**Source: SA4 Audio SWG Co-Chairs[[1]](#footnote-1) (Qualcomm Incorporated, Orange)**

**Title: Report from Audio SWG during 3GPP SA4#124**

**Document for: Approval**

**Agenda Item: 12.1**

**Executive Summary**

The Audio SWG meeting (30 delegates) met in 12 time slots. In total 44 documents were handled. The meeting outcome is summarized below:

* IVAS\_Codec
  + The goal to finalize Pdocs and to complete further elements needed to start selection testing, according to IVAS-2 (project plan) was achieved. Especially IVAS-8a (test plan) and IVAS-7a (processing plan) required much work to be completed: input contributions were received on missing items, then the documents were completed in on-line editing sessions.
  + IVAS Permanent Documents, agreed at the Audio SWG:
    - **S4-231032** IVAS-1 Overview -- agreed as v.0.5.0, next working draft
    - **S4-230992** IVAS-2 Project Plan – agreed as v.0.7.0, next working draft
    - **S4-231049** IVAS-3 Performance Requirements – agreed as v.1.1.0, update of v.1.0.0
    - **S4-231031** IVAS-4 Design Constraint – agreed as v.1.2.0, update of v.1.1.0
    - **S4-230991** IVAS-5 Selection Rules – agreed as v.0.2.0, plenary is requested to agree and raise it to v.1.0.0
    - **S4-231057** IVAS-6 Selection Deliverables – agreed as v.0.5.0, plenary is requested to agree and raise it to v.1.0.0
    - **S4-231058** IVAS-7a Processing Plan for Selection Phase – agreed as v.0.10.0, plenary is requested to agree and raise it to v.1.0.0
    - **S4-231050** IVAS-8a Selection Test Plan – agreed as v.0.9.0, plenary is requested to agree and raise it to v.1.0.0
  + As a result of the efforts, we have a stable basis now to run the selection tests.
    - A detailed list of events until the start of selection testing was collected to assist the process (see AOB section).
    - Offer was received and accepted for Global Analysis Lab (GAL) function from HEAD Acoustics. The 4 LLs reserved their capacities for July and August to run the tests: 9 P.800 experiments (in two labs each) and 14 MUSHRA experiments (in two labs each), plus GAL imply a total expense of 646000 euros (out of total 1.2 Mio paid under FA). ETSI MCC is tasked to sign the service contracts with LLs and GAL before June 27.
    - Multiparty NDA and payments according to FA are all on track.
    - Material collection for selection test, along with x-check and host lab, turns out to be a quite big undertaken; (almost) sufficient offers were received.
    - It cannot be 100% excluded that still minor inconsistencies may be found especially in IVAS-7a and IVAS-8a because of the high complexity. That motivated to ask for SA4 approval power prior to start of selection tests.
  + An invitation was circulated over the reflector to get offers for floating-point to fixed-point conversion, as part of characterization phase which is potentially funded from the remaining amount collected under FA. Reply was received from Ittiam;. Ittiam provided a company presentation and quote (6 months work, USD 373333); this way forward seems promising, not decided yet. A dialog is opened with Ittiam to clarify technical aspects further at interim SWG calls. Corresponding working assumptions are set in IVAS-6. The project may start after IVAS codec selection.
  + On IVAS-2, the update includes events after selection (specification availability and characterization phase).
  + Rapporteurship of IVAS specs was discussed; the workload will be distributed among several contributing companies; table in AOB shows Editor for 26.250 (Stefan Bruhn, Dolby), 26.251, 26.258 (Markus Multrus, FhG IIS), others TBD.
* ATIAS
  + Proposed PD updates on stereo testing, DoA, lowest frequency for MASA test signals and general comments on the current ATIAS Pdoc were reviewed. An update of the ATIAS-1 PD merging all proposed updates was left to be completed offline, to be directly presented to closing plenary in **S4-231065.**
* eUET
  + Updated SWB measurement results for eUET results were presented – further results and proposed frequency masks are expected at the next meeting. Draft changes to TS 26.131 and 26.132 for JBM performance testing were discussed, however this proposal needs further details for consideration.
* FS\_ DaCED:
  + Proposed new text on binaural capture was reviewed and included in TR 26.933. A new version of the TR (v0.1.0) was agreed in **S4-230971**. The time plan is updated in **S4-230972** with an AH telco on July 31 (see details below).
* ISAR
  + Contributions were received on ISAR requirements in **S4-230842, S4-230954, S4-230947.** They cover scenarios, architectures, interfaces, with a certain degree of overlap. Inputs from all contributions were included in the next version of the ISAR requirements TR, removing overlap and cleanup in editing sessions. The result is agreed in **S4-231066** as the next working draft.
* New Work Items/Study Items
  + None.
* AOB
  + Audio SWG calls were scheduled to progress the work, as follows:
    - Telco on IVAS: 12 June 2023, 14:00 – 17:00 CEST, submission deadline: 9 June 2023, 14:00 CEST, host: Dolby
    - Telco on IVAS: 21 June 2023, 14:00 – 17:00 CEST, submission deadline: 20 June 2023, 14:00 CEST, host: Dolby. Special power from SA4 is requested to approve potential updates of IVAS Pdocs IVAS-7a (processing plan) and IVAS-8a (test plan).
    - Telco on FS\_DaCED: 31 July 2023, 16:00 – 18:00 CEST, submission deadline: 27 July 2023, 16:00 CEST, host: Xiaomi
    - Telco on IVAS: 8 August 2023, 14:00 – 17:00 CEST, submission deadline: 7 August 2023, 14:00 CEST, host: Dolby

1. Opening of the Session

The Audio SWG Co-Chairs, Mr. Imre Varga (Qualcomm) and Mr. Stephane Ragot (Orange), opened the Audio SWG meeting on 22 May 2023, 14:00.

The minutes are shared here:

<https://etsihq-my.sharepoint.com/:w:/g/personal/andrijana_brekalo_etsi_org/EYCpkkQyHPFBmHX87gYXVGkBZGqUz5HjccibGf-KJv0bDQ?rtime=p0M3nec820g>

2. Registration of Documents

Imre displays a draft revision of agenda in S4-2300772 R1, including Tdoc allocations.

S4-2300772 R1 is agreed

3. CRs to Features in Release 17 and earlier

None.

4. Liaisons with other groups/meetings

None.

5. IVAS\_Codec (EVS Codec Extension for Immersive Voice and Audio Services)

**S4-230761**

**Presenter:** M. Jelinek

Discussion:

* This version implements the agreed changes from the interim SWG calls. Verified correct implementation.

Decision: **S4-230761** is agreed (as next working draft)

**S4-230862**

**Presenter:** J. Reimes

Discussion:

* The group discussed the list of GAL tasks – they will be taken into IVAS-8a; also, the offered price was discussed and agreed.

Decision: **S4-230862** is agreed

**S4-230883**

**Presenter:** A. Rämö

Discussion:

* Few questions were asked on level normalization, usage of scripts, ...
* The group thanked the source for the hard work of identifying, implementing the method to identify RIRs from actual recordings, and also for publishing the MATLAB scripts (attached in the zip file).
* Companies are encouraged to use the method and MATLAB scripts.

Decision: **S4-230883** is noted

**S4-230899**

**Presenter:** L. Laaksonen

Discussion:

* The group thanked for the work and detailed information for making recordings.

Decision: **S4-230899** is noted

**S4-230900**

**Presenter:** L. Laaksonen

Discussion:

* Discussion showed support for the proposed details of experiments P.800-4, 5, 8, 9.
* The Editor of IVAS-8a was requested to include the proposal into the draft, for further work in editing sessions.

Decision: **S4-230900** is agreed

**S4-230902**

**Presenter:** I. Varga, S. Bruhn

Discussion:

* First part (updated instruction set) was discussed and no comments received.
* It was clarified that the second part (familiarization) is not mandatory (cannot be mandatory).
* Ericsson provided comments (in drafts folder), they were presented.
* Conclusion: the first part will be implemented into IVAS-8a (with minor modifications by Ericsson); the second part is for further consideration.

Decision: **S4-230902** is noted

**S4-230924**

**Presenter:** M. Jelinek

Discussion:

* The IVAS-8a input from the Editor is based on the agreed working draft. The inputs will be taken into account during the editing session.
* Editing session produced the updated version which was then agreed.

Decision: **S4-230924** is revised into **S4-231050** which is agreed.

**S4-230945**

**Presenter:** S. Döhla

Discussion:

* Missing.

Decision: **S4-230945** is withdrawn.

**S4-230946**

**Presenter:** S. Bruhn

Discussion:

* The presentation order in the attached Excel sheet will be used.

Decision: **S4-230946** is noted

**S4-230763**

**Presenter:** T. Toftgard

Discussion:

* This version implements the agreed changes from the interim SWG calls. Verified correct implementation.

Decision: **S4-230763** is agreed (as the next working draft)

**S4-230919**

**Presenter:** L. Laaksonen

Discussion:

* The Editor of IVAS-7a was requested to implement the input into the working draft, for the editing session.

Decision: **S4-230919** is agreed

**S4-230936**

**Presenter:** T. Toftgard

Discussion:

* The IVAS-7a input from the Editor is based on the agreed working draft. The inputs will be taken into account during the editing session.
* Editing session produced the updated version which was then agreed.

Decision: **S4-230936** is revised into **S4-231058** which is agreed.

**S4-230764**

**Presenter:** Huan-yu Su

Discussion:

* The initial version implements a minor clarification as agreed at interim call.
* Editing session produced the updated version which was then agreed.

Decision: **S4-230764** is agreed (as next version)

**S4-230940**

**Presenter:** S. Ragot

Discussion:

* Agreed clarification; the Editor of IVAS-3 was requested to implement it into the next draft.

Decision: **S4-230940** is agreed

**S4-230875**

**Presenter:** Huan-yu Su

* Removing the text was not felt appropriate at this stage. Cost for level 1 decoder to be able to decode higher level bitstream is a valid point, it can be however evaluated on the basis of the C code right now; if issues are found, they could be fixed on the level of code development.

Decision: **S4-230875** is noted

**S4-230876**

**Presenter:** Huan-yu Su

* The change was felt too late at this stage (few weeks before candidate submission).

Decision: **S4-230876** is noted

**S4-230931**

**Presenter:** M. Multrus

Discussion:

* Information needed during this meeting.
* Online editing on material collection led to get volunteers and a detailed time plan of this activity.
* Further inputs re planned to be received at interim SWG calls.

Decision: **S4-230931** was revised into **S4-231046** which is noted

**S4-230901**

**Presenter:** L. Laaksonen

Discussion:

* Discussion on the schedule beyond selection meeting, triggered by this input, led to a revision of IVAS-2.

Decision: **S4-230901** is noted

**S4-230992**

**Presenter:** I. Varga

Discussion:

* Discussion on the schedule beyond selection meeting, led to a revision of IVAS-2.

Decision: **S4-230992** is agreed

**S4-230937**

**Presenter:** T. Toftgard

Discussion:

* Multiparty NDA to cover exchange of audio samples, for information
* On track
* Text agreed by proponents and labs
* Some companies have signed
* Others are in signing process
* Deadlines: signed version available by June 2

Decision: **S4-230937** is noted

**IVAS Pdocs – online editing at the sessions**

**IVAS-8a online editing:** Note that the notion of JBM jitter profile is removed everywhere in the test plan, but everyone is invited to evaluate the provided profiles for potential later inclusion.

**IVAS Permanent Documents, agreed at the Audio SWG:**

* **S4-231032** IVAS-1 Overview -- agreed as v.0.5.0, next working draft
* **S4-230992** IVAS-2 Project Plan – agreed as v.0.7.0, next working draft
* **S4-231049** IVAS-3 Performance Requirements – agreed as v.1.1.0, update of v.1.0.0
* **S4-231031** IVAS-4 Design Constraint – agreed as v.1.2.0, update of v.1.1.0
* **S4-230991** IVAS-5 Selection Rules – agreed as v.0.2.0, plenary is requested to agree and raise it to v.1.0.0
* **S4-231057** IVAS-6 Selection Deliverables – agreed as v.0.5.0, plenary is requested to agree and raise it to v.1.0.0
* **S4-231058** IVAS-7a Processing Plan for Selection Phase – agreed as v.0.10.0, plenary is requested to agree and raise it to v.1.0.0
* **S4-231050** IVAS-8a Selection Test Plan – agreed as v.0.9.0, plenary is requested to agree and raise it to v.1.0.0

**Detailed timeline of events before start of selection tests**

* June 2 – Proper legal framework exists (multiparty NDA among proponents and LLs for exchange of test material signed)
* June 2 – Make hosting servers available, provide login data to all participating contributors.
* June 2 – Dolby to provide example mono sentences for IR processing
* Material upload and review should be started as soon as possible; also provide binauralized version of the material and example renderings of the impulse responses using example mono sentences
* June 5:
  + Provide all material needed for P800-1, P800-2, P800-3, P800-4, P800-6, P800-7, P800-8
  + Provide test material needed for stereo MUSHRA tests
* June 12: Upload deadline for remaining required material
* June 15: Selection of material for
  + P800-1, P800-2, P800-3, P800-4, P800-6, P800-7, P800-8
  + Stereo MUSHRA tests
* June 20 – MC shall choose the parameters and sound materials for remaining experiments
* June 16: Pre-release of IVAS codec selection executable
* June 23: Provide dry-run material to listening labs, using the pre-release executable
* June 27:
  + Release of final IVAS codec selection executable
  + Service contract between ETSI MCC and LLs+GAL is signed.
* June 30: Make final test material available to listening labs
* July 3: Start of Listening tests

**Listening lab and GAL lab expenses for selection testing**

* Force Technology (LL): 239000 Eur (8x18000+3x10000+5x13000)
* Head Acoustics/ IKS (LL): 179000 Eur (3x18000+6x10000+5x13000)
* MQ University (LL): 36000 Eur (2x18000=36000)
* Mesaqin (LL): 180000 Eur (5x18000+9x10000)
* Total 634000 Eur
* Head Acoustics (GAL): 12000 Eur
* Grand total 646000 Eur

**IVAS Funding Agreement payments**

* On track
* All payments received or payment is scheduled within short term

**Legal framework for IVAS**

1. Multiparty NDA to cover exchange of audio samples.

* On track
* Text agreed
* Some companies have signed
* Others are in signing process
* Deadlines: signed version available by June 2

1. Service contract between ETSI MCC and the labs

* MCC to handle this
* Imre is in contact with MCC legal
* No delay of start of testing is possible
* Deadline for the service contract: signed by June 27
* ETSI MCC is expected to provide a Tdoc for August meeting on the expenses spent for selection testing
  + Information for the meeting on the amount that has been spent / is available
  + TSG-SA to approve the test results in September, the associated expense report and ETSI MCC will pay the labs on this basis

**IVAS Fixed-point conversion**

* Working assumptions discussed at May 8 call and included in IVAS-6 at this meeting
* The Chairman sent out an email to 3GPP SA4 and Audio reflectors with call for proponents on May 9
* Reply received from Ittiam
* Presentation at the Audio SWG session by Ittiam representative
  + Ittiam company presentation: Ittiam Systems, Audio Solutions (found in drafts)
  + Ittiam IVAS float2fix quote 11 May 2023 (found in drafts)

<http://10.10.10.10/ftp/SA/SA4/Inbox/Drafts/Audio/Ittiam-Audio-Solutions-May23-Brief.pdf>

<http://10.10.10.10/ftp/SA/SA4/Inbox/Drafts/Audio/Ittiam-IVAS-Float2Fix-Quote-11May2023_updated.pdf>

* Conclusion:
  + This way forward seems promising
  + Other viable ways were not proposed to achieve the goal in time
  + Start of project after IVAS codec selection
  + Action items before final decision
    - Opening a dialog on technical aspects with Ittiam
      * Certain technical aspects to be clarified, this is planned for subsequent SWG calls
    - Certain companies want an internal discussion

6. ATIAS (Terminal Audio quality performance and Test methods for Immersive Audio Services)

**S4-230882**

**Presenter:** Nien Wu

Discussion:

* Stéphane: not sure can use clause 7.10 which is for UE delay
* Nien Wu: just to initiate
* Stefan B: to replace what we have on perceptual test on stereo?
* Nien Wu: same, but harmonization
* Stefan B: seems complete restructuring
* Stéphane: upload
* Andre: spatial perception test? Test of sending ? Capture or receiving?
* Nien Wu: for sending
* Stéphane: normally updates to the Pdoc should come with revision marks, can you provide this Tdoc in this format in the Drafts folder?

(*later Nien Wu shared the updated Tdoc in the Drafts folder)*

* Stéphane: resolution of changes will be done offline in coordination with other contributors to the output document (updated PD), this Tdoc can be noted

Decision: **S4-230882** is noted

**S4-230910**

**Presenter:** Arvi Lintervo

Discussion:

* Andre: you used MAE as metric, if use max angle, seems female speech has an important advantage, same for MASA or FOA, female also within 2.5 degrees circles, idea why?
* Arvi: one reason could be lowest frequency of signal, don’t remember lowest frequency in free field, also frequency response for loudspeaker may not be good due to low frequency content of other signals
* Stefan B: 3 questions, one is what is color code?
* Arvi: not same color at adjacent, no meaning
* Stefan B: tested azimuth from 0 to 180, assume same behaviour if other way around, on cone of confusion why not see any case?
* Arvi: very good microphone, direction agnostic, no issue, maybe for cheaper devices
* Jan: one test signal, sentence saying 5s test signals, was that also for male and female speech?
* Arvi: Also silence, two sentences cropped
* Andre: for eigenmike error is very small, how conversion done? Direct truncation of series
* Arvi: filters, 4 microphones are taken, not sure how is it done, for MASA there is MASA tool will convert from eigenmike to MASA
* Anssi: use VST tool?
* Arvi: no
* Stéphane: not sure how to integrate
* Arvi: short abstract with reference
* Stefan B: also my feeling, Nokia provided other results and we decided not to display everything in the Pdoc, agree to have a reference
* Stefan D: for FOA or MASA, also for HOA? Eigenmike can do HOA4, can do it for HOA
* Arvi: not sure intensity calculation will be for HOA
* Stefan B: based on FOA components
* Stéphane: can be a note for HOA
* Tomas: on 90 degree point,
* Arvi: computed median and average

Decision: **S4-230910** is noted

Mr. Arvi Lintervo (Nokia) is tasked to propose a text update for inclusion in the Pdoc to refer to this input S4-230910, to be shared in shared folder. A note on HOA will also be added.

**S4-230911**

**Presenter:** Arvi Lintervo

Discussion:

* Jan: I am struggling with disabling of frequencies, if do this, indicate in the text which we do this, otherwise we do not understand why we don’t test, test signal is same but evaluate without frequencies in measurement?
* Arvi: could be done in that way, reasoning for disabling is from technology, from the format, not clear what would happen if ignore at evaluation phase but it may impact capture
* Jan: had small offline exchange on related topic, the more frequency components you have the high level is, the number of frequencies to test has an impact, have to think the number of evaluation frequencies, in our data we had too many of them
* Arvi: when scaling, level difference ratios should be equal, but both levels are decreased
* Jan: more general comment, if different test for MASA and FOA, and test lab has to decide, is it FOA or MASA, can we distinguish at all? Ok reference decoder can see, for test lab, need to check format it is, it should be harmonized, user gets immersive terminal
* Andre: test signal has only two modulate tones at 275 and 550 Hz, it is sufficient to characterize UE? They have modulations, 20 Hz per components. Other component should be wider to comprise?
* Stéphane: can we use same signals for MASA and FOA?
* Stefan B: for MASA lowest pair of A and B would be 275 and 550 Hz, we assume everything interpolates well
* Stéphane:
* Stefan B:

Decision: **S4-230911** is agreed

A note will be added to clarify the column on ‘Disable MASA’ (to be provided in the Drafts folder for review)

**S4-230917**

**Presenter:** Stefan Bruhn

Discussion:

* Stéphane: could ask the sources to edit the Pdoc to address the comments and provide updates to the Pdoc and incorporate also changes from other input Tdocs on ATIAS?
* Stefan B: yes we can do that
* Stéphane: the resolution on questions/comments is left to be done offline, interested parties can join the sources, this Tdoc can be noted.

Decision: **S4-230917** is noted

**S4-231065**

**Presenter:** Stefan Bruhn

Discussion:

* Stéphane: This Tdoc will integrate changes based on all ATIAS inputs (882, 910, 911, 917)
* Arvi: On top of Xiaomi’s PD update (draft\_S4-230645\_ATIAS\_Pdoc\_v0.3.0\_revXiaomi in Drafts folder), I included an incremental update in the the Drafts folder (draft\_S4-23xxxx\_ATIAS\_Pdoc\_v0.3.0\_revNokia).
* Stéphane: we have no time to review these intermediate updates and other updates are missing, we will leave it to the offline editing group to produce **S4-231065** and present it directly to closing plenary.

Decision: **S4-2301065** is not seen in the Audio SWG, it is left to be presented to closing plenary.

Stéphane: AH telco needed?

Stefan B: don't think so

Stéphane: we conclude that there is no post-124 AH telco on ATIAS, and we don’t need any time plan update

7. eUET

**S4-230898**

**Presenter:** Jan Reimes

Discussion:

* Jan: work in progress, if someone wants to contribute, it can be merged
* Stéphane: plan for next meeting?
* Jan: more results and derivations according to clause 5

Decision: **S4-230898** is noted

**S4-230941**

**Presenter:** Stéphane Ragot

Discussion:

* Stefan D: profile available
* Jan: in the modified Annex E.2, you proposed E.2a, could not be a E.4 or E.4?
* Stéphane: indeed, would make more sense to have E.3
* Jan: in E.3: you propose to change one profile
* Stéphane: left over, E.3 should not be changed
* Jan: in 5..15 in TS 26.131, set of profiles for testing
* Stéphane: just requirements
* Jan: plan to update the long list as well?
* Stéphane: need to see if characterieation can be removed
* Fabrice: what call VoLTE JBM not defined yet
* Stéphane: see profile shared in previous meeting,
* Fabrice: what is included for ?
* Stéphane: delay figures will be updated
* Fabrice: for contiditon 0 already tested
* Stéphane: not excatly condition 0
* Jan: confused on profile, new profiles should go to Annex F, delay tests, mentioned in Annex F

Decision: **S4-230941** is noted

Stéphane: AH telco needed?

Jan: not much available due to IVAS testing, can skip

Stéphane: we conclude that there is no post-124 AH telco on eUET, and we don’t need any time plan update

8. FS\_DaCED

**S4-230881**

**Presenter:** Nien Wu

Discussion:

* Stéphane: ok to include 2.1.? Answer:
* Stéphane: ear bud something distance from entrance, not clear if influence
* More details in future, some requirements
* Stefan D: why capture on UE? Using ear buds
* Nien Wu: use UE, ear bud is included in study, choose other word
* Stefan D: get rid on UE, that is something general for binaural recording, ear canal can be blocked by tranducers, propose to remove ‘on UE’ and
* Andre: we have a headset UE in our interface, headset is acoustic interface
* Stefan D: here seems headset is UE, be more general, here problem not able
* Stéphane: clause 2.3?
* Stefan D: what is ‘spectral’?
* Nien Wu: mean ‘spectral characterstics’
* Lasse: understand binaural capture as 2 channels or something as part of processing? Number of channels is two for L and R ear, how to understand the capture, it is starting with two microphones?
* Nien Wu: at the end we will have two channels, sometimes we may need more channels at capture
* Andre: then name differently, this is about binaural, if array and then ‘binaural signal representation’
* Stefan B: list of cues, not clear if example list, indicate that just examples
* Stéphane: add e.g.
* Stefan B: in IVAS we discuss quality of spatial signal, formulate that many cues influence binaural capture
* Stefan D: reverse
* Further editing online

Decision: **S4-230881** is noted  
The result of online editing for clause 2.1, 2.2 and 2.3 is agreed to be included in brackets in TR 26.933.

Stéphane: we will need a new Tdoc for the updated TR. Any telco on FS\_DaCED

Wang Bin: yes, it would be good, I will make a proposal in the Drafts folder

**S4-230971**

**Presenter:** Wang Bin

Discussion:

* Wang Bin: a draft version of 971 is in the Drafts folder
* Stéphane: there are a couples of minor editorial issues to fix (reference to Tdoc not allowed, broken citations to references from **S4-230881** in new text, typo, and wrong tdoc number in history). After fixing these formal issues, can we agree? Answer: yes

Decision: **S4-230971** is agreed

**S4-230972**

**Presenter:** Wang Bin

Discussion:

* Wang Bin: there are 2 options for the telco date, June is not best,, I suggest July 31
* Stéphane: can we agree on the telco on FS\_DaCED on July 31? Answer: yes

Decision: **S4-230972** is agreed

9. ISAR

**S4-230842**

**Presenter:** S. Döhla

Discussion:

* Presented scenarios and architectures are revised from previous contributions by Xiaomi and FhG.

Decision: **S4-230842** is noted

**S4-230944-->S4-230954**

**Presenter:** S. Bruhn

Discussion:

* Scenarios are partly overlapping with previous proposal.
* Interfaces are suggested for more work.

Decision: **S4-230954** is noted

**S4-230947**

**Presenter:** A. Schevciw

Discussion:

* Scenarios largely overlap with the other contributions, although 954 contains still more.

Decision: **S4-230947** is noted

**Conclusion**: we include all inputs on scenarios and architectures into the draft TR in square brackets, with the aim to clean up overlaps.

**S4-231066**

**Presenter:** S. Bruhn, A. Schevciw

Discussion:

* Update of the draft TR was prepared based on contributions.
* On-line editing of the draft produced the agreed next working draft.

Decision: **S4-231066** is agreed (as the next TR working draft v.0.2.0)

10. New Work / New Work Items and Study Items

None.

11. Any Other Business

**Scheduling interim Audio SWG calls**

Audio SWG calls were scheduled to progress the work, as follows:

* Telco on IVAS: 12 June 2023, 14:00 – 17:00 CEST, submission deadline: 9 June 2023, 14:00 CEST, host: Dolby
* Telco on IVAS: 21 June 2023, 14:00 – 17:00 CEST, submission deadline: 20 June 2023, 14:00 CEST, host: Dolby. Special power from SA4 is requested to approve potential updates of IVAS Pdocs IVAS-7a (processing plan) and IVAS-8a (test plan).
* Telco on FS\_DaCED: 31 July 2023, 16:00 – 18:00 CEST, submission deadline: 27 July 2023, 16:00 CEST, host: Xiaomi
* Telco on IVAS: 8 August 2023, 14:00 – 17:00 CEST, submission deadline: 7 August 2023, 14:00 CEST, host: Dolby

**Rapporteurs for IVAS specifications**

* The group agreed to distribute the workload of editing among several contributing companies. Currently the offers shown in the table below were received.

|  |  |  |
| --- | --- | --- |
| **IVAS Specification Number** | **IVAS Specification Title** | **Editor/Rapporteur** |
| TS 26.250 | Codec for Immersive Voice and Audio Services - General Overview | Stefan Bruhn (Dolby) |
| TS 26.251 | Codec for Immersive Voice and Audio Services - ANSI C code (fixed-point) | Markus Multrus (FhG IIS) |
| TS 26.252 | Codec for Immersive Voice and Audio Services - Test Sequences |  |
| TS 26.253 | Codec for Immersive Voice and Audio Services - Detailed Algorithmic Description incl. RTP payload format and SDP parameter definitions |  |
| TS 26.254 | Codec for Immersive Voice and Audio Services - Rendering |  |
| TS 26.255 | Codec for Immersive Voice and Audio Services - Error Concealment of Lost Packets |  |
| TS 26.256 | Codec for Immersive Voice and Audio Services - Jitter Buffer Management |  |
| TR 26.997 | IVAS Codec Performance Characterization |  |
| TS 26.258 | Codec for Immersive Voice and Audio Services - ANSI C code (floating-point) | Markus Multrus (FhG IIS) |

11. Close of the Sessions

The Audio SWG Co-chairs thanked the participants for their contributions.

The meeting was closed on 25 May 2023, at 13:00.

**Annex A (Agenda, same as S4-230772 R2)**

**Source: Audio SWG Co-Chairs[[2]](#footnote-2)**

**Title: Draft Audio SWG Agenda**

**Agenda Item: 7**

**1. Introduction**

This document provides the agenda items and allocation of documents for the Audio SWG sessions.

**2. Agenda Items and Allocation of Documents**

|  |  |  |  |
| --- | --- | --- | --- |
| **7** | **Audio SWG** |  | **Slots when Tdocs in this block will be handled** |
| 7.1 | Opening of the session |  |  |
| 7.2 | Registration of documents |  |  |
| 7.3 | CRs to Features in Release 17 and earlier |  |  |
| 7.4 | Liaisons with other groups/meetings |  |  |
| 7.5 | IVAS\_Codec (EVS Codec Extension for Immersive Voice and Audio Services) | **761a (IVAS-8a)**  **862a (HEAD Ac, GAL)**  **883n (Nokia, SRIR)**  **899n (Nokia, immersive recordings)**  **900a (Nokia, IVAS-8a inputs)**  **902n (QC, D, instruction set)**  **901n (Nokia, schedule)**  **931r🡪1046n (FhG, material collection)**  **945w (FhG, JBM)**  **946n (Dolby, P.SUPPL800)**  **924r🡪1050a (IVAS-8a v.0.9.0) A.I. 14.2**  **763a (IVAS-7a)**  **919a (Nokia, IVAS-7a inputs)**  **936r🡪1058a (FhG, Ericsson, IVAS-7a v.0.10.0) A.I. 14.2**  **764a (IVAS-4)**  **962a (VA, IVAS-4)**  **875n (Huawei, interop)**  **876n (Huawei, complexity)**  **1031a (IVAS-4 v.1.2.0) A.I. 14.2**  **937n (Ericsson, NDA)**  **940a (Orange, IVAS-3 input)**  **1049a (IVAS-3 v.1.1.0) A.I. 14.2**  **991a (IVAS-5 v.0.2.0) A.I. 14.2**  **1057a (IVAS-6 v.0.5.0) A.I. 14.2**  **992a (IVAS-2 v.0.7.0) A.I. 14.2**  **1032a (IVAS-1 v.0.5.0) A.I. 14.2** | **Monday 14-**  **Tuesday**  **Wednesday**  **FX: Wednesday at 9**  **Thursday** |
| 7.6 | ATIAS (Terminal Audio quality performance and Test methods for Immersive Audio Services) | **882n (Xiaomi, spatial perception test)**  **910n (Nokia, direction of arrival)**  **911a (Nokia, lowest freq)**  **917n (Dolby & al, comments to ATIAS-1)**  **1065 ATIAS-1 v0.4.0 A.I. 14.1** | **Monday 16-** |
| 7.7 | eUET (Enhancements to UE Testing) | **898n (HEAD Ac, SWB results)**  **941n (Orange, JBM)** | **Monday 16-** |
| 7.8 | FS\_DaCED (Feasibility Study on Diverse audio Capturing system for End-user Devices) | **881n (Xiaomi, binaural capture)**  **971a TR 26.933 v0.1.0 A.I. 15.7**  **972a time plan A.I. 15.7** | **Monday 16-** |
| 7.9 | ISAR (Immersive Audio for Split Rendering Scenarios) | **842n (FhG, Xiaomi, architectures)**  **944r🡪954n (Dolby, scenarios)**  **947n (QC, scenarios)**  **1066a (ISAR TR v.0.2.0) A.I. 14.12** | **Wednesday after FX** |
| 7.10 | New Work / New Work Items and Study Items |  |  |
| 7.11 | Any Other Business |  |  |
| 7.12 | Close of the session |  |  |

n – noted

a – agreed

p – parked

pp – postponed

r – revised

rp – replied

m – missing

w – withdrawn

**Annex B**

Participants

|  |  |
| --- | --- |
| **Firstname Lastname** | **Represented Company** |
| Stéphane Ragot | Orange |
| Imre Varga | Qualcomm |
| Jan Holub | Mesaqin |
| Tore Stegenborg-Andersen | FORCE Technology |
| Takehiro Moriya | NTT |
| Marek Szczerba | Philips International B.V. |
| Lasse Laaksonen | Nokia Corporation |
| Tomas Toftgård | Ericsson France S.A.S |
| Markus Multrus | Fraunhofer IIS |
| Eleni Fotopoulou | Fraunhofer IIS |
| Fabrice Plante (Remote) | Apple |
| Stefan Döhla | Fraunhofer IIS |
| Jan Reimes | HEAD acoustics GmbH |
| Stefan Bruhn | Dolby Sweden AB |
| Hiroyuki Ehara | Panasonic Holdings Corporation |
| Noboru Harada | NTT |
| Milan Jelinek | VoiceAge |
| Wang Bin | Xiaomi |
| Ninghang Wu | Xiaomi |
| Arvi Lintervo | Nokia |
| Anssi Rämö | Nokia |
| Andre Schevciw | Qualcomm |
| Brian Lee | Dolby |
| Huan-yu Su | Huawei |
| Erik Norvell | Ericsson |
| Srikanth Nagisetty (Remote) | Panasonic Holdings Corporation |
| Vladimir Malenovky (Remote) | VoiceAge |
| Arto Lehtiniemi | Nokia |
| Dong Wang (Remote) | OPPO |
| Andrijana Brekalo | ETSI MCC |

**Annex C**

Document status

**C.1 Agreed documents (to be presented to SA4 plenary)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| S4-230991 | IVAS Permanent Document IVAS-5: Selection Rules, v.0.2.0 | Qualcomm France | 7.5 | Agreed |
| S4-230992 | IVAS Permanent document IVAS-2: IVAS Project Plan, v.0.7.0 | Qualcomm France | 7.5 | Agreed |
| S4-231031 | IVAS Design Constraints (IVAS-4) v.1.2.0 | Editor (Huawei) | 14.2 | Agreed |
| S4-231032 | IVAS codec development overview (IVAS-1) | Huawei Technologies France | 14.2 | Agreed |
| S4-231049 | IVAS Performance Requirements (IVAS-3) v.1.1.0 | IVAS-3 editor (Dolby Laboratories Inc.) | 14.2 | Agreed |
| S4-231050 | IVAS Permanent Document IVAS-8a: Test Plan for Selection Phase, v.0.9.0 | VoiceAge Corporation | 14.2 | Agreed |
| S4-231057 | IVAS-6: Selection Deliverables 0.5.0 | Dolby Sweden AB | 14.2 | Agreed |
| S4-231058 | IVAS-7a: Processing plan for selection phase, v.0.10.0 | IVAS-7a editor (Ericsson LM) | 14.2 | Agreed |
| S4-231066 | Draft TR 26.865 Immersive Audio for Split Rendering Scenarios; Requirements v0.2.0 | Rapporteur, Audio SWG | 14.12 | Agreed |

**C.2 Agreed documents (not to be presented to SA4 plenary)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| [**S4-230761**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230761.zip) | IVAS Permanent Document IVAS-8a: Test Plan for Selection Phase, v.0.8.4 | VoiceAge Corporation | 7.5 | Agreed |
| [**S4-230763**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230763.zip) | IVAS-7a: Processing plan for selection phase, v.0.9.2 | IVAS-7a editor (Ericsson LM) | 7.5 | Agreed |
| [**S4-230764**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230764.zip) | IVAS Design Constraints (IVAS-4) v.1.1.1 | Editor (Huawei) | 7.5 | Agreed |
| [**S4-230772**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230772.zip) | Draft Audio SWG Agenda | Qualcomm Austria RFFE GmbH | 7 | Approved |
| [**S4-230862**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230862.zip) | Global Analysis Lab for IVAS selection phase | HEAD acoustics GmbH | 7.5 | Agreed |
| [**S4-230900**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230900.zip) | Proposed updates to Test plan | Nokia Corporation | 7.5 | Agreed |
| [**S4-230911**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230911.zip) | On the lowest frequency of test signal for multisource test methods | Nokia Corporation | 7.6 | Agreed |
| [**S4-230919**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230919.zip) | Proposed updates to Processing plan | Nokia Corporation | 7.5 | Agreed |
| [**S4-230940**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230940.zip) | Proposed update to IVAS-3 | Orange | 7.5 | Agreed |
| S4-230962 | Proposal to IVAS-4 | VoiceAge Corporation | 7.5 | Agreed |
| S4-230971 | [FS\_DaCED] TR 26.933 skeleton\_V0.1.0 | Xiaomi Technology | 7.8 | Agreed |
| S4-230972 | Work Plan for the study on DaCED-v0.2 | Xiaomi Technology | 7.9 | Agreed |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| [**S4-230842**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230842.zip) | ISAR - Scenarios and Architectures | Fraunhofer IIS, Xiaomi Technology | 7.9 | Noted |
| [**S4-230875**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230875.zip) | On IVAS Interoperability | HuaWei Technologies Co., Ltd | 7.5 | Noted |
| [**S4-230876**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230876.zip) | On IVAS Complexity Limits | HuaWei Technologies Co., Ltd | 7.5 | Noted |
| [**S4-230881**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230881.zip) | Binaural capture on UE | Beijing Xiaomi Mobile Software | 7.8 | Noted |
| [**S4-230882**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230882.zip) | Spatial perception test for stereo UE harmonization | Beijing Xiaomi Mobile Software | 7.6 | Noted |
| [**S4-230883**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230883.zip) | SRIR recording and analysis | Nokia Corporation | 7.5 | Noted |
| [**S4-230898**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230898.zip) | Updated SWB Measurement results for eUET | HEAD acoustics GmbH | 7.7 | Noted |
| [**S4-230899**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230899.zip) | On immersive recordings for IVAS Selection tests | Nokia Corporation | 7.5 | Noted |
| [**S4-230901**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230901.zip) | Confirming the schedule towards IVAS selection | Nokia Corporation | 7.5 | Noted |
| [**S4-230902**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230902.zip) | Instruction Set for P.SUPPL800 Tests | Qualcomm Incorporated, Dolby Laboratories, Inc. | 7.5 | Noted |
| [**S4-230910**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230910.zip) | On direction of arrival test method evaluation | Nokia Corporation | 7.6 | Noted |
| [**S4-230917**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230917.zip) | Comments to ATIAS-1: Permanent Document on ATIAS (v0.3.0) in S4-230645 | Dolby Laboratories, Inc., HEAD acoustics, Nokia Corporation, Qualcomm Incorporated | 7.6 | Noted |
| [**S4-230924**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230924.zip) | IVAS Permanent Document IVAS-8a: Test Plan for Selection Phase – Input to editing session based on v.0.8.4 | VoiceAge Corporation | 7.5 | Revised |
| [**S4-230931**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230931.zip) | On material collection for selection testing | Fraunhofer IIS | 7.5 | Revised |
| [**S4-230936**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230936.zip) | Proposed updates to IVAS-7a | Ericsson LM, Fraunhofer IIS, Dolby Laboratories, Inc. | 7.5 | Revised |
| [**S4-230937**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230937.zip) | Confidentiality Agreement for the IVAS Codec Selection | Ericsson LM | 7.5 | Noted |
| [**S4-230941**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230941.zip) | Proposed changes for JBM performance testing | Orange | 7.7 | Noted |
| [**S4-230944**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230944.zip) | Split renderer scenarios and interfaces | Dolby Laboratories, Inc. | 7.9 | Revised |
| S4-230945 | Delay and Error Profile | Fraunhofer IIS | 7.5 | Withdrawn |
| [**S4-230946**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230946.zip) | Presentation order randomization for IVAS P.SUPPL800 tests | Dolby Laboratories, Inc. | 7.5 | Noted |
| [**S4-230947**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230947.zip) | Connectivity scenarios for ISAR | Qualcomm Technologies Int | 7.9 | Noted |
| [**S4-230954**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_124_Berlin/Docs/S4-230954.zip) | Split renderer scenarios and interfaces | Dolby Laboratories, Inc. | 7.9 | Noted |
| S4-231046 | On material collection for selection testing | Fraunhofer IIS | 7.5 | Noted |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc | Title | Source(s) | Agenda Item(s) | Status |
| S4-231065 | Pdoc ATIAS-1 v0.4.0 | Editor | 14.1 | Not seen in SWG |
|  |  |  |  |  |

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