**Source: SA4 SQ SWG Chairman[[1]](#footnote-1)**

**Title: 3GPP SA4 SQ SWG report at SA4#110-e**

**Document for: Approval**

**Agenda item: 13.4**

**3GPP SA4 #110-e Speech Quality Sub-Working Group**

The SQ SWG during SA4#110-e was held in three telcos (1 ½ time slots). In addition, the SQ e-mail discussions during the meeting can be tracked here:

<https://list.etsi.org/scripts/wa.exe?A0=3GPP_TSG_SA_WG4_SQ>

The meeting (20 to 23 participants) handled 5 input documents (incl. one revised Tdoc). The meeting outcome is summarized for the work items handled by SQ:

* **ATIAS (Terminal Audio quality performance and Test methods for Immersive Audio Services)**: One input document (S4-201115 from HEAD acoustics) proposing reference test scenarios for immersive conferencing use cases was discussed and noted in Telco #1. HEAD acoustics was invited to bring with a dCR on 26.260 with more details at the next SQ SWG meeting. The time plan for ATIAS was not revised at this meeting, an update will be presented only at SA4#111-e.
* **HaNTE (Handsets Featuring Non-Traditional Earpieces)**: The round-robin test report from Lab 1 (Qualcomm) in S4-201096 was reviewed in details in Telco #3. A minor revision of this report will be produced in a future SQ SWG meeting after checking some results / fixing some errors. The time plan of HaNTE was revised and agreed (see S4-201164); in particular, the next test report (from Lab 2) is expected to be presented in Oct. 2020.
* **HinT (Extension for headset interface tests of UE)**: Initial discussions took place based on S4-201113 (HEAD acoustics) and S4-201162 (Orange). Draft CRs to 26.131/132 were invited for the next SQ SWG meeting, taking into account comments collected in Telcos #1 and #2. An initial time plan for HinT was agreed (see S4-201163).

Two Ad-Hoc SQ SWG conference calls were scheduled before SA4#111-e:

* Conference call on HinT: Sep 14th, 16:00-17:30 CEST; Submission Deadline: Sep 11th 23:59 CEST; Host: HEAD acoustics GmbH
* General SQ SWG Conference call (on ATIAS, HaNTE, HInT): Oct 19th, 16:00-17:30 CEST; Submission Deadline: Oct 16th 23:59 CEST; Host: HEAD acoustics GmbH

**A.I. 9.1 Opening of the session**

SQ chair Stéphane Ragot (Orange): welcome to delegates and review of schedule in S4-201160. The Wednesday EVS slot may become an SQ slot if needed.

Peter Isberg (Sony) kindly volunteered to take minutes.

**A.I. 9.2 Registration of documents**

Stéphane: Suggest to go in numerical order for agenda items and Tdocs, except of HaNTE where Tdoc 1096 is a late document, it will be handled after other agenda items to be fair.

**A.I. 9.3 Liaison Statements**

None.

**A.I. 9.4 CRs to Features in Release 16 and earlier, and other contributions on terminal acoustics**

None.

**A.I. 9.5 ATIAS (Terminal Audio quality performance and Test methods for Immersive Audio Services)**

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| [**S4-201115**](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201115.zip) | Measurement of Possible Reference Scenario for ATIAS | HEAD acoustics GmbH |

**Presenter:** Magnus Schaefer (HEAD acoustics)

**Comments / questions:**

Magnus: typo above Fig 2 (in ‘from A3 to B2’), the fig is correct. ITD and frequency responses were measured for three paths from HATS mouth to HATS ears, for a conferencing scenario at a table

Stefan Bruhn: You reported before on perceptual quality attributes. How do you think ITD and frequency responses map to those?

Magnus: Important question. Target? What would be a perfect communication system? These are simple to calculate and verify, and they can give the designer/tester direct feedback. Ideally human perception from a simple measurement should be obtained.

Markus M: What do you think is the connection between your figures and the final DUT?

Magnus: The idea is that we have the actual reference scenario, this should be recreated by the communication system. The test can be split into two sides, sending and receiving.

Peter: angles etc are just for the testing purposes, right?

Magnus: Yes, it’s just an example

Peter: the reference scenario is guiding in terms of ITD etc but levels may have to be different than in reality, as they are in traditional mono telephony

Magnus: yes, looking mostly into spatial aspects as ITD

Stefan B: Referring to docs from HEAD acoustics and Sony in Wroclaw. One approach is end-to-end. Another is the divided with a point of interconnect in between. I am concerned about the end-to-end approach. There could be many.

Magnus: Describing a send/receive partitioned system derived from end-to-end

Stefan B: Maybe we need to consider both

Jan R: End-to-end testing are valuable as reference, but the partitioned testing with a POI should work

Stéphane: What about room aspects (reflection, reverb)

Magnus: Correct, the chamber has impact. Sometimes reflections have a large impact on e.g. frequency responses while less for perception.

Peter: Fig 3 has large difference at 100 Hz. Standing wave?

Magnus: Could be a modal effect. Will check.

Stéphane: Good input, we need this for ATIAS. Do you have any specific proposal?

Magnus: It is a setup that can be fairly easily be recreated, we suggest it and the two parameters for a test case to evaluate the communication systems.

Stéphane: We will need to create requirements and test method specifications.

Jan: The example we presented is one of many possible reference scenarios. We are open for others.

Stéphane: The proposal received some support, especially using POI. How would you like to proceed? Invite follow-up contributions? Telco?

Jan: We could draft something for the test setup.

Stefan B: In SQ, do you define requirements first or methods first?

Stéphane: Sometimes round-robin. Requirements are decided at the end but some idea about criteria are good to have also in the beginning. Should we try to estimate something at the perceptual level?

Jan: Perceptual attributes are tricky. P.863 perhaps not good for the reverberation. We should first stick to the simpler parameters. Methods first, then requirements.

Stéphane: If possible, we should have a basis in perceptual tests. We are contribution driven. It would be fair to consider this update with more details.

Stefan B: The contribution is very good. ITD and frequency response are important. We need some kind of understanding about deviations from the expected result to set limits, based on perception.

Stéphane: Summary: we can conclude that HEAD acoustics is invited to bring more details. In addition, levels.

**Decision:** S4-201115 is noted.

Stéphane: For ATIAS, shall we update the time plan? Myself and Stefan B are co-rapporteurs.

Stefan B: Unfortunately, the work has not progressed in the pace we hoped for but we are still within the plan, we may update in Nov. The related IVAS is also progressing more slowly.

Stéphane: Any request to update the plan at this meeting?

Jan: What about telcos?

Stéphane: We can have telcos without updating the time plan. Proposals for telco dates? Offline? Discuss in the next slot (telco#2)?

At telco#3, it was agreed to have a telco shared with other work items handled by SQ (HInT and HaNTE):

Telco (Oct 19th, 16:00-17:30 CEST; Submission Deadline: Oct 16th 23:59 CEST; Host: HEAD acoustics GmbH)

**A.I. 9.6 HaNTE (Handsets Featuring Non-Traditional Earpieces)**

Stéphane: The 1096 document is a late submission. The source is invited to submit the document as an S4 document (even if it is a copy of AHQ-146 that was distributed over the SA4 reflector).

Andre Schevciw (Qualcomm): I can do that

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| S4-201096 | Results of HaNTE round robin tests in Lab 1 | Qualcomm Technologies Int |

**Presenter:** Andre Schevciw (Qualcomm)

**Comments / questions:**

Andre: Tdoc is late, the goal is to share experiences.

Jan Reimes: The term MECRP is for a manufacturer-defined point, you have used it also for a point chosen by a test operator as a “manual” ECRP.

Andre: Agree, we could find another term

Jan: We also noticed that the position guided by the UI, was difficult to find in menus.

Andre: For this test, focused on consistency between HATS and labs, etc, we think it’s OK to use the same position for these 8 phones (“endstop” 21 mm, centered).

Andre: Concerning fork positions, there were not many places to choose from, due to buttons etc. Sometimes even difficult to hold the phone securely at all.

Stéphane: Can you elaborate on fork positions

Andre: Future labs are supposed to use the same positions as the first lab.

Jan: To confirm, you were able to find three positions, without blocking buttons etc?

Andre: Some fork positions are repeated

Peter: If we reuse the figures, I suggest we have different terms for vectors of unit length (Xe, Ye) and distances along these vectors. See P.64 to clean up terminology

Andre: yes, origin is center of top edge

Andre: For some devices there were deviations between HATS types, in our lab. Let’s see what other labs come up with. For the non-Hante device, this was not the case, results were more consistent.

Andre: Device 3 (Hante) had good performance in informal tests. Its frequency response was also smooth and the consistency across HATS types was fairly high.

Andre: My thinking is that forks impact vibrational modes for some Hante devices.

Jan: There is MOS 2.6 and 3.2 for the same condition, which of these mountings was plotted? DUT6 has strange resonance in frequency response, was it audible?

Andre: Will check

Stéphane: Did you check if there is a relation between fork positions and results

Andre: We’ll get to that later. Not much variation between positions, for the same holder (in contrast to previous study).

Antero: What sentences were used?

Andre: As agreed in the HaNTE test plan

Antero: Frequency responses with four sentence pairs

Andre: Max volume: larger MOS differences between HATS types

Alain: surprised about the amount of differences between HATS types.

Stéphane: It will be interesting to see if these differences will be confirmed by subsequent labs and how to explain these differences.

Andre: Yes, we’ll look holistically at all the data from all labs

Andre: Regarding Privacy, the delta between the ear RLR and distant microphone RLR was an interesting indicator. The seal to the ear drives one up and the other one down.

Andre: Preliminary results indicate that privacy is not a large problem with the tested devices, RLR is not designed for low levels but the test is useful. All devices have a correct amount of attenuation and there is no privacy issue found for these devices.

Andre: Concerning robustness, the variation w.r.t. the position is smaller for the HaNTE devices.

Antero: What about the grid for positions?

Andre: There were eight positions with HMS II but with 4128C only the mandatory ones.

Andre: Concerning fork positions, there is only small variation for most devices

Andre: Subsequent labs are welcome to contact us with potential questions

Antero: About grid size, I see +/-5 mm. Didn’t we discuss using +/-10 mm?

Andre: It was actually +/-10 mm. There is an error in the document. We follow the 919 document.

Stéphane: Do you expect to bring a revision of the report?

Andre: Yes, between the meetings

**Decision:** S4-201096 is noted.

The HaNTE time plan was edited online starting from Tdoc S4-200919. The result is to be submitted as tdoc S4-201164.

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| S4-201164 | Proposals for data collection of HaNTE – test methods | Rapporteur (Qualcomm Incorporated) |

**Presenter:** Andre Schevciw (Qualcomm)

**Comments / questions:**

Stéphane: Reports from labs are expected to be submitted the telcos and also for SA4#111-e.

**Decision:** S4-201164 is agreed.

**A.I. 9.7 HInT (Extension for headset interface tests of UE)**

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| [**S4-201113**](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201113.zip) | Headset Interface Tests for 3GPP TS 26.132 | HEAD acoustics GmbH |

**Presenter:** Jan Reimes (HEAD acoustics)

**Comments / questions:**

* Telco #1 part:

Tomas T (Ericsson): Wording changes. Should it be unified?

Jan: Yes. We could use “electrical interface”

Tomas: I meant only “electric” and “electrical”

Stéphane: we can check also “acoustic” vs “acoustical”

Stefan B: Is wireless included in electric interface?

Jan: yes. Analogue or digital, wired or wireless.

usb-c connections are special, there may be signal processing such as noise reduction.

If Bluetooth is considered, there could be a by-pass to have a transparency test

Stéphane: see the WID where there is similar text on wired and wireless interfaces

Jan: It is obvious that analogue accessories cannot perform speech processing. How to handle the digital?

Not always headsets, one may use the wording accessory interface or UE auxiliary interface.

Peter: Regarding “it is in general assumed for all tests in the following clauses that typical signal processing for telecommunication (e.g., noise reduction, echo cancellation) takes places only in the UE”, I don’t see how we can assume anything. If we specify for the future, we can require future products to behave in a certain way. If we specify testing of products that are now on the market, we cannot just assume how they work.

Jan: We may be guided by ITU-T P.1100/1110 about testing when handshaking takes place (speech processing takes place in accessory or not).

S4-201113 was parked (in Telco #1).

* Telco #2 part:

Jan: How to name the interfaces?

Peter: Suggest to have a geenric name for the interface as such (“accessory interface”, “electrical interface”...) and then the headset electrical tests are defined to be performed over this interface.

Jan: For the first clause. “Electric” or “electrical”?

Stéphane: Help from native speakers?

Scott Isabelle (Amazon): “electrical” could be expected from a US English person at least

Stéphane: Any feedback on the proposed structure in the doc?

Jan: Main changes in clasue 4 are to add sub-clauses under the Interface clause

Stéphane: This is mostly editorial. If no further comments, let’s compare with tdoc 1162. It would be good to decide the structure.

Peter: Do you mean like a skeleton document?

Stéphane: yes

Peter: Structure of 26.131 could be kept, while integrating electrical headset test cases

Stéphane: We can start with only clause 4 and add teh sub-clauses as Jan suggested

Peter: Good

Jan: Clause 5: We need to agree on how to give reference to physical connectors/sockets. Need to consider devices that can cannot perform/enable/disable noise reduction, echo cancellation etc.

Stéphane: We can take step-by-step. Any comment on the skeleton or the figures? Can we keep them as provisional?

Jan: What do you mean?

Stéphane: We may be able to use the figures as provisional content for the draft “skeleton” CR. We can expect a similar document as skeleton.

Jan: Clause 7: Another structure would also be ok, no strong opinion.

**Decision:**

S4-201113 is noted.

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| [**S4-201157**](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201157.zip) | HInT requirements | Orange |

**Presenter:**

**Comments / questions:**

**Decision:** S4-201157 is revised to S4-201162.

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| [**S4-201162**](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201162.zip) | HInT requirements | Orange |

**Presenter:** Alain Curti (Orange)

**Comments / questions:**

Alain Curti (Orange): Not written in the tdoc, but we would also like to include other requirements (MOS-LQO, using P.863). We also want to discuss how to organize requirements for the electrical interface (inside or after existing clauses).

Stéphane: When it comes to the organization of 26.131, we can discuss that in conjunction with the update on doc 1113.

Jan: ITU-T is expected to publish an update of P.381. To Orange: “was it the jitter-buffer tests you referred to, about MOS-LQO?”

Alain: We want to check what is useful and discuss internally.

Peter: Formulation in ITU-T is more generic for delay requirements, for 3GPP one may just rely on existing requirements. Requirements for P.381 for test cases we already have for handset, one may look at convergence, not adding new tests

Alain: (unintelligible speech)

Stéphane: Taking the Orange “hat”: At this stage this input from Orange is not specific on requirements. We are reviewing what test cases we can take from P.381. The objective of this contribution is only defining clause headings, areas on a higher level.

Stéphane: Taking the SQ chair “hat”: This gave some useful feedback to HEAD acoustics and Orange for drafting draft CRs to the next meeting or make a joint proposal. We have some feedback from Sony, too. We will look at the structure of the document also.

**Decision:**

S4-201162 is noted.

HEAD acoustics and Orange were invited to take into account comments for drafting draft CRs to the next meeting or make a joint proposal.

A draft of HInT time plan was presented by Jan Reimes (no tdoc number) in Telco #2.

**Presenter:** Jan Reimes (HEAD acoustics)

**Comments / questions:**

**Decision:**

Stéphane: please use tdoc number 1163

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| S4-201163 | Time Plan for HInT, v0.1 | Rapporteurs (HEAD acoustics GmbH, Orange) |

**Presenter:** Jan (HEAD acoustics) / Stéphane (Orange)

**Comments / questions:**

Stefan B:If telcos are combined with ATIAS, September is not good for me

Stéphane: Suggest HInT for the first telco and general SQ (allowing both HInT and ATIAS) for the second telco.

**Decision:** S4-201163 is agreed.

**A.I. 9.8 New Work / New Work Items and Study Items**

None.

**A.I. 9.9 Any other business**

None.

**A.I. 9.10 Close of the session**

The SQ chair closed SQ at 16.22 CEST on 26th Aug-20.

**Annex A – Meeting agenda**

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| 9 | Speech Quality (SQ) SWG |  |
| 9.1 | Opening of the session |  |
| 9.2 | Registration of documents |  |
| 9.3 | Liaison Statements |  |
| 9.4 | CRs to Features in Release 16 and earlier, and other contributions on terminal acoustics |  |
| 9.5 | ATIAS (Terminal Audio quality performance and Test methods for Immersive Audio Services) | Test scenario:1115n (HEAD Acoustics)Telco date (shared with HInT and ATIAS):Telco (Oct 19th, 16:00-17:30 CEST; Submission Deadline: Oct 16th 23:59 CEST; Host: HEAD acoustics GmbH) |
| 9.6 | HaNTE (Handsets Featuring Non-Traditional Earpieces) | Report from Lab 1 (RR):1096n (Qualcomm)Test plan (incl. time plan):1164a, A.I. 16.4 |
| 9.7 | HInT (Extension for headset interface tests of UE) | 26.132:1113n (HEAD Acoustics)26.131:1157r->1162n (Orange)Time plan:1163a, A.I. 16.5 |
| 9.8 | New Work / New Work Items and Study Items |  |
| 9.9 | Any Other Business |  |
| 9.10 | Close of the session |  |

**Legend for Tdocs:**

* **Color: not-yet processed**, **processed**, **late**, **~~withdrawn~~**, **moved to a different A.I.**, **under email agreement**
* a agreed, app approved, n noted, pa partially agreed, np not pursued, pp postponed…

**Annex B – List of participants (provided by the SA4 Secretary – MCC)**

**B.1 Telco on 21st August 2020 (15:30-17:00 CEST)**

**23 participants:**

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| AMAZON - Scott Isabelle |
| Apple - Fabrice Plante |
| Dolby - Brian Lee |
| Dolby - Stefan Bruhn (SA4 VC) |
| Ericsson - Tomas Toftgård |
| Fraunhofer IIS - Markus Multrus |
| Fraunhofer IIS - Stefan Döhla |
| HEAD acoustics - Jan Reimes |
| HEAD acoustics - Magnus Schaefer |
| HUAWEI Technologies - Antero Tossavainen |
| Jayeeta Saha - GTM (B=1) |
| NOKIA - Lasse Laaksonen |
| NTT - Naotaka Morita |
| NTT - Takehiro Moriya |
| Orange - Alain Curti |
| Orange - Stéphane Ragot |
| Philips - Paul Dillen |
| Qualcomm - Imre Varga |
| Qualcomm - Andre Schevciw |
| SONY - Peter Isberg |
| Samsung - Eric Yip |
| Samsung - Kyunghun Jung |
| VoiceAge - Milan Jelinek |

**B.2 Telco on 25th August 2020 (15:30-17:00 CEST)**

**21 participants:**

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| AMAZON - Scott Isabelle |
| Apple - Fabrice Plante |
| Dolby - Stefan Bruhn (SA4 VC) |
| Ericsson - Tomas Toftgård |
| Fraunhofer - Stefan Döhla |
| Fraunhofer IIS - Markus Multrus |
| HEAD acoustics - Jan Reimes |
| HUAWEI - Huan-yu Su |
| HUAWEI Technologies - Antero Tossavainen |
| Jayeeta Saha - GTM (B=1) |
| NOKIA - Lasse Laaksonen |
| NTT - Naotaka Morita |
| NTT - Takehiro Moriya |
| Orange - Alain Curti |
| Orange - Stéphane Ragot |
| Philips - Paul Dillen |
| Qualcomm - Imre Varga |
| Qualcomm - Andre Schevciw |
| SONY - Peter Isberg |
| Samsung - Eric Yip |
| Samsung - Kyunghun Jung |
| Tencent-Zhuoyun Zhang |

**B.3 Telco on 26th August 2020 (15:00-16:30 CEST)**

**20 participants**

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| Apple - Fabrice Plante |
| Dolby - Brian Lee |
| Dolby - Stefan Bruhn (SA4 VC) |
| Ericsson - Tomas Toftgård |
| Fraunhofer - Stefan Döhla |
| Fraunhofer IIS - Markus Multrus |
| HEAD acoustics - Jan Reimes |
| HEAD acoustics - Magnus Schaefer |
| HUAWEI Technologies - Antero Tossavainen |
| MCC - Jayeeta Saha |
| NOKIA - Lasse Laaksonen |
| NTT - Naotaka Morita |
| NTT - Takehiro Moriya |
| Orange - Alain Curti |
| Orange - Stéphane Ragot |
| Panasonic-Hiroyuki Ehara |
| Qualcomm - Andre Schevciw |
| SONY - Peter Isberg |
| Samsung - Eric Yip |
| Samsung - Kyunghun Jung |

**Annex C - Documents status**

**C.1 Agreed documents (not presented to SA4 plenary)**

None.

**C.2 Agreed documents (to be presented to SA4 plenary)**

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| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| S4-201163 | Time Plan for HInT, v0.1 | Rapporteurs (HEAD acoustics GmbH, Orange) | 9.7, 16.5 | Agreed |
| S4-201164 | Proposals for data collection of HaNTE – test methods | Rapporteur (Qualcomm Incorporated) | 9.6, 16.4 | Agreed |

**C.3 Other status than agreed documents (not to be presented to SA4 plenary)**

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| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| S4-201096 | Results of HaNTE round robin tests in Lab 1 | Qualcomm Technologies Int | 9.6 | Noted |
| [S4-201113](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201113.zip) | Headset Interface Tests for 3GPP TS 26.132 | HEAD acoustics GmbH | 9.7 | Noted |
| [S4-201115](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201115.zip) | Measurement of Possible Reference Scenario for ATIAS | HEAD acoustics GmbH | 9.5 | Noted |
| [S4-201157](http://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_110-e/Docs/S4-201157.zip) | HInT requirements | Orange | 9.7 | Revised (to S4-201162) |
| S4-201162 | HInT requirements | Orange | 9.7 | Noted |

**C.4 Other status than agreed documents (to be presented to SA4 plenary)**

None.

1. **Mr. Stéphane Ragot, Orange**

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