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

**Title: 3GPP SA4 SQ SWG report at SA4#112-e**

**Document for: Approval**

**Agenda item: 13.4**

**3GPP SA4 #112-e Speech Quality Sub-Working Group**

The SQ SWG during SA4#112-e was held in four telcos (1 hour time slots). The SQ SWG e-mail discussions during the meeting can be tracked here:

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

**Executive summary**

The meeting (TBD participants) handled 8 documents including 5 output documents. The meeting outcome is summarized below for work items under SQ SWG responsibility:

* **ATIAS (Terminal Audio quality performance and Test methods for Immersive Audio Services)**: One input from HEAD acoustics with evaluation results has been discussed and noted; an adhoc telco (joint with HInT) has been agreed (see below) and the HInT time plan has been updated. It was noted that ATIAS will be completed in Rel-18.
* **HaNTE (Handsets Featuring Non-Traditional Earpieces)**: The round-robin results from Lab 3 (Orange) and aggregated results (Labs 2 and 3) have been reviewed and noted. An adhoc telco dedicated to HaNTE has been scheduled on March 15 (see below) to review results from Lab 4 and aggregated results; the time plan for the round-robin activity has been updated.
* **HInT (Extension for headset interface tests of UE)**: Updated draft CRs on TS 26.131 and 26.132 have been agreed as a basis for further editing. An adhoc telco (joint with ATIAS) has been agreed (see below) and the HInT time plan has been updated.

**Agreed adhoc conference calls post SA4#112-e:**

* SQ SWG telco on HaNTE: Friday 5 March, 2021, 16:00-17:00 CET, host: Qualcomm
* SQ SWG telco on ATIAS and HInT: Monday 15 March, 2021, 16:00-17:00 CET, host: HEAD acoustics

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

The SQ Chair opens the session at 14:00 CET on February 2, welcomes delegates, and displays meeting agenda. He also shows the SQ SWG meeting schedule that includes four telcos (February 2-3-5-8 in the 16:00-17:00 CET time slot).

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

The agenda including the Tdoc allocation is approved (see Annex A for latest revision).

**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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| [**S4-210137**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210137.zip) | Evaluation of simplified communication systems for ATIAS | HEAD acoustics GmbH |

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

This contribution presents a brief analysis of the behaviour of two simplified communication systems in a conferencing situation. The communication systems are described and measurement results for the two systems are presented – mostly focusing on the resulting frequency responses. The main point in this investigation is not the performance of the systems as such but the question if an analysis of the frequency responses is capable of assessing the system performance with respect to the spatial properties.

The two simplified communication systems are a mono and a stereo transmission that are used for three different paths in the conferencing setup. These three paths cover the three possible relations between talker and listener that are possible in this setup.

A comparison of the interaural frequency response differences for the original scene and for the two transmission systems shows that such an analysis is capable of assessing the performance of a communication system with respect to basic spatial properties. The next steps should try to identify which criterion is most suitable for this assessment task. This could, e.g., include repeating the investigation with other systems to get more insight. A first step might be to equalize the loudspeakers in the two simplified setups and analyze if this makes the frequency responses more similar.

It is not yet possible to derive performance criteria from the analysis of the simplified systems, but a similar analysis of the performance of realistic systems (once they are available) might help in identifying these criteria.

**Comments / questions:**

Stefan B: how does it sound at the position of HATS and does it correlate with what we hope? if look at ILD, they get smaller on average for stereo. If you are in B1/B2/B2 and listen what is the impression with mono or stereo compared to directly hearing from the talker?

Jan: not listening much, all recordings are available, in reference scenario, if sitting in the room, it can work nicely and someone can identify the direction; in the communication situations in Fig. 3 it’s preliminary, did not listen much but one can understand it’s different, it’s loudspeakers and not talkers, also because it’s in a room

Tomas: what is the effect of not being in the sweet spot of rendering?

Jan: cannot give mature guess, signal were inserted in loudspeakers, this is a task of spatial rendering, there is no equalization so no real sweet spot. one may compensate for one position, it is hard for mono, but there are tricks for stereo. This is a worst-case scenario.

Tomas: for the A1 to B1 path, there is a direct path but the playback if from the center

Jan: reason why mono cannot reconstruct cases 1 and 3 in Fig. 4, case 2 works for mono without equalization it would not work for stereo

Tomas: even stereo does not work as direct path

Stéphane: any other comment? there was a request at the last meeting to present such results, any reaction?

Stefan D: we requested measurements and there is more to cover but it is a good start

Stéphane: recording may be shared?

Jan: can check if it would be under NDA or not, contact me

Stéphane: it may be a bit early to consider sharing test signals but this may be needed later when defining test methods

Jan: idea is to collect what is good, bad to span the range, advantage is to cover the low range

Stéphane: see next steps in conclusions, any view?

Jan: one may wonder how to generate a good or bad system without HATS?

Stefan D: entire approach is based on a round table, for conferencing, typically one may have people in front of wall which may be more important to cover?

Jan: I will make a note and see, maybe one could add a TV mounted to the wall

Milan: you considered more than 2 speakers?

Jan: not yet, the idea is to equalize with 2 loudspeakers with the system we have, we can use 3, 4 or 5 loudspeakers. One may add a center speaker, depending on discussions. First step is how far we go with 2 loudspeakers, there are already many cables in the room for HATS, speakers, etc.

For the beginning we keep it more simple

Stéphane: any other comment on conclusions to help further work?

Jan: not possible to derive performance requirements from the curves, the study of the setup may help, at later stage

**Decision:** S4-210137 is noted.

The SQ Chair invites the ATIAS Co-Rapporteur (Mr. Stefan Bruhn, Dolby) to comment on a potential update of the time plan.

Stefan B: see if a telco is needed, ATIAS ma be covered in a general SQ adhoc meeting

Stéphane: will park this discussion on time plan for the wrap-up session

(*discussion on time plan resumes in the wrap-up session*)

Stéphane: any view on using the March 15 telco decided for HInT also for ATIAS?

Stefan B: most active party is HEAD acoustics, much depends on them

Jan: would not rule out a contribution, discussed today internally about further measurements and results, can make March 15 a general SQ telco, gives 5-6 weeks to get more results

Stéphane: need a time plan update for ATIAS, can allocate S4-210259.

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| **S4-210259** | Draft time plan for ATIAS, v0.4 | ATIAS Co-Rapporteurs (Orange, Dolby Laboratories, Inc.) |

**Presenter:** Stefan Bruhn (Dolby)

(*Stefan B prepares S4-210259 on the fly and displays a draft version*)

**Comments / questions:**

Jan: ATIAS is for Release 17 or 18? ATIAS is linked to codec development, and IVAS was postponed, so should move ATIAS to Rel-18

Stéphane: this relates to the discussion of IVAS-1 that took place in the EVS SWG, it was decided there to have a working assumption that IVAS would be in Rel-17

Tomas: ATIAS is aligned with IVAS, it was discussed in the EVS SWG that IVAS may be ready for Rel-17, if ATIAS comes a bit after, it will go to Rel-18.

Stefan B: see S4-210259, added one telco on March 15, ATIAS is slightly behind IVAS, it’s not possible to have it in Rel-17

Tomas: I see the ATIAS schedule (completion date) is already agreed, it is already going into Rel-18.

**Decision:** S4-210259 is agreed.

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

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| [**S4-210167**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210167.zip) | Report on HaNTE round robin test for Lab 3 | Orange |

**Presenter:** Alain Curti (Orange)

This contribution provides the report on round-robin tests conducted in Lab 3 (Orange), A preliminary version of the present contribution has been presented in the Jan. 18, 2021 SQ SWG telco. The round robin test followed the latest version of the test plan, with few exceptions.

It is proposed to re-run a subset of tests, in particular privacy and potentially tests at nominal level for DUT4.

**Comments / questions:**

Jan: regarding idle noise quality issue in Table 2, impact of this shows in Mic RLRs that do not exceed 24-25 dB, where in labs 1 and 2 these values were much higher (with a lower level). If devices are louder, 16-bit quantization and dynamic range are less relevant. It does not make sense to look at delta RLRs because RLR at the microphone is unwanted signal. Another measure should be used: absolute or level compared to DUT. We are abusing RLR here as RLR assumes a reasonable range.

Tomas: on page 1 there is a unclear statement on DUT4

Alain: it’s a typo, it should say that it may lead to a level different from nominal.

**Decision:** S4-210167 is noted.

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| [**S4-210089**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210089.zip) | Updated results of HaNTE round robin test | HEAD acoustics GmbH |

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

This contribution reports on the Handsets featuring Non-Traditional Earpieces (HaNTE) round robin results at Laboratory 2 (HEAD acoustics GmbH) and 3 (Orange).

Tests were in general conducted according to the agreed test plan of the 3GPP work item HaNTE. However, due to some observed issues, some measurements and analyses were extended.

This contribution shows merged/aggregated results across labs. Each lab in the round robin test also provided a separate report. Due to some observed issues and additionally agreed measurements, results from this lab were not yet taken into account for the aggregated analysis.

**Comments / questions:**

Andre: very well done, puts data in a nice presentation, this has lots of value, think it is worth taking more time to complete the data collection with 4 labs, so take devices around with latest test database. Concern: the work item looks like a study item, looking at results, there are problems in terms of repeatability, the control sample from traditional UE seems repeatable across labs. After this meeting, what to do? current tests are not enough repeatable.

Jan: in some cases not sure if issue is labs, HATS or devices, some devices have a strange frequency response anyway

Andre: a lot of devices do not meet requirements, in high frequency seems repeatable, in low frequency inconsistent results (pinna? sealing?), need to check.

great work, thanks a lot to HEAD acoustics

Peter: impressive work, slight details, frequency response adjuster to upper tolerance, if more than one curve and tolerance is present, you have to adjust each curve to the tolerance? have you attempted to do something else, or do you maintain an absolute level?

Jan: when presenting similar curves with lab 2 in previous meeting, it seemed to confuse even more, curves do not fit with each other and you don’t see differences between labs anymore. One may remove the pass/fail criterion if not of interest, it’s taken for reference.

Peter: important to retain absolute sensitivity

Jan: each lab was adjusted to one value

Peter: same offset for all curves?

you start with tolerance, float to max, use that value for all others, that’s like always absolute sensitivity

Jan: yes but wanted to have have y axis for all graphs

Peter: this needs to be further clarified, if one curve can display it with y axis or to the tolerance, if more than one curve, do floating, if keep absolute sensisivity, remove tolerance scheme

Jan: offline

Stéphane: this document is an interim report, results from other labs will be aggregated, so one may just note this Tdoc

**Decision:** S4-210089 is noted.

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| **S4-210258** | Time plan for HaNTE | HaNTE Rapporteur |

**Presenter:** Andre (Qualcomm)

The main modification is to reflect what has been done and to add one telco.

**Comments / questions:**

Stéphane: there seems to be an official time plan for HaNTE in S4-200304 (Wroclaw meeting SA4#107) and then another time plan for the round robin was created in meeting SA4#108. please check what should be done with S4-200304.

(*the group discusses a draft version of S4-210258 shared in Inbox/Drafts/SQ*)

Andre: The round robin is beyond test schedule, one may check the status from lab 4. Propose to have a telco to discuss results from lab 4 and look at aggregate results. Then taking devices to lab 1, when all finalized, look at data.

Antero: status of lab 4 is that received all phones, conducted measurements, now in a phase to make a document from results, support to have a telco, preferably in weeks 9-10. need to discuss how to return phones, if Orange wants to re-run or directly to Andre?

Andre: suggest discussing shipment offline. for telco depends on whether it’s a general SQ telco or not

Stéphane: we may schedule a dedicated telco for HaNTE just like there was one for HInT in Dec. 2020

(*Stéphane shows dates provided as guidelines for AH telcos post 112-e*)

Stéphane: which date would be appropriate?

After some online discussion, the following tentative telco is proposed:

**March 5, 2021, 16:00-17:00 CET, host: Qualcomm**

Stéphane: will revisit this topic in next SQ SWG session (wrap-up)

(*discussion resumes in the wrap-up session*)

Stéphane: can we agree on S4-210258 with the March 5 telco dedicated to HaNTE?

**Answer: yes.**

**Decision:** S4-210258 is agreed.

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

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| [**S4-210040**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210040.zip) | DraftCR TS26.132 on Headset Interface Description (update) | HEAD acoustics GmbH |

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

Within the scope of the work item HInT, it is intended to add new test methods to TS 26.132 for analogue and digital interfaces of UE. As a preparation for these, a detailed specification and description of the introduced interfaces has to be included. This dCR introduces new clauses for analogue and digital interfaces, editorial changes in the existing clauses regarding measurement equipment.

Compared with SaQ200156, lots of new clauses were added: the dCR was for NB, now it includes WB, SWB, FB.

See overview provided by email over the SQ reflector (copied here):

* Until the last version of the draft-CR, measurements for headset interface were only described for NB. S4-210040 was extended regarding WB, SWB and FB measurements.
* The cover sheet now also includes the additionally affected clauses.
* Some re-wording has been done on the last two paragraphs in clause 5.1.6.2 (digital electrical interface), which affects the “expected behaviour” of such digital interfaces regarding signal processing (highlighted in yellow). Hope this text is agreeable?
* The following changes on the measurement description are not ordered by the clause numbers in TS 26.132. Same measurements in NB/WB/SWB/FB are grouped (see editor’s note between change 6 and 7).
* General edits/simplifications:
	+ 7.8/8.8 Distortion: Proposals for clarification
	+ 7/8/9/10.10.4 Delay and speech quality loss: clarification on usage of P.863
	+ 7/8/9/10.13.2 Jitter buffer management and speech quality loss: clarification on usage of P.863
	+ 9.13 Jitter Buffer Management: suggest to shorten this clause, since it’s identical to WB.
	+ 10.13 Jitter Buffer Management: added short sub-clauses
* Changes regarding WB measurements (clauses 8.x) compared to NB:
	+ Extended analysis range to 100-8000 Hz (mainly receive measurements)
	+ Different weightings of ITU-T P.79 for Junction loudness ratings (Send/Receive) as well as sidetone masking rating were used
	+ 8.12 Speech quality in the presence of BGN: adapted usage of TS 103 106 in wideband mode
* Changes regarding SWB measurements (clauses 9.x) compared to WB:
	+ 9.8 Distortion and 9.11 Echo control remain unchanged, since they just point to WB measurements (clauses 8.8, 8.11)
	+ 9.12 Speech quality in the presence of BGN: adapted usage of TS 103 281
* Changes regarding FB measurements (clauses 10.x) compared to SWB:
	+ Suggest to shorten 10.3 Idle Noise (just point to SWB-measurements)
	+ 10.8 Distortion and 10.11 Echo control remain unchanged, since they just point to SWB measurements (clauses 9.8, 9.11), which point to WB.
	+ 10.10.4.3 & 10.13.2: Consider usage of P.863 V3.0, which supports fullband?

**Comments / questions:**

Peter: on 9.4.0, I remember this one. We had a problem, when looking at 1/3 octave band data, if plot bars on each side, it is allowed to violate the mask, because the mask is only applicable to center frequencies, we don’t want a jagged curve when drawing, you check if you are within tolerances after interpolating to octave band frequencies. If the text is only here, it would be a problem.

Jan: I know the issue, for the next version I will include it for NB, WB clauses

Peter: on SWB clause 9.10.4 duplicated from WB, one has to be careful, there could be a good reason to duplicate text, there is also guidance to filter signals and one may refer to a lower bandwidth

Jan: when FB points to SWB there is extra text ‘observing signal properties’

Peter: yes, when there is such clarification it is safe, but this was only done when adding FB

Stéphane: clarify, not removing brackets?

Jan: all text that was in brackets is kept in brackets in this version, the clauses in the beginning have no bracket but this was the same in the previous version, brackets start with clause 5.1.6.2

Stéphane: can we agree this dCR as the next version for editing?

**Answer: yes**

**Decision:**

S4-210040 is agreed (as a basis for further editing).

This Tdoc will go to A.I. 15.5.

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| [**S4-210169**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210169.zip) | dCR 26.131 Extension for headset interface tests of UE | Orange |

**Presenter:** Stéphane Ragot (Orange)

TS 26.131 does not currently specify requirements for an analogue, digital or wireless headset interface of a terminal. It is relevant to introduce testing of the headset interface in today’s market where users can purchase compatible products that use standardized connections from different suppliers, and compatible headsets can be freely combined with mobile phones.

See overview provided by email over the SQ reflector (copied here):

S4-210169 extends S4-201482 which has been agreed as a basis for further editing at SA4#111-e.

The first affected clauses are not changed (introduction, 1 scope, 3.1 Definitions, 4 Interface definitions).

For subsequent clauses the requirements that were left TBD are now filled with some draft proposed text. Every time the existing requirement for headset (i.e. existing requirement in TS 26.131) was used as a basis and adapted to draft a proposal for the electrical interface (sometimes adjusting the text to replace acoustic interfaces by the electric interface).

The actual requirements (limits) are kept TBD in all new clauses for the electrical interface.

All new clauses are still kept in brackets. The draft requirements cover all bandwidths (NB, WB, SWB, FB).

Besides some minor editorial corrections have been made in existing clauses (wrong formatting of tables in TS 26.131: Table 2 in 5.4.2, Table 14a in 6.4.6, Table 30 in 7.4.6).

**Comments / questions:**

Stéphane: apologies, ‘revision of S4-201482’ is missing in the document header

Peter: very minor comment, on title ‘sending performance in the presence of background noise’, I like this title in TS 26.131, good to fix it in TS 26.132

Jan: I suggested revising the dCR in 26.132, with speech quality and noise intrusiveness in the presence of ambient noise, agree with changing TS 26.132

Peter: the title in TS 26.131 is not bad

Stéphane: can put in minutes that will make the title change in TS 26.132

Jan: lots of TBDs, it’s already an issue to find requirements, rough proposal to determine values? for sending, we have the same type of measurement as for headet, but for receiving with the electrical interface any idea?

Stéphane: did not want to be too pushy, values can be proposed next time, labs have time to check once the test method is more stable

Peter: may be good to look at P.831

Stéphane: any other comment, can we agree on this dCR as a basis for further editing?

**Answer: yes**

**Decision:**

S4-210169 is agreed (as a basis for further editing).

This Tdoc will go to A.I. 15.5.

It is suggested to change the title of clauses in TS 26.132 dealing with performance testing the presence of background to match TS 26.131.

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| S4-210088 | Time Plan for HInT, v0.3 | HEAD acoustics GmbH, Orange |

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

Very few changes. No inputs in the Jan 18 telco.

**Comments / questions:**

Stéphane: any telco for HInT?

Jan: there is already a Jan 5 telco (for HaNTE)

Stéphane: afraid the Jan 5 has to be dedicated to HaNTE only as it is a 1 hour slot and we will cover one lab report and aggregated results, this will be a busy telco. Any other date?

Jan: suggest March 15

Stéphane: we may make the extra telco on March 15 a general SQ SWG telco to also include ATIAS

(*discussion stopped until wrap-up session*)

**Decision:**

S4-210088 is agreed.

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

None.

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

Stéphane: see proposed schedule for SQ SWG slots at 113-e in S4-210255, this schedule is still open and I got a request to consider grouping some SQ SWG slot with other SWG slots in the morning (CET). Any views?

Milan: depends who participates, morning sessions in Europe are difficult for Eastern America, prefer to address ATIAS at usual time in the afternoon in Europe, it is more convenient.

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

Stéphane thanks all delegates for their participation and contribution, invites them to join the closing plenary and contributes to post-112e adhoc telcos. The meeting was closed at 16:32 CET on February 8, 2021.

**Annex A – Meeting agenda**

**Source: SA4 SQ SWG Chair[[2]](#footnote-2)**

**Title: Meeting agenda (SQ SWG during SA4#112-e)**

**Document for: Information**

**Agenda item: 9.2**

|  |  |  |
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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) | Evaluation:137n (HEAD acoustics)Time plan 259a A.I. 15.315 March, 16:00-17:00 CET, host: HEAD acoustics |
| 9.6 | HaNTE (Handsets Featuring Non-Traditional Earpieces) | Report from Lab 3 (RR):167n (Orange)Aggregated RR results (Labs 2 / 3):089n (HEAD acoustics)Time plan258a A.I. 15.45 March, 16:00-17:00 CET, host: Qualcomm |
| 9.7 | HInT (Extension for headset interface tests of UE) | 26.132:040a (HEAD acoustics) A.I. 15.526.131:169a (Orange) A.I. 15.5Time plan 088a (Co-Rapporteurs) A.I. 15.515 March, 16:00-17:00 CET, host: HEAD acoustics |
| 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.0 Consolidated list of participants (merging three telcos with no doubles)**

**TBD participants**

**B.1 Telco on 2nd February 2021 (16:00-17:00 CET)**

**TBD participants**

**B.2 Telco on 3rd February 2021 (16:00-17:00 CET)**

**TBD participants**

**B.3 Telco on 5th February 2021 (16:00-17:00 CET)**

**TBD participants**

**B.4 Telco on 8th February 2021 (16:00-17:00 CET)**

**TBD participants**

**Annex C - Documents status**

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

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| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
|  |  |  |  |  |

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

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| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| [**S4-210040**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210040.zip) | DraftCR TS26.132 on Headset Interface Description (update) | HEAD acoustics GmbH | 9.7, 15.5 | Agreed |
| **S4-210088** | Time Plan for HInT, v0.3 | HEAD acoustics GmbH, Orange | 9.7, 15.5 | Agreed |
| [**S4-210169**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210169.zip) | dCR 26.131 Extension for headset interface tests of UE | Orange | 9.7, 15.5 | Agreed |
| **S4-210258** | Proposals for data collection of HaNTE – test methods | Rapporteur (Qualcomm Incorporated) | 9.6, 15.4 | Agreed |
| **S4-210259** | Draft time plan for ATIAS, v0.4 | ATIAS Co-Rapporteurs (Orange, Dolby Laboratories, Inc.) | 9.5, 15.3 | 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 |
| [**S4-210089**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210089.zip) | Updated results of HaNTE round robin test | HEAD acoustics GmbH | 9.6 | Noted |
| [**S4-210137**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210137.zip) | Evaluation of simplified communication systems for ATIAS | HEAD acoustics GmbH | 9.5 | Noted |
| [**S4-210167**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_112-e/Docs/S4-210167.zip) | Report on HaNTE round robin test for Lab 3 | Orange | 9.6 | Noted |

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

None.

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