

**Source:** NEC  
**Title:** On the issue of specification format in the Rel-6 PSS Audio codec selection  
**Document For:** Discussion

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## 1 Introduction

The 3GPP TSG SA WG4 is currently conducting an audio codec selection. The selection rules permanent document used to select the winning candidate needs to be approved before the evaluation can proceed. Because of lack of consensus in the SA4 group regarding the format of the specification which is included in the selection rule document, the SA4 chairman seeks advice from SA on how to handle the issue. This contribution intends to provide some background information on the selection process for audio codecs and hopefully help SA formulate an advice.

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## 2 Background

### 2.1 Families of codecs

Codecs selected by SA4 apply onto various media: speech, audio, video, image etc. The speech, audio and video codec have different technologies:

- Speech codecs: optimized for human voice
- Audio codecs: consider the all spectrum of audio signals and can handle speech and music
- Video: optimized for moving pictures

They also have different mobile systems implementations:

- Speech codecs: for telephony they require both encoder and decoder to be implemented in the handsets
- Audio codecs: for streaming and MMS, only the decoder is necessary for the handset. The MMS encoder may be in the handset.
- Video codecs: for streaming and MMS, only the decoder is necessary for the handset. The MMS encoder may be in the handset. for video telephony, both encoder and decoder are implemented in the handset.

They also have different level of relation with the radio interface:

- Speech codecs: for telephony, radio is optimized for speech.
- Audio and Video codecs: are rather independent from the radio interface.

Strength of the technology is also different

- Speech codec: Mobile industry has been the technology leader
- Audio/Video codec: Mobile industry is NOT the technology leader

Because of the above differences, ad hoc selection methods may be better suited for the purpose of selecting a codec.

### 2.2 Codec selection

3GPP have a good experience in speech codec selection. But 3GPP do not have experience of audio and video codec selection. We believe 3GPP should learn from procedures used in other standards body rather than applying the speech codec selection process as is.

For example, let's look at the selection process within MPEG of the MPEG4 video codec and MPEG4 AAC audio codec that 3GPP references. These procedure are the same for both. The format of the specification for MPEG4 video is as follow:

- An MPEG4 video detailed decoder specification (detailed enough to be implemented)

- A reference source code (non quality nor complexity optimized) for encoder (that generates conformance bit-streams ) and decoder.
- Test vectors for conformance testing.

The MPEG4 video codec was developed under MPEG. Companies proposed solutions and MPEG chose the best basic technology using in-house tests. Then optimizations were made by companies providing additional codec tools. So called core experiments were run to prove each technology. Companies were required to prove the quality of the tools with their optimized implementations (including cross checking). Then, if selected, the providing companies would deliver the reference code for the specification. The reference code was required to be functional but not necessarily quality nor complexity optimized.

ITU-T follows the same procedure as 3GPP for speech codec selection (normative encoder and decoder C code) but ITU-T follows the same procedure as MPEG for video codec selection

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### **3 Audio codec selection objective and proposal**

Our objective is to select the best codec from quality and complexity point of view. We should try to compare the candidate as much as possible, and not to limit the candidate before evaluation, so far as they follow the 3GPP rules.

As a requirement for 3GPP audio codec specification, we propose the following:

- A detailed encoder and decoder specification (enough to implement a functional codec),
- The decoder C source code that was used during the evaluation
- A reference encoder C source code (not necessarily quality nor complexity optimized)

Which basically follow the MPEG procedure.

(Note that this does not impact the required C source code necessary for verification of the winning candidate).

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### **4 Conclusion**

Since the audio codec selection is a new selection, we would like to ask opinion from delegates from the viewpoint of

3GPP speech codec based procedure or Audio/Video codec selection procedure used in other standardization group