travels** | **Cost estimate** |
| TC DECT #78 meeting | 500 |
| TC DECT #79 meeting | 500 |
| TC DECT #80 meeting | 500 |
| TC DECT #81 meeting | 500 |
| **Total cost** | **2 000 €** |

Part IV: STF performance evaluation criteria

# Key Performance Indicators

Contribution from ETSI Members to STF work

* Conference calls to review STF documents/contributions
* Number of delegates attending meetings attending DECT and WG DECT-ULE meetings
* Number of delegates directly involved in the review of the deliverables
* Contributions/comments received from the reference TBs

Contribution from the STF to ETSI work

* Contributions to TC/WG meetings (number of documents / meetings / participants)
* Contributions to other TBs
* Presentations in workshops, conferences, stakeholder meetings

Liaison with other stakeholders

* Stakeholder participation in the project (category, business area)
* Cooperation with other standardization bodies
* Potential interest of new members to join ETSI

Quality of deliverables

* Approval of deliverables according to schedule
* Respect of time scale, with reference to start/end dates in the approved ToR
* Comments from Quality review by TB
* Comments from Quality review by ETSI Secretariat

Time recording

For reporting purposes the STF experts shall fill in the time sheet provided by ETSI with the days spent for the performance of the services

In the course of the activity, the STF Leader shall collect the relevant information, as necessary to measure the performance indicators. The result will be presented in the Final Report.

# Document history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Date** | **Author** | **Status** | **Comments** |
| 0.1 | 19-Sep-2017 | Dr. Guenter Kleindl | Draft for TC approval |  |
| 0.2 | 01-Oct-2017 | Dr. Guenter Kleindl | TC approved | Review comments implemented |
| 0.3 | 9-Oct-2017 | ETSI Secretariat | Editorial comments |  |
| 0.4 | 16-Oct-2017 | Dr. Guenter Kleindl | Editorial update |  |
| 0.5 | 10-Nov-2017 | Dr. Guenter Kleindl | Editorial update |  |
| 0.6 | 31-Jan-2018 | Dr. Guenter Kleindl | Editorial update | Budget reduced as requested by Board#116 |
| 0.7 | 15-Mar-2018 | Dr. Guenter Kleindl | Editorial update | Addresses remarks received from Gabrielle Owen |
| 0.8 | 09-Apr-2018 | Youssouf Sakho | Editorial update | Review of task in view of CfE release |
| 0.9 | 10-Apr-2018 | Dr. Guenter Kleindl | Editorial update | Timing adjusted |